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GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE
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MASTER THESIS

DEVELOPMENT OF E-GOVERNMENT APPLICATION IN IRAQ:
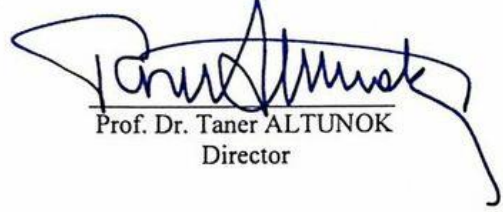A CASE STUDY OF IRAQ MINISTRY OF EDUCATION
EMPLOYMENT AGENCY

HASSAN SAEED

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Title of the Thesis: **Development of E-Government Application for Employment Agency**

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This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science in Computer Engineering.

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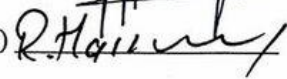**Examination Date:** 06.06.2011

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ABSTRACT

DEVELOPMENT OF E-GOVERNMENT APPLICATION IN IRAQ:
A CASE STUDY OF IRAQ MINISTRY OF EDUCATION EMPLOYMENT
AGENCY

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In present day, we can describe the e-government as the latest government systems in the provision of services, for both private and public sectors, recently adopted by governments to benefit from the advantages of information and communication technologies (Internet networks), to connect the governmental institutions with each other. In addition, collection and delivery of various governmental services and share them with public and private institutions, by putting information accessible to individuals, it creates a transparent relationship characterized by speed and accuracy and it improve and add services as well as increased of performance.

In this study, an integrated system is developed as one of the e-government services (Employment Agency) for receipt and processing of citizens' requests in the area of the (job appointment requests), as case of study we choose the Ministry of Education being one of the largest civil ministries that receives job appointment requests. A survey is conducted to a statement the readiness of the citizens in the adoption of e-government services, being an important aspect of the success of e-government initiatives in developing countries. The results were satisfactory. There is a good percentage 69% of the citizens they are ready to deal with e-government services.

Key Words: E-government, Iraqi E-government, Employment Agency.

ÖZ

IRAK'TA E-DEVLET UYGULAMASI GELİŞTİRİLMESİ: EĞİTİM BAKANLIĞI İSTİHDAM AJANSI İÇİN BİR ÖRNEK DURUM ÇALIŞMASI

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Günümüzde, devletler hem özel ve hem de kamu sektörü için hizmet sunumunda bilgi ve iletişim teknolojileri (İnternet ağları) avantajlarından yararlanmak için birçok çalışma yapmaktadır. Bu çalışmalar e-devlet olarak nitelendirilmektedir. Çeşitli kamu hizmetlerinin sunumu ve bireyler için erişilebilir bilgilerin toplandığı e-devlet uygulamaları, kamu ve özel kurumlar ile vatandaşlar arasında şeffaf bir ilişki oluşturur ve aynı zamanda hız ve doğruluk artmasıyla kamu hizmetlerinin gerçekleştirilmesinde iyileşme sağlanmış olur.

Bu çalışmada, Irak Eğitim Bakanlığı istihdam ajansı için bir örnek durum çalışması gerçekleştirilmiştir. E-devlet hizmetleri kapsamında iş başvurusu alanında vatandaşların taleplerinin alınması ve işlenmesi için bütünleşik bir sistem geliştirilip test edilmiştir. Özellikle gelişmekte olan ülkelerde e-devlet girişimlerinin başarısı için önemli bir unsur olan vatandaşların e-devlet hakkındaki hazır bulunurluklarını ölçmek amacıyla bir anket uygulanmıştır. Anket sonuçları Irak'ta önerilen e-devlet uygulamasının gerçekleştirilmesi için uygun bir hazır bulunurluğun mevcut olduğunu göstermektedir. Ankete katılanların %69'u e-devlet hizmetlerini kullanmak için hazır olduklarını bildirmiştir.

Anahtar Kelimeler: E-devlet, Irak E-devlet, İş Kurumu.

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LIST OF ABBREVIATIONS

e-government:	Electronic Government
e-form:	Electronic Form
ICT:	Information and Communication Technology
IT:	Information Technology
SMS:	Short Message Service
G2C:	Government to Citizen
G2B:	Government to Business
G2G:	Government to Government
G2E:	Government to Employee
G2N:	Government to Non-profit
SOA:	Service Oriented Architecture
EAI:	Enterprise Application Integration
HTTP:	Hypertext Transfer Protocol
XML:	Extensible Markup Language
IDE:	Integrated Development Environment
VS2010:	Visual Studio 2010
ASP:	Active Server Pages
C#:	C Sharp pronounced as (See Sharp)
IIS:	Internet Information Service
CGI:	Common Gateway Interface
JSP:	Java Server Pages
DBMS:	Database Management Systems
UI:	User Interface
URL:	Uniform Resource Locator
IP:	Internet Protocol

ODBC: Open Database Connectivity

SQL: Structured Query Language

TCP/IP: Transmission Control Protocol/Internet Protocol

PDF: Portable Document File

QR: Quick Response

CPU: Central Processing Unit

Mbps: Mega Bit Per Second

ISP: Internet Service Providers

ISM: Industrial, Scientific And Medical

AJAX: Asynchronous JavaScript and XML

INTRODUCTION

At the end of the war in the 9th of April 2003 and the end of the economic embargo on Iraq, one of the reconstructions of Iraq is to build new schools because of the severe shortage in the number of schools besides the continuous increasing of population. The Ministry of Education is responsible to support these schools with teaching and administrative staff. This operation is usually done by announcement for unfilled jobs then citizens apply for these jobs to the offices and general directorates distributed in the provinces of Iraq. When applying for jobs citizens bring with them their official documents and stand in very long queues. After the end of the period set for application, the Ministry of Education recruits a large number of employees to enter all the information papers to the computers and then extract reports about the applicants by scheduling information by (competence, gender, residence site, etc.). Usually these operations take months (from three to six months) and both government and citizen suffer from this old routine.

In this research, we will use the benefits of information and communication technology to develop an electronic interactive employment agency as one of the electronic government application to make the employment process much easier. As a case of study, this will be applied in the Ministry of Education in Iraq because of the expansion of the Ministry as mentioned above.

The electronic government has a number of terms (e-government, e-Gov., digital government and electronic government), which appeared in early 1992. It appears to share experiences, data and services of governments.

In previous years, e-government started to emerge within the government services to citizens, businesses and also to other governments. The history of e-government is accompanied with the development of computer science and engineering, especially information and communications technologies, since it's entered government institutions and merged with its services. E-government presents an active role in all aspects of government that is based on the government structure of traditional laws and services [51, 60].

The main role of e-government is to meet the needs of the audience for access to public services of high quality; there is also a need to develop e-government in order to increase transparency and efficiency in the management of the state. Hence, it is to provide services in such a way in the places and times that are most convenient for citizens and business owners through integrated electronic services continuously. Apart from the traditional channels of communication, new types of communication devices will be used in the future; services will be provided on the basis of (a single portal). Accordingly, the adoption of e-governance in Iraq is a process of change that will help to expand the areas of citizens and businessmen to participate in the new economy based on knowledge. In order to get the full potential of e-governance, there must be a reform of the structure of management, operations management, information. Also it is necessary to change the mentality and action plans in the public administrations, as well as, their way of communicating with citizens and business owners, so as to know the citizens readiness for the adoption of e-government services. In this regard, a questionnaire (survey) has to be conducted to know how many Iraqi citizens ready to adopt such type of electronic services submitted by e-government applications.

One of the e-government services that will be an improvement to the governmental services in Iraq is the employment agency developed in this work, which is divided into two parts. The first part (user part) represents web application in which citizens can submit their requests to the ministry of education for a certain job. The second part (administration part) consists of windows application for administrative issues such as reports supporting the administration with the total number of applicants, ages, genders, competence of applicants, and location of residence and so on.

The windows application supports also the administrative accounts management. The optional facilities supported with windows application are the users' data (information) that has to be checked to avoid any attempt of frauds.

The main reason that has motivated us to choose the topic of employment agency is the suffering of both the citizens and the government shown in any appointments operation for jobs in Iraq. Citizens usually suffer from:

- Congestion on the windows stemming from the act of submitting applications within a limited time.
- Costs a long time.
- Cost of money.
- Psychological damage caused by chaos.
- Brokerage illegal acts for application.

While the government (ministry) suffering from several factors in each employment operation: (money, time, human resources, use of unstable technologies for gathering data, and the possibility of falsification and fraud).

In this study, we amid to develop an integrated e-government application to serve citizens in particular, and facilitate the work of administrators in the governmental sector, to fulfill the requests of citizens in recruitment staffs of governmental organizations, in modern and stylish character by using fast and sophisticated techniques, to benefit from modern information and communication techniques for dispensing the traditional methods in provision of services, which costs the government and the citizen large amounts of money in addition to an unprecedented delay in the respond to citizen's requests because of the large number of such requests and delayed processed. So we have implemented an integrated system to receive citizens' requests and deliver them to the governmental administrators properly and accurately. What the user need is a computer connected to the Internet to interact with the system.

CHAPTER I

LITERATURE REVIEW

The revolution of the information and communication technology (ICT) has been started in the 21th century and makes the (information community). We are living in a digital space; the fast changes in technologies that have turned the community to an economical community nowadays and converted the government as well as [48].

The information technologies have entered to all aspects of any government. Now, government services can be delivered to citizens by using information technology resources like the Internet. This is the principle of the electronic government referred to as "E-Government".

In this chapter various perspectives of e-government have been reviewed and followed by the types of e-government. In this chapter we will also review the stages of e-government and some perspectives of e-government and some important architectures of e-government. Finally, the benefits and challenges of the e-government are also mentioned in this chapter.

1.1 THE PERSPECTIVES OF E-GOVERNMENT DEFINITIONS

There are a lot of perspectives (definitions) reviewed in this chapter expressing the diverse perspectives of scholars reflected in their attempt to define the e-government. From technical perspective, Schware, Deane and Al-Mashari define e-government as the ability of using information technologies in government institutions and its processes in converting the government to IT-based service with dependency on the capacity of using information and technologies [45, 6].

Moreover, Burn with Robins and Banerjee with Chau (2004), define e-government with regard to the citizens point of view as the method to ameliorate the contact citizens with government services by making the government services "electronic" such as e-form [10, 8].

Another type of definition combining these two definitions above is mentioned by Fang [17], Wang and Liao [56], stating that e-government is to exploit the transformational power of information and communication technologies to consolidate the quality of the government services in all aspects, and hence, to suite all parties (within government, businesses and citizens).

For business perspective, Lieber defines the e-government as a better description of the non-expensive model and effective way to conduct commerce facilities of buying, selling or any business deal for stakeholders. Furthermore, the administrative perspective is described by Wimmer who says that e-government is the framework that forms the boundaries of general administration into "Information Community" [59].

The U.S government also defines the e-government as the capacity of using the Internet, web applications, and information and communications technologies in government organizations alongside with operations that use these technologies to provide one of the followings

- Increase access to the services, also increase the performance of the government services and availability of information to the government agencies as well as other governments or
- Make improvement in government services and operations that can contain competency, effectiveness and quality of services or conversation [51].

In addition, there are a huge number of definitions in the resource around the world and from the definitions previewed above we can't describe e-government exactly duo to the fact that people working in the field define e-government according to their own perspectives.

We can define e-government as the virtual version of real classic government with difference that the first one lives in networks and information systems, and simulates the functions of the second that reside in the state apparatus… "and uses the information and communication technologies like local area network, servers, e-mails and Internet to deliver government services and information to serve citizen, businesses and even other governments constantly 24/7 (twenty four hours a day per seven days a week)". Our definition of e-government is based on the nature and characteristics of information and communication technologies that effect on e-government, which is one way or another touches the people's needs, just as classic governments do. In our view classic government cannot be an alternative for the e-government, but they form the other side of it with a different form.

1.2 TYPES OF E-GOVERNMENT

The current state of art of the e-government known as services can get access to the services at any date and venue through a variety of devices (mobile and fixed) with property of accessing the Internet. Some of these services are available on the Internet as web application or on the mobile devices as Short Message Service (SMS) applications. In fact, the concept of e-government appeared during the creation of the "new economy" with the support of the technical revolution that led to the development of what was called "new media" [22].

Regarding, the classifications of e-government services based on the types of beneficiaries of the services, there are many recipients of electronic government services. The most famous beneficiaries are: citizens as beneficiaries of e-government services (G2C), business as beneficiaries of e-government services (G2B), government as beneficiaries of e-government services (G2G), employees as beneficiaries of e-government services (G2E) and non-profits as beneficiaries of e-government services (G2N) [22].

- Government to citizens (G2C) services: e-government focuses on making information and government services available to citizens online; this is referred to as citizen-centric of e-government. When the government steps wider to provide electronic services based on their needs (requesting or renewing a driver's license, a request for employment, a request for issuing and renewing passports, voter registration, voting on the Internet, requesting birth, death or marriage certifications, filling state taxes forms, and getting access to medical information from the national institute of health) through the systematic organized form of the webpages and hyperlinks that represent the structure of a live government having bureaucracy procedure in the field of citizens' needs [22, 44].

- Government to business (G2B) services: e-government strategies use information and communication technologies to facilitate interactions and activities of the government with the private sector to purchase goods and services and do all trade exchanges and coordination's of transactions with private companies. This process called e-business which can be defined as one of the applications of information technology and communications that support all trade activities between the groups, companies and individuals observed in any business nowadays because of the large number of procurement of the government with reference to the private sector, there is a need to develop procedures in terms of speed and more cost-effective procedures to handle typical purchases [27].

- Governments to government (G2G) services of e-government use (ICT) resources in data sharing among government institutions, departments, ministries and organizations and also facilitate the interaction of other government organizations and institutions [37].

- Government to employees (G2E) services: they embark on initiatives that would serve and facilitate the administration of the civil services. They also make easier interior communications with governmental employees so as to convert the applications to the electronic format and go even far by processing these requests electronically. This is expression described by the electronic office (electronic employee) [17].

- Government to non-profit (G2N) services: e-government provides information and communication for non-profit organizations, political parties, social organizations, legislative organizations, and etc. [17].

1.3 STAGES OF E-GOVERNMENT

Electronic government is a new government appearance and it is the result of change in the government departments due to the affirmative intervention of communication and information technologies. It should be noted that e-government is much larger than the information available on the Internet. Therefore, it is necessary for such information to include architecture and continuous development to prevent unnecessary duplications of some infrastructure and key elements in the individual government. Also the information needs a sort of integration of different procedures, services and activities that it is may fall outside scope. E-government is not simply turning the laws and information of the traditional government to digital information and making it available to all that can be reached through the Internet and converting the functions and services of the current government into an electronic platform. However, the e-government is a tool that makes a big consideration in the implementation of the governmental functions nowadays in order to strengthen and integrate these operations [7].

The government has several strategies to implement e-government. E-government can be implemented through several stages (phases) depending on the designer of the e-government; a case varies from one to another. These stages are not correlated with each other, i.e. they do not necessarily end a certain phase in order begin the next phase, since the main objective is to implement the e-government and reach its goals in a best and short way. In the following literature review, we will review different studies, reports and researches carried out by a group of scientists and researchers or organizations such as Gartner Group (2000), Deloitte and Touche (2000), United Nations Division for Public Economics and Public Administration (2001), Layne and Lee (2001), and World Bank (2002).

According to Gartner's research, e-government is divided into four stages developing an integrated plan, from the beginning and till the completion of the construction of e-government, in order to reach the desiring goals of e-government. The stages of Gartner Group are [9]:

- Presence: this stage is the first one of the establishment of e-government services. It often starts with a website on the Internet describing the services of e-government. Sometimes it is called (electronic government booklet).

- Interaction: this phase offers a basic communication between government and citizens, business sectors or other governmental organizations. The interaction operations and communications can be implemented by several ways in the light of the development of technologies of communication and availability of information such as website on the Internet that allow interaction via e-mail or the electronic forms.

- Transaction: this phase is founded to enable the user of e-government services to pay for government entitlements for the services of a real government but via the Internet, such as, paying the entitlements of issuing a new passport or issuing, renewing driving license.

- Transformation: it is the last phase of the design of e-government. This phase describes the e-government as being similar to the classic government but in electronic nature; this is normal because of the fact that electronic government results from interference of modern technologies in the government services.

Another important study conducted by the United Nations Division for Public Economics and Public Administration [54]. This study classifies the five phases for developing the e-government services. It describes the phases as representatives of the government offices and services with electronic form. It depends mainly on the services provided to each phase (government representatives) through governmental website on the Internet. These stages are:

- Emerging: this stage describes the e-government only as multiple official websites that contain limited, static, simple and basic information.

- Enhanced: In this stage official website becomes more numerous; information offered through e-government web site shows high vitality and variability. Information and contents of the websites are modernized with much harmony.

- Interactive: this stage enables users react through website to submit forms about a certain request, make appointments, conduct with official e-mails and download forms.

- Transactional: this stage enables transactional operations in which beneficiaries of the services can pay to get real services of e-government or do some electronic financial transactions.

- Seamless: full representation of government services in electronic forms within the scope of the rules and the laws of the government administration. Total consolidation of electronic functionality and services within the limits of the governmental administration.

In another e-government pattern, Layne and Lee organize a four phase pattern for e-government and propose development of (phases of development) a fully functionality pattern [31].

- Cataloguing: in the first phase in this model the state government focuses on starts with electronic subsistence for the government offices.

- Transaction: this phase is extending of the previous (cataloguing) phase, e-government enabling users to carry out some simple procedures such as, filling governmental organization forms.

- Vertical integration: this phase begins converting from governmental offices and utilities, instead of automates existing operation. It focuses on connecting different functions or services at various grades, such as local community's governments and the central government of the country.

- Horizontal integration: in this phase, e-government focuses on the integration of different tasks and services from a number of regimes in order to provide a seamless and robust utility.

The Center for Democracy and Technology (2002) offers a model for operation of developing e-government. These phases are not interdependent, but they offer three methods to access the objectives of e-government [49]. These phases are:

- Publish: publishing e-government applications vastly differ with regards to designs and contents, but overall, they can help any government to start to introduce the actions and features of e-government by promulgating governmental acquaintance on the Internet through websites, starting the bases and rules.
- Interaction: e-government has the capacity to engage citizens in the administration operations by making the user to interact with government decisions through briefing them on the work of the representative of governmental decisions in all policy and at all layers of government. The principle of promoting civic participation helps to build trust government.
- Transact: in this stage, government expands its online services, by making more websites to let users to make further transactions via the Internet. Transact sites provide services for both public and privet sectors and making the process that requires governmental assistance or approval faster, easier and with low cost.

There is another model that has been proposed by Deloitte with six stages to reach the goals of e-government. According to Deloitte [14], these stages are:

- Information publishing / dissemination: in this stage government prepares an electronic catalogue (encyclopedia) that contains all governmental information to reduce the number of contacts of customers with government, so they can reach the right employee who can fulfill their requests.

- Official two-way transaction: the agencies will use secure websites to provide a secure interface between government website and interactions of citizens using the modern methods of security that offer information and communications technologies such as secure communication channels and passwords, so that the clients are capable to use their private profile information and they must trust the capacity of the administration behind e-government services, where in the information remains private and away from the public and the publishing.

- Multi-purpose portal: These stage users can reach a variety of services from single website. E-government described as a unified portal includes all government services across multiple departments.

- Portal personalization: government puts into beneficiaries' hands more power by allocating portals which are classified according to their own desirable services and classes of government services.

- Clustering of common services: government enhances cooperation and reduces the brokers for the provision standardized and a smooth service through e-government.

- Full integration and foundation transformation: what started as general encyclopedia, it is now a complete center of services. At this stage, government provides best advance and characterized services to all citizens and customers and in accordance with their own needs and performances.

1.4 E-GOVERNMENT ARCHITECTURES

E-government architecture has started as management tools focusing on the information and communication technology aspect of government. After that, it has been developed to the tool shaping the business aspect of government. There is a large unanimity to build "e-government" on solid architecture. The term architecture is interoperability framework. The framework is more than simply a set of Service Oriented Architecture (SOA) application and gadgets.

It offers an interoperability of e-government through the establishing of common set of tool. Architecture takes another step forward by organizing these applications, not just listing them. They allow various channels based on joint infrastructures to supplement each other. The architecture also permits providing services to be separated from the anterior end acknowledgment procedure [24]. In this section, we will review a various literature referring to e-government architectures.

1.4.1 Interoperability (Open Standards) Frameworks

Government services are varied and are offered by different offices to provide complete portal services. The government should enable a smooth flow of information in boundaries of the law through the offices of the individual departments. Interoperability frameworks are designed to meet this objective [24]. The European commission publications define the interoperability framework as follows: it should be applied with a group of criteria and principles that characterize the method which may be adopted by an organization, organization that interact with each other. The common framework is not a rigid document, which may have to adjust several times by vagaries of standards and techniques and changing in management criteria [16].

1.4.2 Enterprise Architecture

Enterprise architecture is a professional (complete and accurate) method to describe the structure of present and future operations of the organizations, sub-organizations, information systems and stuffs, in order to fit with the basic objectives of the organization and its strategic directions, although they are frequently related to the development of information technologies [24].

Gartner enterprise framework was described by Kreizman, Baum and Fraga [19]. They insist that the architecture of the e-government must be very organized and it needs to constantly develop and to be based on Enterprise Application Integration (EAI) framework. They emphasize the "transaction-oriented" architecture that is to deliver services consistently through a variety of channels.

Real-time and analytical processing style may be implied and appropriate to support e-government services delivery; however, these styles are not emphasized.

1.4.3 Web Services Architecture

Web services architecture is a structural organization of distributed computers serving combined users, and it is considered as one of the most important developments in the past 30 years. Besides, it is a new and effective method in communication applications with each other that share data regardless of the language the application uses, operation platform and the environment used.

Web services architecture has been overviewed by Gottschalk, Graham, Kreger and Snell as "The purpose of the standard that is to improve the operating environment for heterogeneous systems software with others, and at the same time it is a significant reduction from the current level of the high cost of integration. SOA based on its work on the Internet protocols and data models such as Hypertext Transfer Protocol (HTTP) and Extensible Markup Language (XML) and other supplement standards" [30].

1.5 E-GOVERNMENT ADVANTAGES

There are many advantages obtained from representing the live government with the e-government. In (G2G) sector, the government benefits from e-government services in many of its operation with government organizations. These governmental operations will be faster, easier, seamless, simultaneous and more suitable, according to Office of Management and Budget (2002) [41]. The government information exchanged via the Internet services is more accurate, faster, interactive and more advantageous over traditional services.

E-government enhances issues of providing services with high and more precise efficiency, and also, it reduces the costs and saves a lot of time used by the employee compared to the implementation of day-to-day working routine [46]. In addition, e-government enhances the efficiency and effectiveness of government performance [11].

In (G2B) sector, business has the opportunity also to benefit from electronic services of e-government. Recently, it has public and private companies to take advantages of online services such as improving labor market, improving management, facilitating transactions supplying and reducing the cost through provision of these services via Internet in an effective manner [50].

Also, as one of the electronic services that spread recently an electronic procurement provides cost-effectiveness, convenience and improves quality of services to the government and business sector, and also improves and facilitates the work of the procurement agencies [52].

In (G2C) sector, the e-government is expected to be a significant (tool) role in the digital life of the individual citizens, and it can enhance the interaction between citizens and government and make life easier. Citizens are free and able to track the information at their convenience in contrast to the traditional method [57].

The citizens' sector takes the largest apportion of the e-government benefits [26]. In the list given below, there are some of the benefits of e-government to government, business, citizens and others:

- Transparent government with the citizens [53].
- The confidence between governments and citizens can be built by the strong services of e-government [53].
- Providing electronic services for citizens, business, and even to other governments at anytime and anywhere, 24x7 (twenty four hours per day and seven days a week) [53].
- Decreasing errors related to humans such as, reducing the amount of information due to unnecessary duplication by integrate unified databases and networking websites [29].
- Cost saving and improving efficiency [29].
- Saving both time and information, also providing information with high utility and trusted credibility [58].

- Further satisfactions; improving general decision making and government with more responsive [5].
- Improving the standers of life, making citizen happy and making them informed citizenship [40].

Table (1.1) shows the benefits of e-government.

Table 1.1: Summaries of E-Government Advantages.

Government	Business	Citizen
• Time and cost saving • Improve employee productivity. • Reduce redundant tasks. • Eliminate corruption. • Speedup procurement services. • Improve efficiency and effectiveness of government performance.	• Remove routines with government. • Decrease cost and increase efficiency. • Make more business. • Interaction with government more easer. • Speedup procurement services.	• Reduce time and cost. • Provide easy method to access requited information. • Provide multiple options for service delivery, such as SMS, website and e-mails. • Always and anywhere service. • Improve the response to a certain request. • Enhance democratic process. • Minimize bureaucratic process.

1.6 CHALLENGES OF E-GOVERNMENT

Previously in this literature review the types of e-government and the groups that interact with the areas of applications are said have many promises. This interaction also makes e-government suffering from several obstacles.

The e-government obstacles have been mentioned in several studies working on this topic. The most important obstacles viewed from different perspectives are technical, political, cultural and legal aspects [21].

1.6.1 The Technical Impacts

Compatibility with existing applications and hardware platforms is one of the key success factors in e-government; it is not reasonable that the provided resources can be estimated, and what there is a complete changing for founded applications. The designer should take into consideration in harmonic scalability with upcoming features. At last, several of the legislative sides, such as safety and particularity, must be taken into account, while profile statements are treated and stored. It should be performed with pecuniary operations. To handle such needs, it is important to choose best suitable technologies for such needs [42].

Interoperability indicates that the system must be inerrability. When a new service developed in e-government, it should be compatible with existing legacy services. So, it is important to use "open standard" architecture, to avoid heavy maintenance on existing applications [39].

Privacy is one of the main obstacles in the implementation of e-government. It is concerned with the citizens on their privacy and confidentiality of submitting personal information as part of the access to government services. Privacy and confidentiality must be given much attention in the creation and maintenance of website [39]. Security, it an important issue to achieve payment (fines, taxes, etc.). It is an obvious requirement to secure transaction [39].

1.6.2 The Political Impacts

There are many political issues that must be considered. In this aspect, e-government services and processes must be of precise study and design (for example, e-justice). If e-government can provide a variety services that have to be more integrated and useful and to expand e-government services to services of a large number of society slices. From the user perspective, process standardization must be simple (friendly to use) with reparations, agreements, authority, and responsibility must be clearly formulated and recognized in order to protect user [21].

1.6.3 The Cultural Impacts

In cultural perspective the difficulties and challenges in e-government are more difficult, because they rely on a great deal of the psychological factor of the user. Hence, the principle of (friendly to use) owns a significant effect on e-government factors in order to succeed. It allows more people to benefit from e-government services, and in other words, more users, even illiterates could be beneficiaries of e-government services [21].

1.6.4 The Legal Impacts

This perspective embraces many problems related to the violation of networks security threads, such as viruses and hacker attacks, shun of unauthorized identity and computer falsification. Moreover, there is a lack of relevant laws in the field of information technology [21].

CHAPTER II

METHODOLOGY

In this section of study we review our e-government application (Employment Agency) that will be used in the General Directorate of Education in Mosul – Iraq, as a case of study. Strategies in design and tools that are used, in addition to the technology and methodology of the application. We take into consideration that the application must be easy to use, well-defined and must use clear terms to suit all classes of Iraqi society. The application is designed to be integrated with itself no need for further applications or tools in this performance. At this time, it just needs a computer with an Internet browser and a connection to the Internet. Also we take in consideration the selection of tools and methods for designing the pages of the application that are scalable to scope, updatable and moveable from a technology to another with easiness and without any sensation from users.

2.1 THE EMPLOYMENT AGENCY MAIN TECHNOLOGY.

Regarding the advantages of e-government mentioned in the section 1.5, and the suffering of government and citizens mentioned in the introduction, we need to develop an electronic version of employment agency based on electronic forms "e-forms" to handle the employment process in which citizens will interact with the government using any computer connected to the Internet.

Our employment agency web application relies mainly on the electronic form and there are three main types of e-forms [43]. The main difference between them is the automation:

Print and fill: this type is very simple and famous that can be used by governmental and private organizations. Models of the forms can be placed on the Internet or intranet, and users can print forms to fill in these vacancies.

- Fill and print: in this type the user will fill the form on-screen and print it before the submission. This type may include validators, calculations, and accounts to check itself for errors or missing information, and direct users to make correction before submitting the form by processing. This type of forms makes significant improvements in overall quality of the completed forms by catching errors before they were submitted. This eliminates the need to send it back for correction and then resubmit thus, reducing the time and cost of the process.

- Fill and submit: responsibility of entering data transmitted from an organization to the users who are filling the forms, indicates that information in this type of electronic forms can be transferred directly to the backend systems of the organization to store, analyze and significantly shorten the time it takes between the entering of the information and tack action. Forms of this type are less confusing to complete because they need all relevant information which applies to an individual user. Therefore, there is less chance, among the users, that the section would not apply to their situation. This means that forms can be filled very quickly. This will increase the quality of information provided by users since they are doing the right thinking.

In this work we have chosen the third type (form filling and submission) of e-forms. We have developed e-form that requires specific information from the user to apply for a certain job and publish it on the Internet by using several tools to complete this application with an integrated solution for an electronic appointment process in Iraq. As a case of study, we have chosen Iraqi Ministry of Education because of it is one of the largest Iraqi ministries and is in need for teachers, administrative and technical staff duo to the increasing number of schools in Iraq.

2.2 TOOLS OF DEVELOPING EMPLOYMENT AGENCY

In the development of the e-government application (Employment Agency), we use several tools, new technologies, development assistance software and programming to complete the application. The used applications, software, server and programming language are:

1. Visual Studio 2010 (VS2010) is an integrated development environment (IDE).
2. ASP NET Framework 4.0 (Active Server Pages) as a server side web application framework.
3. C# "see sharp" object-oriented and type safe programming language.
4. jQuery, open source JavaScript library, for the users interface design.
5. Internet Information Service (IIS) is web applications server software.
6. SQL Server 2008 Enterprise Edition, software product for managing database system.
7. Windows Server 2008 is a brand name for server operating system.

2.3 METHODOLOGY OF THE EMPLOYMENT AGENCY

At the beginning of the international network of the Internet (World Wide Web), the servers that host Internet sites with limited missions which provide minor information that limits the user to browse this information only, which can be accessed through the Internet browser. Nowadays, the servers that have embraced just simple Internet sites come to embrace sophisticated and interactive web applications. Web browser becomes a user first tool to access these applications that hosted by these sophisticated servers. The best example of such modern web applications that become widespread in the present time, web applications and services of e-government through Internet websites and also websites that facilitate electronic commerce that deals with citizens and business in relation with databases [32].

There is a large variety of software, tools and technologies to construct the web applications. One of the oldest methods has been the common gateway interface (CGI) which is a standardized and basic interface that facilitates the use of web applications that host on a server. When starting the web application on a web server, for each type of applications (requests) there is a dynamic processing of the applications (requests), and thus, processing the applications will be smoothly. Techniques of the present used in the creation of web applications such as java server pages (JSP) and active server pages NET (ASP. NET), deal with vital elements that can be used in stages of creating the web application for certain requests. After the lifting of these applications to servers for web applications, it will represent the real work that has designed this application, leading to increase efficiency, improve performance and facilitate the administrations. Furthermore, the server can provide the functional and non-functional elements for the web application such as personalization, user interface, performance, security and etc. [32].

Web applications are described as distributed applications in the network, which rely on their work to communicate with each other to accomplish the specific work, and the communication takes place using one of the Internet protocols, the most important one is (HTTP), and the major structure for web application architecture is server-user template. In this template, the users and servers have an active role in the processing of the data (information) and such a case can be described as a double processing by the user and processing by the server for data (information) [18].

2.3.1 Three Tier Application Architecture

Three-tier applications architecture is used it in our design of Employment Agency web application. It consists of clients, application servers and database management systems (DBMS), which have become mainstream in dynamic web applications. The structure of three-tier architecture matches the logical decomposition (client, application and data) of applications. The front-end of users provides a user interface for service access. Servers play an active role in web application, where they show responsibility in processing application and communication with other tiers. As for data processing and storage, there are database servers as back-end for the overall structure.

Usually, one or more transactions are initiated by the application server when receiving a demand from the client. After processing the request, the result is returned to the client. It is critical that the services provided by the tree-tier architecture are reliable and continuously available [3].

A three-tier structure is conceptual. In practice, there are different applications of database applications on the Internet that fit this structure. The most common implementation has a web server (which includes a script engine that handles text and performs actions that define) and database management system installed on one machine (it is simpler to manage and secure). With this type of application on modern hardware, our application can handle perhaps ten thousands of requests every hour [55].

For popular web sites, the implementation of the common is to install a web server and database server on different machines, so we are committed the resources to allow the application more scalable and faster. For very high-end applications, we can use a combination of computers, where the database is copied to the web server to distribute the load over many devices. We can describe web applications on the Internet that using in their building of three-tier architecture makes it look formally structured and organized. However, it conceals the fact that the applications should combine the various protocols and software, and that programs need to be installed, configured and insurance. Figure 2.1 shows the three-tier model architecture for web applications [12].
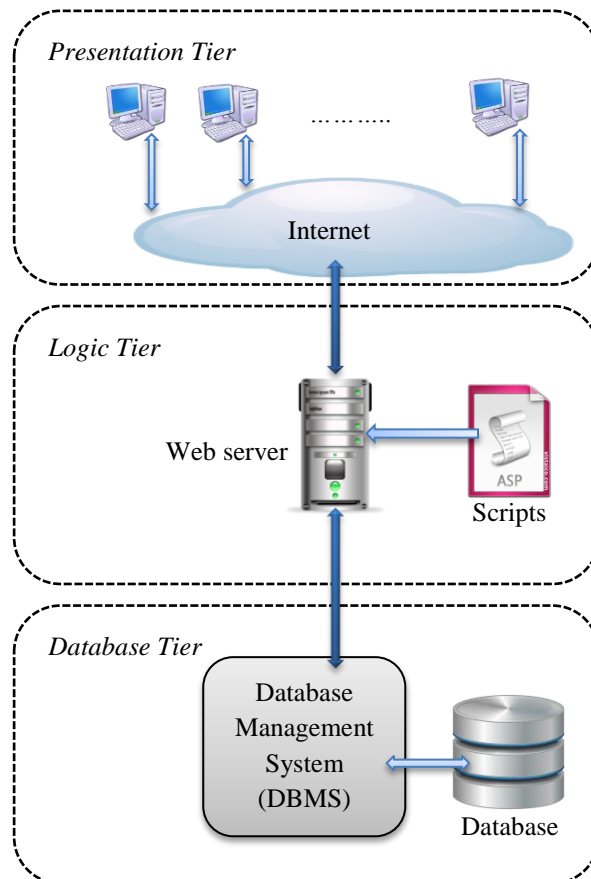
Figure 2.1: Three-Tier Architecture Model for Web Applications.

2.3.1.1 Presentation Tier

Presentation tier also called client tier is the highest level of the architecture. Client tier offers an interface for the users of the application, which is important in enabling the user to use the application easily and interactively also known as User Interface (UI). Usually this includes the use of graphical user interface to interact with the activities and needs of the user, and also includes techniques for the networking and also uses the web browsers for viewing in the case of web applications. Information in client tier is displayed to related services such as e-government services through web application.

There is an interdependence between this layer and other layers where the interdependence includes the participation of all the layers in the data (information) entered by the user and also outputting the results to the browser or UI layer after processing the request through the work of all other layers and even tiers in the another networks [47, 4].

Presentation layer deals with applications and user interactions as mentioned above. The user enters the uniform resource locator URL of the service (web application) available in a particular server that hosts web applications where the browser will use the Internet protocols to translated the (URL) to Internet Protocol (IP) address and then the browser sends the users' request to the server using one of the Internet Protocols appropriate for that application is often the (HTTP) [4].

2.3.1.2 Logic Tier

The logic tier (also known as application tier, business logic tier, data access tier or middle tier), it is a part from the first tier (client tier). It is responsible for primary functions of the application and the detailed processing. This tier is withdrawn from the presentation tier to be a separate layer for performing the same tasks more effectively. In this tier, the issue has been disposal of mission critical (the resources that are available in any application or system that could affect the results during the failure in processing requests) [4].

The elements that are forming this layer exist on a server. It can assist the sharing of resources. These components can be used to enforce the rules of services, such as corporate structure, the legal system or government laws. Those sources available in this tier are not constrained to a specific user. They are easy to use in any application and any layer depending on the type and place of use [35]. For instance, it is possible to make minor modifications such as; the transfer of certain function from the user tier to application tier can reduce the loads on the network by large margin or design roles for data in the database to do some operations on the data.

In this tier the application's functionality is applied to the application by performing detailed processing of data form the client tier. The server like Internet Information Services (IIS) or server script like (ASP) can be used to provide such characteristics [4].

2.3.1.3 Data Tier

This tier is composed from database systems. It provides physical reach to the database management systems (DBMS). This tier can deal and interact with the middle tier and in some cases there is a connection with the presentation tier. In this tier the information is stored and retrieved. This tier isolates data impartially and insulated from the application or presentation tier. Data tier can give its own characteristics and improvements such as susceptibility and functionality. This layer is composed of data access ingredients (DBMS) (alternatively of the ordinary connection methods) to play a significant role in the resource sharing and allow users to interact without installing libraries and configuration of data management systems (Open Database Connectivity ODBC) drivers on each clients' machine. For example, one of the famous software for administration of databases that could prove on the host server for web applications or separately and which will add property of (DBMS) is the Microsoft structured query language (SQL) Server. Reaction with the databases that are available in this tier will be using by special languages for databases such as (SQL) queries and to support this interaction through global networks are protocols used protocols such as transmission control protocol/Internet protocol (TCP/IP). Data infrastructure should be built on the form of tabular (table), it should support self-adjustment feature in such operations add, deletion and modification of information. Also the data must be maintained from loss or damage due to some factors beyond their control by always making backup copies and in a regular way to discovery errors and overcome the interruptions in service, also the data must be indexed and empty from any iterations [4].

Finally, it is important to mention some key benefits of using three-tier architecture in our web application (employment agency) design [4]:

- Maintenance: each layer of layers is independent from the other layers; we can make any amendment or replacement without compromising the application as a whole.

- Scalability: the benefits of the basics and standards of the development in the tier architecture, any expansion in the scope of the application can be sensible and direct.

- Flexibility: three-tier allows the management of each tier separately, resilience is increased.

- Availability: application takes advantage of the flexibility structure to enable systems using reusable component and resources easily, therefore availability increase.

2.4 TECHNOLOGY OF EMPLOYMENT AGENCY

Our e-government application (Employment Agency) consists of two parts depending on which it will deal with users (citizens) and administrators.

2.4.1 User Case

In this part, the user can be interacting with web site (Web Application) to get e-governmental services. Initially, the user must register in the system by using personal information and e-mail, after that he or she must confirm the used e-mail by confirmation code that has been sent by the system automatically in registration process. After this step the user can be a regular member in the system and go to login. In the first login, the user will redirected to the e-form to submit required information of the employment demand. In the second login, the user, he or she, will be redirected to status page not to the e-form page in which the user can edit some specific information such as address, academic information, marital state and so on. In the status page, the user can also print a report about the submitted information in the form of portable document file (PDF) file type which is consisted on a Quick Response barcode (QR) type which is important to easy reach the user information in administrator case. The following flow chart in Figure 2.2 can clarify the user case to use the system.
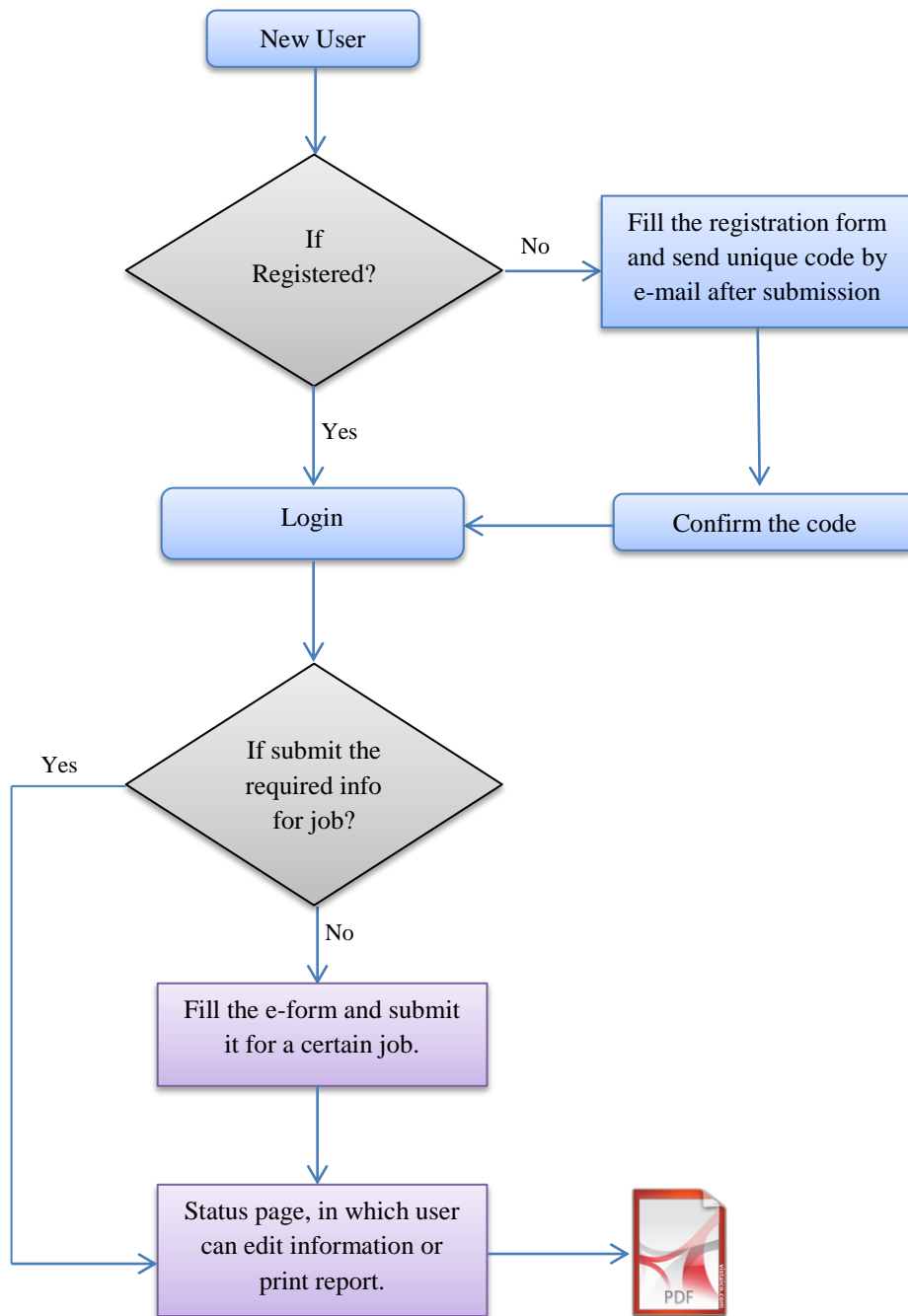
Figure 2.2: User Case to Use the Employment Agency System.

2.4.2 Administrators Case:

The case of administrators uses the system to manage user information and accounts, data collected from users and examine the submitted information form users. This overall process can be achieved by windows application. The application consists of login facility to know the authorities of application user's, the authorities divided into three types: super administrator, report administrator and information check administrator. To distinguish among the accounts type we set authority (ID) in the administrator database to (1, 2 and 3) sequentially. Also there is an indicator to the account activation status:

- Super administrator: when this account login it's redirected to windows form application that enables to create users, enable and disable users and sets the authorities of the new users.

- Report administrator: this account is redirected to another windows form application that enables to prepare reports about the submitted and checked information through web application and e-form, which stored in different database.

- Information check administrator (optional): this account enables windows form application user to examine the data submitted by the users form web application, the examination of the data conclude on comparison between the data in the database and the official document with report printed form web application in user case that must be submitted to any office of the directorate concerned in job appointments. After the comparison, the data will be saved in different database with the name of person that checks the data. This database cannot be reached with any account just only with report administrator accounts for reporting issue. This process is considered optional in the implementation, which is prepared to overcome the fraud and plagiarisms in the official papers that could happen.

The following Figure 2.3 represents the flow chart of the administrator's case for using windows application.
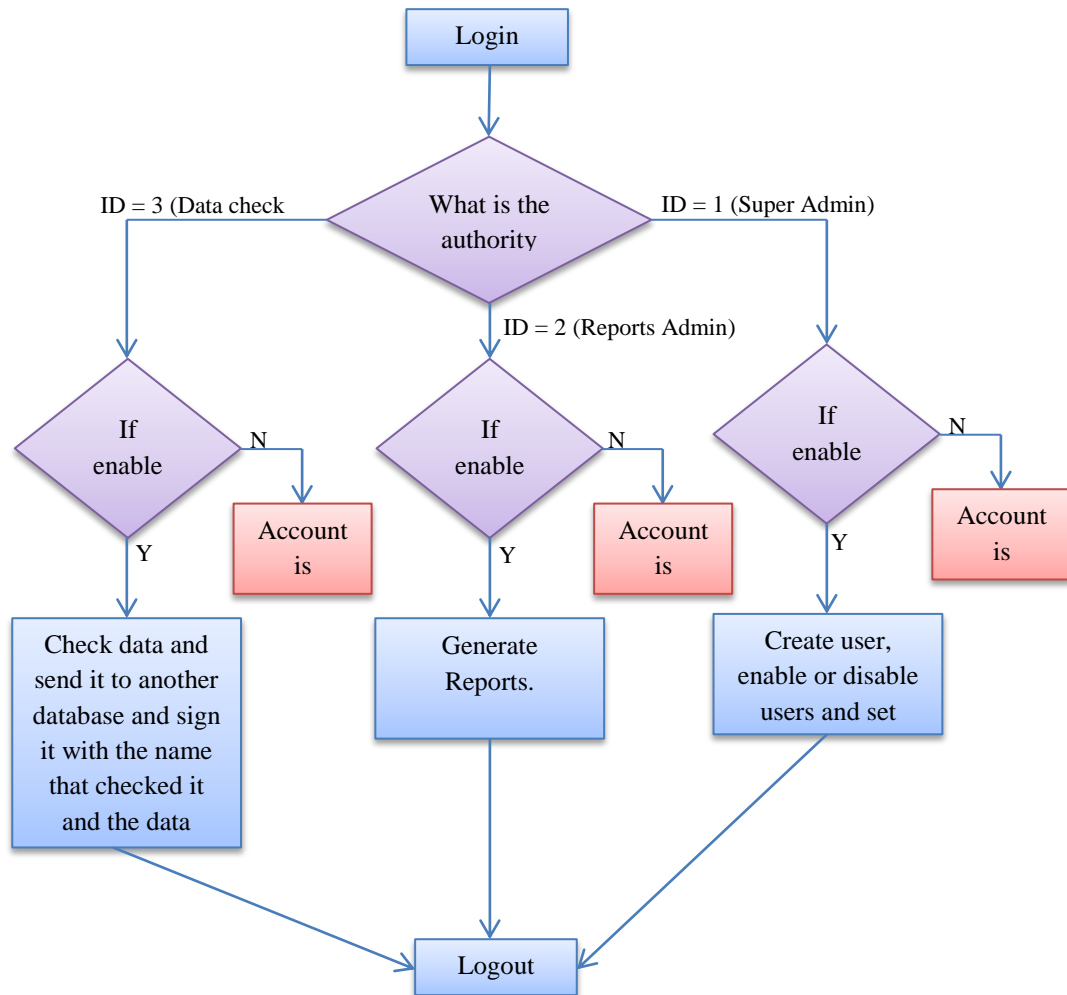
Figure 2.3: Administrators' Case for Using Windows Application for the Employment Agency.

2.5 FUNCTIONAL AND NON-FUNCTIONAL REQUIREMENTS

One of the fundamental goals of any project is to collect all needed requirements. These impose on us to be sure that they are in equality and regularity, and most importantly, without prejudice as the project progresses. Generally, there are two types of requirements in the establishment of any project (such as web application). The first is the functional requirements which consist of tasks, functions or certain behavior that should be available in the application to provide specific functions and services. The second is non-functional requirements that have some restrictions imposed through the use of those services.

The functional requirements are concerned with high-quality functions because of their high effectiveness on the services. We are less interested in the rest of the functions properties for non-functional requirements. Since the non-functional requirements concerned with limitations on the outcomes that are supposed to be obtained from functional requirements (for example, restriction on services throughput or qualification of a particular task), the task of building in accordance with the functional requirements, is a statement structures underlying to build integrated requirements statement beneficial.

This approach is dependent in our work to create the e-government application (Employment Agency) for job appointments; it is worth to think about the non-functional requirements in numerous areas and circumstances, such as the speed of response, the efficiency of the application, etc.

2.5.1 Functional Requirements

Functional requirements are to give the impression about the capabilities or services required in the application. They provide the system (application) to the users of this system and to satisfy them. Functional requirements also contains a characterization of the required functions, characteristics, skeleton, determination and inquiry associated with them on the Internet, and details of the data used in the system that will also be used. It is also the capability must carry the system to solve the problem [33]. Our system requirements can be classified in the following functional requirements [4]:

- The user interface requirements: also there are other terms such as user interaction requirements or requirements of the user. This will give an impression about the way the client will deals with the employment agency. In this job application user should fill the application from a device (computer device) connected to the Internet and supported with any web browser.

- Transactional requirements: also having other terms such as, internal functional requirements or the requirements for services. It reflects what is happening internally from calculations and activities in the application, without regardless of the interface appearance. In the employment agency the age of users (applicants) must be calculated automatically depending on the birthday entered by the user itself.

- Personalization requirements: also there is another canonical term. They are adjustment requirements. These are characterized as the possibility of a Web application to resetting itself and acclimatization to the user, depending on the environments or on users' profile. So user should register to the system and confirm the used e-mail in the registration process and then the user must login to personalize the web application and for right use to the system.

- Data requirements: A requirement for the purposes of data and dealings, also known as conceptual, content or storage requirements. The accurate description of these requirements is the way which deals with the processing, managing and storing method of data by application. Our system of user's information is stored in (SQL) database server in different tables and indexes to manage it more effectively. Also there is separate (SQL) database to store administrator information.

- Navigational requirements: represent the needs of navigation loots for the users.

- Web application should allow the public easy to access and get services.

- Also should be designed to reduce the amount of time required for the user and also for better management and operation of the system.

- Automatic e-mail, SMS or announcement for registered users when new statuses add to their data in the database.

- Monitoring the status and the use of the system for administrative issues.

- The (help) link in the system provides simple instructions for the use of the employment agency. In addition can provide a link form the basic definitions of the terms used throughout the site and information about creating accounts, as well as basic information to contact.

- The system must support (update) button to enable the facility of update information that submitted previously.
- The (print) button must be provided by the system to enables the user from printing the final information submitted to the system to save it the user side in an electronic form (PDF) or hard copy.

2.5.2 Non-Functional Requirements

Non-functional requirements are possible values and functions that could be considered unnecessary to provide the application. Non-functional requirements describe the characteristics of the system unrelated functions. These requirements are shaped from the structure of the system during the design phase. The non-function requirements in our system can be described in the following upcoming [13]:

- Response time: this describes condition how long it takes from a moment a user submits a request to the system, in order to provide the complete response. In our web application, and this concept of transmission and processing of the request, the transfer of the response. Factors that are resource capacity (processing power, memory, disk, and network bandwidth latency) are produced by other connections that work on the same server or the number of concurrent requests. For complex web applications, this may also include call to external systems or other subsystems; in this case the properties could be taken off from host's internal network and other resources' load into consideration.
- Uptime: total time the service is available. Uptime can be described as a percentage. When considering the uptime, it is necessary to bear in consideration the readiness of services provider uptime. For example, if the provider uptime 99.5%, it would be impossible to deploy a web application with high uptime. Other factors have potential to recover the system (such as, how much time it takes to restart the service after the failure occurs).

- Response per unit of time: this describes a number of requests that system can handle successfully per unit of time. Also, it can be referred to as a productivity of the system. Resource allocation uses influence in this parameter. In addition, the number of requests can have an impact on response time requirement (a large number of requests will lead to the deterioration of the overall response time).

- Performance: one of the characteristics of the system is the manner in which errors can afford. Weather hardware or software based. In case of web application, we cannot provide a web application without errors at the physical or servers that hosting the services. While the firs case is usually out of the developer's control, servers faults can be handled by different means, for example by increase the resource Central Processing Unit (CPU), memory and disk of the server, or having backup to response to failures.

- Security: another non-functional requirement is the security that can be applied to the hosting provider or to the system developer. In the first case, the web application host providers under security measures such as physical infrastructure policies or isolation network access mechanisms.

- Operational cost: usually, it was decided to build on the initial application hardware requirement. Changes in requirement usually results is expensive upgrades involves high cost to provide new machines, install and configuration of the application to run. In the cloud system, resource can be upgrade almost immediately; this means that the cost can be considered variable change.

CHAPTER III

CITIZENS' READINESS

In this study, we look for the citizen readiness to espouse e-government services, espouse is an important side for the success of e-government initiatives in developing countries. The high adoption of services increases the changes that e-government will facilitate the social and economic benefits for citizens [34]. Nevertheless, the design of e-government initiatives adopted citizen that remains a challenge for much government of developing countries. This is because off the successful implementation of e-government initiatives adopted in this context that requires a complex allocation between technologies and the execution context in developing countries [20].

The implementation of e-government iterative adopted requires structural, procedural, the cultural and behavior changes in government [28]. These changes are difficult and require a lot of resource. Accordingly, the government in developing countries even workout between automation and amendments of government operations to provide citizens' initiatives adopted [28]. As mentioned previously, the application of e-government with emphasis on the potential of the adoption of citizens. The citizens' readiness for e-government is a study of the Iraqi citizens' progress towards the e-government. Its goal is to find out how citizens' understanding of e-government services so that all citizens participate in and benefit from the services, also to know what to develop in its services to do their part more effectively.

3.1 TARGETED GROUP

This study aimed for preparing a questionnaire paper with a group of questions (eleven questions and one optional question for communication with participant in the questionnaire) that targets a group of people to know the readiness of citizens for e-government services. Our targeted group is from different layers of the Iraqi society. The first part of this group was from the University of Mosul that was targeted university education staff, and students, they were chosen because they represent the educated class of Iraqi civil society. The second part of our targeted group was the employees and revisers of the General Directorate of Education in Mosul–Iraq, because they represent the most employees doing office work in the city, so they are in dire need for e-government applications. The fact is revisers are representing the various layers of civil society (with a high education level and also uneducated). The third part was the Facebook users from various fields and discipliners (medical, engineering, accounting, management, and etc.). It is worth to mention that we take the official approvals for publication of this questionnaire for the purposes of study and research only, as shown a copy of it in the appendix (A).

3.2 THE QUESTIONNAIRE DETAILS

Our questionnaire consists of eleven questions for studying the readiness of citizens for e-government service adoption, and one question for communication with participants in the survey to extract more information from him or her, the English and Arabic copy of the questionnaire is shown in appendix (B). The questions shown below and the benefits from answering like question, in other words, the extracted information from each answer reflects in total the readiness of citizens.

- Does the concept of e-government is clear to you? This question reflects how many citizens know about the e-government and what does it mean, the answer (Yes) means that the participants have well known about this concept, the (No) answer reflects that the participants who do not know anything about this term and need to make some studies and reading about the e-government. If the answer was (I do not know) that means the participants are confused about what is the e-government and they may need some clarification about this concept.

- Do you think that e-government is necessary in Iraq? this question lets us know how much the services of the e-government are necessary in Iraq from citizens' view, where participants have a good knowledge about the e-government. The answers for this question was one of three (Yes, No, and I do not know). The first answer shows that participant agree, the second answer shows he or she does not agree, while the last answer reflects confusion of the participants about the advantages and disadvantages of e-government.

- Are you ready to put your personal information in an electronic site for government services via the Internet? the answers of this question were (Yes, No, Partly, and I do not know). The (Yes) answer shows agreement and trust of participants such as these sites, the (No) answer shows disagreement and distrust of participants such as these sites, while the (Partly and I do not know) shows the participants fear of their personal information and that the result from lack of confidence in such sites.

- What do you think about services of ministries and agencies in Iraq? this question reflects the citizen's evaluation of the performance of the ministries and agencies that provide services to citizens, in fact, this question is related to the next question. The evaluation scale was (Excellent, Good, Medium, Weak and Very Weak).

- Do you think that e-government services to the republic of Iraq will improve the performance of ministries and agencies? the answers of this question supports the answers of the previous question, and shows the need for e-government applications in governmental departments and institutions, the answers were (Yes, No, and I do not know) according to the efficiency of government institutions and readiness by providing services through e-government applications.

- Are you aware of the existence of e-government services to the republic of Iraq? the answers of this question were (Yes, No, and partly). According to citizens' awareness in the e-government services that are available in Iraq at the present time.

- To what extent government agencies respond to citizens' request submitted via the Internet? the answers of this question shows the effectiveness of e-government applications in Iraq and also shows the citizens' satisfaction with these electronic services. The answers were (Quickly, Slowly, Do not respond, and I do not know).

- Do you have an Internet connection at (home, work or mobile phone)? the answers were (Yes or No). We chose this question as one of the important questions to know how many computers are connected to the Internet among 100 citizens because one of the important theologies of the information and communication technologies (ICT) is the Internet services which represents the interconnection between the citizen and e-government services.

- If the answer to the previous question is (Yes), how satisfied are you about the Internet services. And if the answer to the previous question is (No), please specify the reason: the scale for participant's satisfaction was (Excellent, Good, Medium, Weak and Very weak). We also asked the participants to let us know about are the reasons behind lacking the Internet services, despite the development of the telecommunication sector in Iraq.

- Gender: we also asked the participant to specify the gender in order to know the percentage of male and female in a participant group.

- Email (Optional): this question was optional just to have a communication method with the participant in order to be able to extract more information from him or her.

- Age group: we divide the age group into four sections (18-25, 26-35, 36-45, and 46-and more) years, ranging from younger to older, reflecting the participant's experience in each questionnaire.

3.3 INFORMATION AND COMMUNICATION TECHNOLOGIES IN IRAQ

The telecommunication sector in Iraq has an important place in insurance contact, in both the local and international levels; it is also a great economic position in the development process that plays as key sectors in various fields which are the main foundations of the infrastructure of this country.

Iraq has witnessed the unprecedented communication and information technologies in addition to mobile phone services which have become the primary means of communication besides the fixed phones.

The Internet is considered to be the most advanced technology in the current time and the main key for development in the field of communications and exchange of information, services, techniques, and products. Since it has released during the 1960s, it had an active role in creating opportunities and conditions for progress in the developed and developing countries alike. Not all states, although a special welcome for this tool of global interdependence. One of such a nation is the Republic of Iraq; which faces significant challenges in the further spread of the Internet, capacity building, and change of the traditional method of communication.

We can explain why the Internet seems to be omnipotent by two unique characteristics that no other information previously processed and communication mechanisms. Firstly, the Internet is the largest supplier of information in the world. Secondly, it provides access to people with an interactive mechanism to communicate directly with each other [25].

Before 2003 Internet access was very limited, the government at that time limits the use of the Internet with a few people (a couple of hundreds in 2002) in Iraq as a whole. After the end of the war, it was popular to use the Internet. Initially, there was only one Internet service provider in Iraq called (Uruklink). Now, it is facing a strong wave of providing Internet service through other providers, including broadband services providers to access the Internet by using the satellites. Notably, in early 2006, the emergence of several private companies that they provide more and multiple options to provide Internet service with more effectiveness, but the prices were somewhat higher due to the use of the Internet through satellite [36].

In early 2010, in the Iraqi capital (Baghdad) four companies were appeared to equip Internet service to the citizens and the government, the government depends on private companies in that time by providing it with Internet service, they are; (Masarat) communication was offering bandwidth up to 40 Mbps and this was the fastest Internet in Iraq.

(EarthLink), which provides download speed up to 5 Mbps in non-peak times and download/upload speeds of 1024/128 Kbps at the time of maximum load in the network. (Rose ISP), provides speeds up to 4/0.8 Mbps. All Internet services providers in Iraq uses the wireless technologies to deliver Internet service to the users. The people of Iraq expect reformation and equipped the communications infrastructure in the country to allow the wild Internet access method, such as cables. In the beginning of the 2010, about 5.5 million Iraqis have access to the Internet [36].

There is also a development in cellular communication sector significantly in Iraq. Statistics and advertising of operating companies in 2011 shows that, the number of subscribers lines of Zain Company "according to the company" about 11 million subscriber, while the number of ASIACELL subscribers about 9 million subscriber "according to the company", the number of subscribers in Korek Telecom is about 8 million subscriber "according to the executive director of Korek Telecom" [2].

Iraqi Ministry of Communications announces the completion of submarine cable system, the project which connects Iraq with the whole world. The project cost was 36 million dollars; the project was implemented by the company (Gulf Bridge International). The project expected to provide Iraqi cities with very high quality services at low prices, the most important services that are expected: high speed Internet access, phone service, and TV service through cable as well [23].

3.4 THE SURVEY RESULTS

The survey was published in Iraq exactly in Mosul province and targets different types and levels of the Iraqi society, the results were different and varied depending on the views, education level, and available technologies of the participants in the questionnaire, we collect totally 215 effective participation, by collecting printed questionnaire (base paper) as well as electronic questionnaire (via the Internet).

The number of participants who say (Yes) about the concept of e-government for him or her is clearly 132, and the number of participants who say (No) is 66, and the participants who are confused and say (I don't know) about this term are 17 participants. The Figure 3.1 shows ratios and the opinions of the participants in terms of the clarity of the e-government concept.
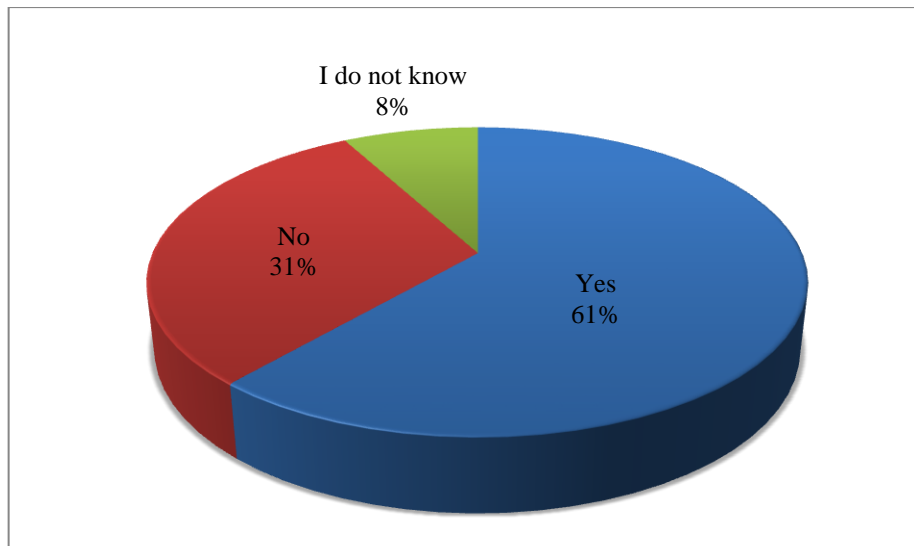
Figure 3.1: Clarity of E-Government Concept for the Citizens.

The second question is to know the opinions about the need for e-government in Iraq, the citizens who say it is necessary by choosing (Yes) are 149, while the citizens who say (No) are 31, and there are citizens who may not know the right meaning of e-government or confused and say (I don't know), their numbers are 35. The Figure 3.2 shows the results for the second question.
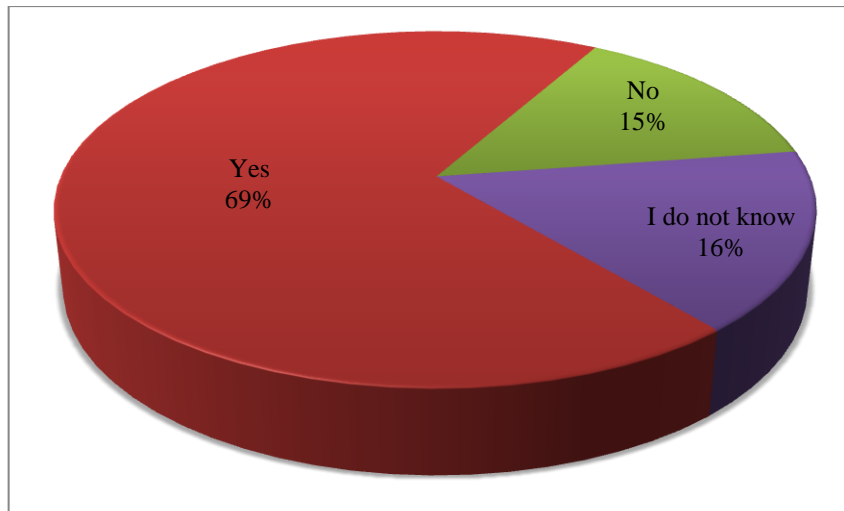
Figure 3.2: Necessity for E-Government Applications from Citizens' Perspective.

In the third question, we need to know citizens' readiness who trust in e-government services through governmental web sites, the citizens who say (Yes) and they are ready to put their personal information to get e-government services are 84, while the citizens who say (No) are 64 citizens who do not trust such sites, while the citizens who trust such sites are 56, there are also confused citizens about using personal information in governmental web sites and they are 11 citizens. The Figure 3.3 shows the ratios of answers for the third question.
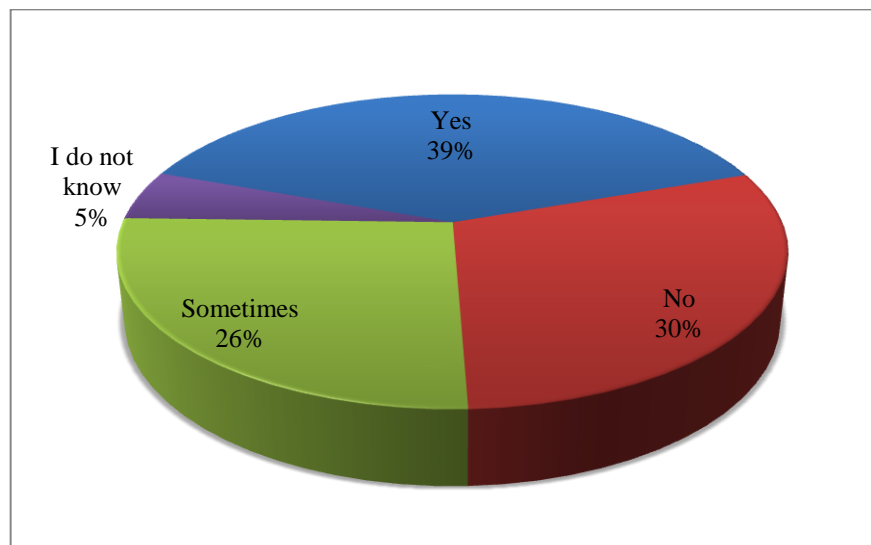

Figure 3.3: Citizens' Readiness to Use Their Personal Information in Governmental Web Sites.

The fourth question, is put to evaluate the performance of government departments in Iraq without any of the e-government services, citizens evaluate the performance on a scale of five, citizens who say (excellent) are 4, the number of citizens who say (good) are 8, the number of citizens who say (medium) are 54, the number of citizens who say (weak) are 80 and the number of citizens who say (very weak) are 69. The Figure 3.4 shows the ratio of answers for the fourth question.
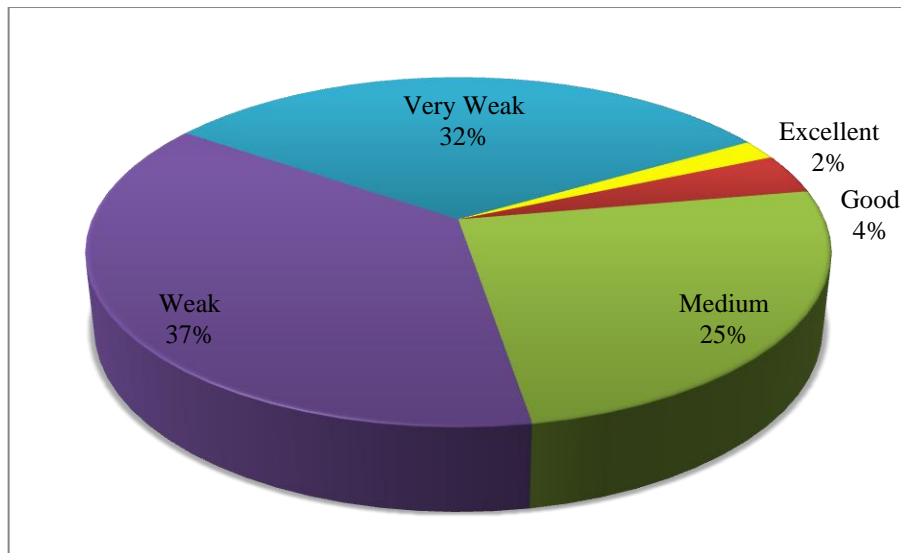
Figure 3.4: Performance Evaluation of the Governmental Departments from Citizens' Perspective.

The fifth question is dedicated to know the opinion of citizens and employees in relation to the possibility of increasing the efficiency of government institutions through the use of e-government services in the provision of services to citizens, business and other governments. The results are 120 of participants who say (Yes), while 41 of participants who say (No), and there are 54 participants who look confused about how e-government will improve the performance of individual government services. The Figure 3.5 shows the percentage of the different answers in the fifth question.
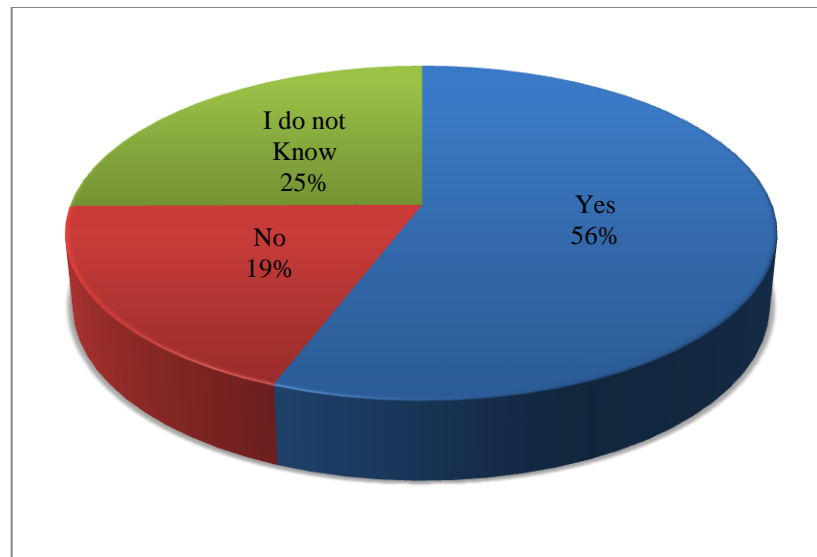
Figure 3.5: The Ability of E-Government Applications to Improve Government Services From Citizens' and Employees' Perspective.

Also there is a question to know if the citizens are aware of some e-government services in Iraq such as (passport issuing and renewing, driving license issuing and Iraqi virtual science library), the answers are varied among (Yes, No, and partly). The number of participant who say (Yes) are 49, and the number of participants who say (No) are 86, also there are some of participants who cannot distinguish between e-government services, the number of these participants are 80 who think that the conversion from the office and the paper transaction to the electronic transaction is for arrangement issues only, that means, it is not a fully electronic transaction. The Figure 3.6 shows the ratios of answers in the sixth question.
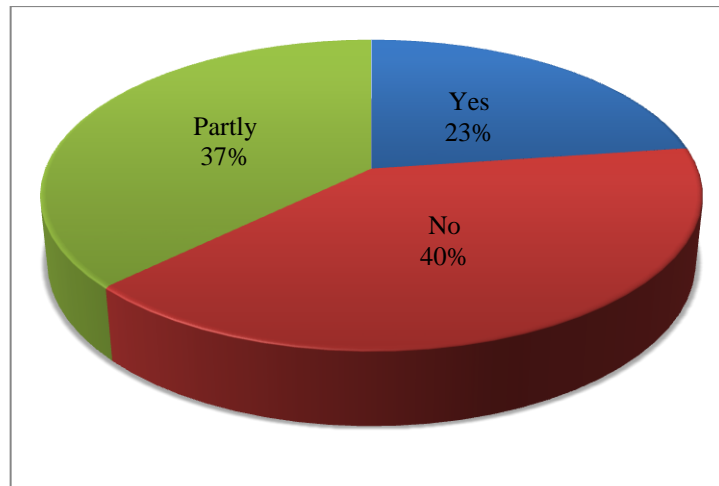
Figure 3.6: The Knowledge of Citizens about the Existence of E-Government Services in Iraq.

One of the most important assess is citizens' satisfaction for e-government services to improve the quality of services, so we need to include the seventh question to know how e-government services respond to citizens' request that submitted via the Internet, 18 of the participants say that the government services respond (quickly), 106 say that the government services respond (slowly), while 63 say they (do not respond), finally there are 28 of the participants who say (I don't know). The Figure 3.7 shows the ratios of the answers for the seventh question which is related to the citizens' satisfaction from the e-government services in Iraq.
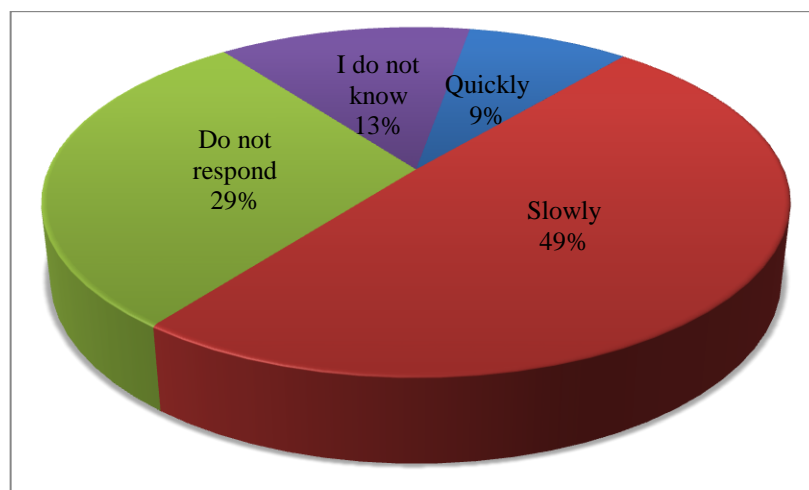
Figure 3.7: Citizens' Evaluation to the Response of E-Government Services in Iraq.

One of the important factors to make the e-government application successful in any country is the number of computers that connected to the Internet per 100 users. In our survey we put a question to know who has the Internet at (home, work, or even in mobile phone), the numbers of participants who have the Internet are 176, and those who do not have the Internet are 39. The Figure 3.8 shows the ratio of those who have the Internet per 100 users and also who do not have the Internet.
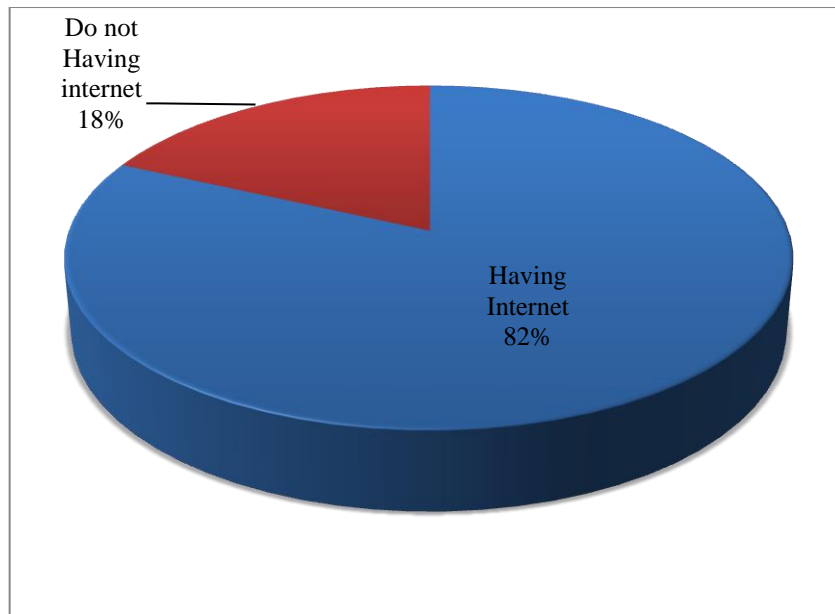
Figure 3.8: Citizens Ratios Who Have and Who Do Not Have the Internet.

The participants (176 participant) who have the Internet also having an opinion about the Internet services quality in Iraq, they evaluate the Internet services on a scale of five, 6 participants say it is (Excellent), 29 participants say it is (Good), 74 participants say it is (Medium), 51 participants say it is (Weak) and 16 participants say it is (very weak). The Figure 3.9 shows the ratios of citizens' evaluation of the Internet service.
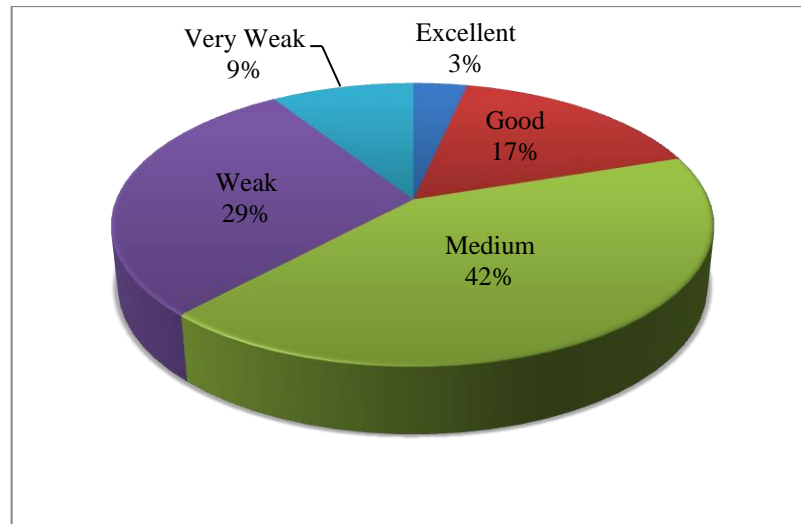
Figure 3.9: Citizens' Evaluation of the Internet Service in Mosul Province.

Also there are participants (39 participants) who do not have Internet service, they have their own reasons that are varied from one to another, some of those who say, (I do not have time to surf the Internet), some others say, (I do not trust the Internet Service Providers (ISPs) in Mosul Province because they do not block restricted sites), also some other say (most of sites are in English language and I do not know English), while another group says (most ISPs provide very expensive service as compared with the quality of services of the other countries), and finally some participants say (we currently do not have any: needs, associations or responsibilities for Internet and also we are not interested in the Internet at all).

The number of male who participates in this questionnaire is 165, while the female number is 50; we collect these numbers by putting the tenth question for specifying the gender. The Figure 3.10 shows the percentage of male and female who participate in the survey.
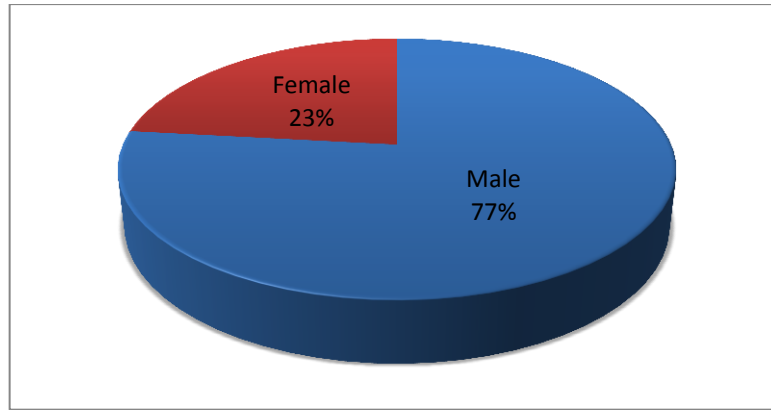
Figure 3.10: The Percentage of Male and Female Participation in the Survey.

In the twelfth question, we classify the ages of participants to four groups, the results shown in the Table 3.1, and Figure 3.11 shows the ratio of participation of each age group in the survey.

Table 3.1: The Number of Participants in Each Age Group.

Age group	Number of participants in age group
18-25 year	35
26-35 year	98
36-45 year	56
46 year and more	26
Total	215
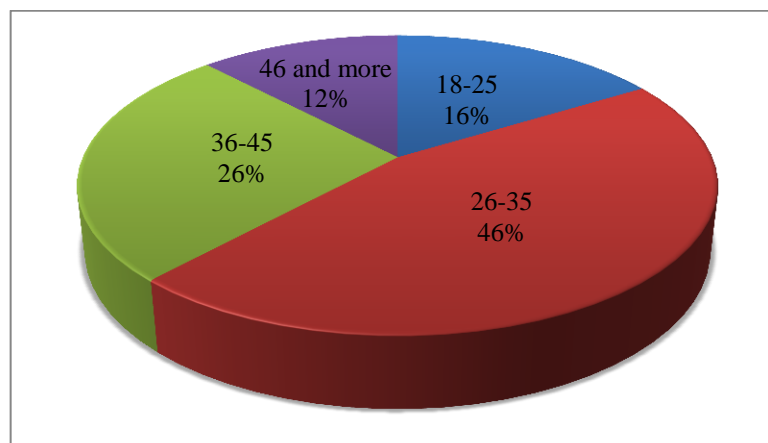
Figure 3.11: Age Groups' Percentages in the Survey.

3.5 SURVEY CONCLUSION

Behind the results presented above, we can observe inequality among answers and related answers with each other and one question to another, for the first question we can notice that 61% of citizens have a good knowledge and awareness of the term e-government, for the second question, such as the previous rate and slightly more 69% assured faith that electronic services for e-government are necessary in Iraq, we can notice that approximately 40% of the citizens do not have sufficient knowledge or they are confused about the term e-government, therefore they do not know if the e-government services are necessary or not in Iraq.

For the third question which is related to the readiness of citizens to use their own personal information in electronic services of e-government applications in Iraq, we observe a significant difference in the opinions, in general a group of citizens reaches to 40% who are willing to put their personal information in e-government sites to get electronic services, the reason for the low ratio due to the unstable security situation which Iraq is going through, also citizens do not show confidence to share personal information with anyone because of the fear of threats, racketeering or espionage.

In the fourth question, participants assess the performance of government departments and institutions in the provision of services by the traditional way, the results are converged among very weak, weak and medium, there is a consensus that e-government services will improve the traditional services of the government, and it will provide modern services rapidly through e-government applications, while 25% of citizens are confused about what are the advantages of e-government services, another group 19% of citizens believes that these trendy services do not have any effect on the quality of the services provided by government institutions.

The organizers of e-government services lack the announcement of their services and give details about their services but in electronic form and the benefits for citizens who deal with such electronic services. This is what we observe from the participation of citizens in the questionnaire, that 40% of citizens do not know the existence of e-government services in Iraq, while 37% of citizens know about the existence of such serv1ices but it is not clear for them.

In the questionnaire also opinion poll of citizens concerning the effectiveness of e-services available in Iraq, the percentage of those who say that these services do not respond to interactions of citizens is 49% may due to some mistakes prevailing in the management of such services, some of these mistakes are the period required for the completion of any transaction electronically is the same time that needed by any transaction in the traditional way, most faults that occur in the electronic services in Iraq was considered as only to organization issues of transactions rather than managing them electronically, And also there are some technical factors that affect the effectiveness of electronic services, such as the poor and high cost of the Internet services.

In the questionnaire there is an important question to support one of the main pillars of the success of e-government services, the question is the number of computers that are connected to the Internet, where these devices that are connected to the Internet is the link between the citizen and the electronic services of the e-government, if this episode does not exist, there will be a big gap between the citizen and the services, the result of the questionnaire is 82% of citizens have devices connected to the Internet.

Another factor affecting the success of e-government services is the quality of Internet services, in the questionnaire Internet quality is rated in different proportions between medium and weak, that is because of the techniques used in Iraq to deliver Internet services to the citizens, most of these techniques are wireless connection technology (ISM band 2.4 GHz and 5.8 GHz). Such technique exposed to several factors adversely affect them, such as interfering with the rest of the microwaves of the same frequency, there are some companies are using a power injectors with high power which makes interference more and more.

CHAPTER IV

IMPLEMENTATION

We can mainly describe our e-government application the (Employment Agency), as web application mainly depends on three-tier architecture in the designation technology as it is described in chapter three, the methodology of using the Employment Agency web application that is used in our application is referred to in section 2.1. In this chapter we will review the implementation of the Employment Agency for users (citizens) case, and there is a part dedicated for administrators' case with database tables' designs and structures.

It should be noted here that the application which is implemented did not come into the real test in the study area because of the deteriorating security situation in Iraq, and due to the resignation of the Minister of Education (Mr. Mohammed Tamim) protest against the deteriorating in security situation, so I could not take the approvals to activate the application for the test purpose.

4.1 GENERAL OVERVIEW FOR EMPLOYMENT AGENCY

The objective of this research is to implement electronic Employment Agency that is devoted to serve citizens and to facilitate the work of the government, so we adopted in implementation to split the application into two parts. The first part is intended for citizens through the website that serves citizens' reactions. The second part is devoted to facilitate and accelerate the work of the government from data collection, verification and reporting. These services are offered to the government sector through the implementation of a windows application.

It should be noted here that the first part of the application deals with a database that include number of tables accessible by users (citizens) and administrators (authorized government employees), while the second part of the application has a database that includes a number of tables accessible by the administrators only (authorized government employees) for security issues.

4.2 DATABASE STRUCTURE OF THE EMPLOYMENT AGENCY

The database is the vital part of the application where all data used by the application and data provided by users when they create their own accounts and submit personal information that will be used in the future in the decision making process for job appointments, databases in the Employment Agency application consist of two databases. First, for users named (EGOV) and the second, named (ADMIN) for administrators

4.2.1 EGOV Database (Users Database)

The first part of the database of the application is devoted to hold and tabulate users data as the accounts data, personal information and the data that are used by the application (such as cascading dropdown list) this database can be accessed by both the users for transactions issues, and the administrators for administration issues. This database is named as (EGOV) and contains six tables (registered, form, continents, countries, cities, and survey), as shown in the Figure 4.1 below.
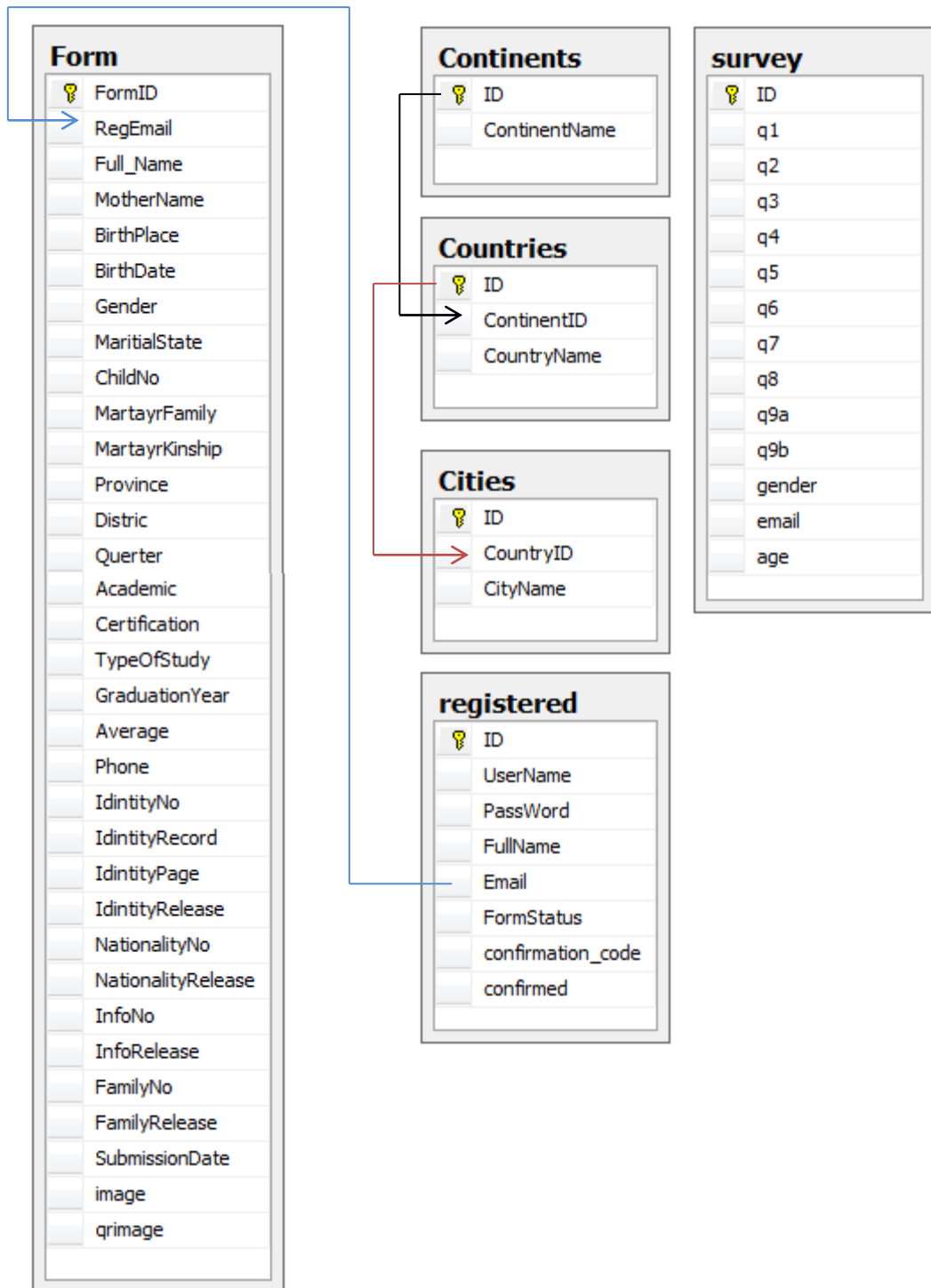
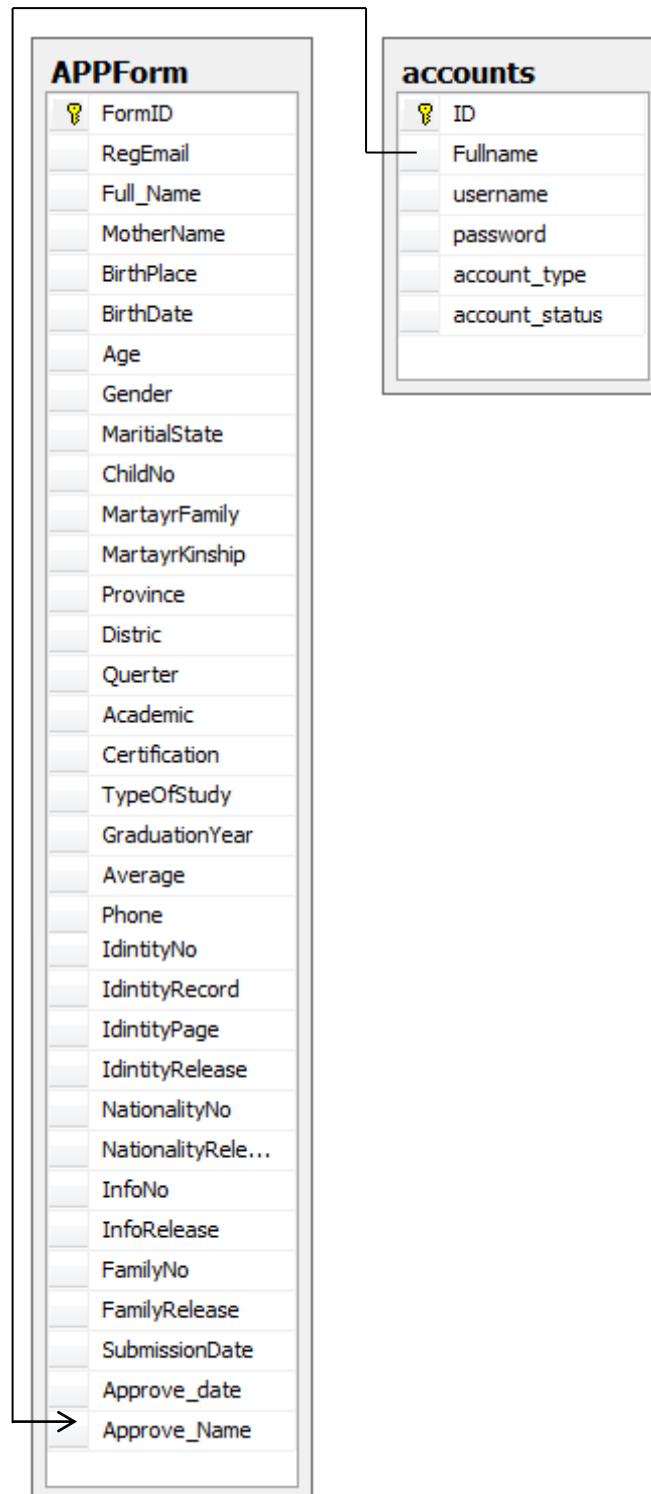**Figure 4.1:** EGOV Database Tables.

- Registered table: this table is used to hold the registration information for users' accounts; it contains simple personal information and contains two indicators for the status, the first is about form submission, and the second is for the account activation status.

- Form table: it is designed to contain detailed personal information (managing information, personal information, address information, academic information and identification information) that will be used in job appointment.

- Continents table: this table holds the names of provinces of Iraq, which is used with cascading dropdown list to facilitate the process of selecting the address by the user.

- Countries table: this table is responsible for holding the districts of the provinces in Iraq.

- Cities table: this table complements the duty for the previous two tables by holding the quarters of the districts of provinces in Iraq.

- Survey table: it is used to collect the results of citizens conducting with the electronic copy of the survey that we prepare.

4.2.2 ADMIN Database (Administrators Database)

While the second part of the database named (ADMIN) which contains two tables, has been allocated for administration purposes only such as managing administrators accounts, reporting and validation of users' information and store it in an administration database as shown in Figure 4.2. This part of the database can be accessed only by administrators and supervisors from the application for protection and security issues.

- Accounts table: this table holds the information of the administrator accounts like administrator full name, account type (account manager, reports maker and user information checker) and account status (enabled or disabled).

- APPForm table: in this table we will collect the users' information after checking the operation by a group of information check administrators, the system will store the name of the administrator who is in charge of checking the information with the accurate date of check in this table, as shown in the fields (Approve_name) and (Approve_date) in the table (APPForm) in Figure 4.2.

Figure 4.2: ADMIN Database Tables.

4.3 THE IMPLEMENTATION OF USER'S CASE (THE WEB SITE)

As it is mentioned above, we have designed and implemented a website (by using ASP. NET) that will serve the users and facilitate submission of required information (by using e-forms) to a certain job, our website final implementation is shown in the Figure 4.3, the content is in Arabic language because the native language for the targeted users is Arabic, so we will translate each statement and word to English by using comment on the Figures.

Figure 4.3: Home Page for Employment Agency.

As shown in the Figure 4.3, the home page contains a tab menu for navigation which consists of six tabs (welcome, instructions, registration, login, survey forms and contact). The tab menu is implemented by jQuery (jQuery is open source JavaScript library that simplifies the interactions between HTML document or more precisely the Document Object Model (DOM), and JavaScript).

4.3.1 Registration Page Implementation

First of all, the users (citizens) should register in the system by using their own e-mail, we choose the e-mail as an identification method between the users because Iraqi citizens do not have a consolidated national number (unique ID) that distinguishes citizens among themselves through the servers provided by the Iraqi Interior Ministry and provide a database of all personal information for the Iraqi citizens.

As shown in the Figure 4.4 the registrations form required e-mail, password and full name. The registration form fields contain a required field validator and expression validator. In other words, the fields must not be empty and the information must be in a correct expression. As an example, to ensure the email in a correct expression, we used the following expression validator "\w+([-+.']\w+) *@\w+([-.]\w+)*\.\w+([-.]\w+)*".


Figure 4.4: Registration Tab.

After the submission of the registration form, the user needs to confirm the used e-mail, and it is not a fake one, we accomplish this step by generating a unique string code that is stored in the (registered) table and send a copy of the code to the user's e-mail, when the user clicks the register button, the website will be redirected automatically to a code confirmation webpage (confirm.aspx), this page will ask the user to enter the confirmation code (activation code) that is sent to the user's e-mail previously, the webpage (confirm.aspx) which will be shown in the Figure 4.5, after entering the code by the user, the account will be confirmed (activated) by updating the (confirmed) field in the (registered) table that belongs to (EGOV) database, now the account is ready for login to the system.
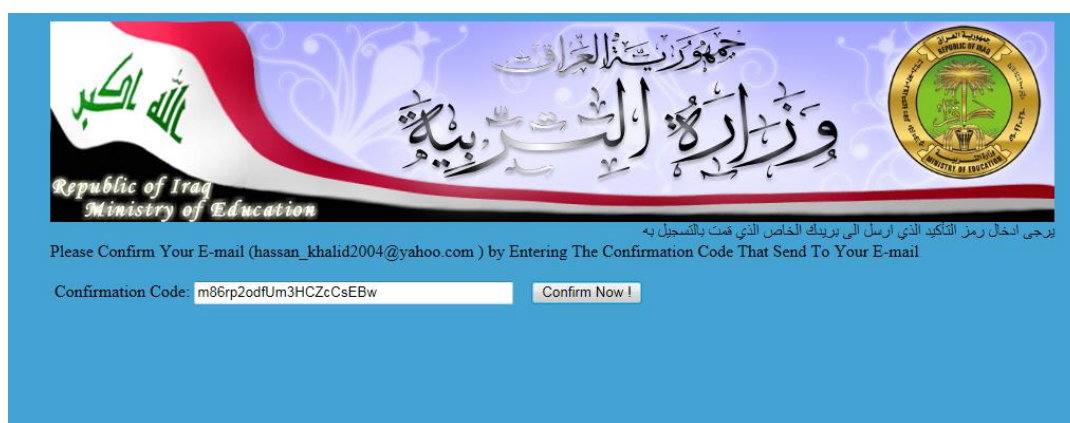
Figure 4.5: The (confirm.aspx) Webpage.

4.3.2 Login Page Implementation

After user activated the account, the account is ready to use and login the system, after the login operation there are two possibilities. The first possibility is that the user did not submit the application form; therefore the system will redirect the user to fill the application form (WebForm1.aspx) as it is described in section 4.3.3. The second possibility is that the user has already submitted the application form; therefore the system will redirect the user to (status.aspx) page for printing report issues as it is described in section 4.3.4. The login tab is shown in Figure 4.6 below.
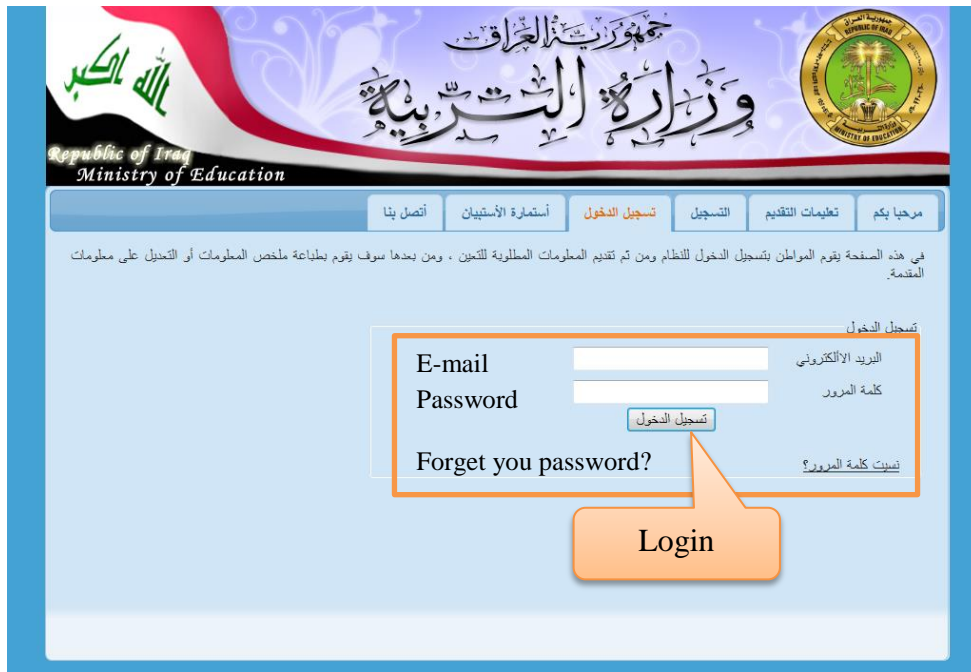
Figure 4.6: Login Tab.

We can distinguish between users who have given the appointment request form who did not submitted it through field (FormStatus) in the (registered) table that belong to (EGOV) database. This operation accomplished by, for any new registration in the system we placed the string (No) in the field mentioned above as a default value for each new user registration, when the user fill out the application form the field mentioned will be updated to (Yes), so when the user back to login he or she will turns automatically away from the application form.

The login tab fields consist on requirement fields' validator, and expression validator to ensure enter the correct e-mail form and do not leave the fields empty so will reduce jobs on servers. There is a link specializes in case user forget the password, depends mainly on sending the password as e-mail for users' e-mail that used in the registration process, if the entered e-mail is wrong or is not available in the database, the system will notify the user that e-mail is wrong or not available in the system by a message that appears onscreen, this feature has been implemented by using the AJAX panel extender as shown in Figure 4.7.

Figure 4.7: The AJAX Panel Extender Used for Forgotten Passwords.

4.3.3 Application Form (E-Form)

The electronic form is the most important topics in the system, it is used to collect and arrange the information from users. To be correct and coordinated we use the required field validator and expression validator to collect data from users in a unified and accurate format, if there are errors in data entry, it will be returned for correction at the same moment and correction responsibility located on the user as also the process of data entry.

The e-form in our system consist of four sections: personal information, residential address and contact, academic achievement and identification information as shown in Figure 4.8 below.

- Personal information: this section responsible to collect information like the (full name), for the full name we divided the name to four fields (first name, father, grandfather and surname) to avoid similarity in names and to find out the composite names, (mother name) also important to avoid similarity in names, (place and date of birth) it was implemented by using AJAX calendar extender to choose the date form popup calendar with fixed format through using for expression validator, (gender), (martial state), (number of children) and (if the user from the families of martyrs and described kinship martyr) the Iraqi government prefer the families of the martyrs in the job appointment as honor and gratitude for the martyrs, but the martyrs must to be a first-degree relatives.

- Residence address and contact: the second section is the responsible to enter the residence address by using the cascading dropdown list with the SQL database to choose a province, district and quarter, also there is a field to enter the mobile phone number for contact issue as well as the e-mail.

- Academic achievement: through this section the user can demonstrate academic achievement that awarded for him or her, it is includes the degree of academic achievement (primary, secondary, Bachelor, Master, etc.), the certificate and competence, the type of study, graduation year and average.

- Identification information: The last section of the electronic form is dedicated to providing identification information and because Iraq has no unified database of citizens' information we chose some of the most important official documents that are used in Iraq to prove the personality of the Iraqi citizen. These identification documents are: identity card, Iraqi nationality card, information card and the family card.

Figure 4.8: The Application Form (E-Form).

4.3.4 Status and Report Page.

The status page can be displayed in two ways. The first, after login of user who submitted the application form before. The second, after the user submitted the application form successfully he or she will redirected to status and report page immediately. The status page will display the final information that submitted by the user to the system and enable users to print a report from this page. The Figure 4.9 below shows the status page.

Figure 4.9: Status and Print Page.

The report in our system is implemented by using the crystal report, through filling the report with user's information that retrieved from the database; at the same moment, the crystal report will be converted to Portable Document File (PDF) and displayed on user's web browser with the ability of download a copy from the report. The sample of a report can be shown in Figure 4.10.

The report that is shown below in Figure 4.10 shows how it carries a Quick Response barcode (QR) that is important to retrieve users' information, in information checking process in the administration application that will be described in section 4.4.4.

المديرية العامة لتربية نينوى
جمهورية العراق ـ وزارة التربيـــة

أستمارة التقديم

المعلومات الأساسية

المعلومات التحصيل الدراسي		المعلومات الأساسية	
درجة التحصيل الدراسي	ماجستير	الأسم الكامل	Hassan Khalid Saeed SAEED
الأختصاص	Computer Engineer	أسم الأم	Ahlam
طبيعة الدراسة	أهلي	محل الولادة	نينوى
سنة التخرج	2012	تاريخ الولادة	08/02/1983
المعدل	96.5	الجنس	ذكر
		الحالة الزوجية	متزوج

المعلومات الثبوتية

المعلومات الثبوتية			
رقم هوية الاحوال المدنية	1234	عدد الاطفال	1
رقم السجل هوية الاحوال المدنية	1234	من ذوي الشهداء؟	كلا
رقم صفحة هوية الاحوال المدنية	1234	صلة القرابة بالشهيد	
تاريخ صدور هوية الاحوال المدن	01/04/2013	تاريخ تقديم الأستمارة	4/2/2013 6:32:41 PM
رقم الجنسية العراقية	1234	**المعلومات العنوان**	
تاريخ صدور الجنسية العراقية	01/04/2013	المحافظة	نينوى
رقم بطاقة المعومات	1234	القضاء	قضاء الموصل
تاريخ صدور بطاقة المعلومات	01/04/2013	الناحية	المركز
رقم بطاقة العائلة	1234	الهاتف	00905319452236
تاريخ صدور بطاقة العائلة	01/04/2013	البريد الالكتروني	hassan_khalid2004@yahoo.com

6:34:34PM   4/2/2013

Page 1 of 1

Figure 4.10: The Final Report for Employment Agency Application.

4.4 THE IMPLEMENTATION OF ADMINISTRATOR'S CASE.

For the purposes of the administration, we implement another application using C# Windows Form Application to manage administrators' accounts, generate reports and check users' information to prevent counterfeiting and fraud in the user's information. The administration application will consist of, a window that enables the administrator to login to this application and find out the type of action which is authorized by the system that of data checker, reports maker, or administrator's account manager, these choices have been implemented by reading the accounts information from the (ADMIN) database that is referred to in section 4.2.2. Depending on the administrator account type, the successful login will be redirected to the right window as it is mentioned earlier; each type of account has its own application window.

4.4.1 Login Window.

The first important window in the administration application is the login window, it is a simple login window that requires a username and password, at first, the application will check if the account is enabled or disabled, then the application finds out the type of account to redirect the administrator to the right application window, all that implemented by reading parameters from (ADMIN) database. The following code with Figure 4.11 will illustrate a login window.

```
if (vars.acc_status == "Enable")
{
                if (vars.acc_type == "Accounts Manager")
    {
                        vars.acc_name = "Accounts Manager";
                        Accounts a = newAccounts();
        a.Show();
                        this.Hide();
    }
                if (vars.acc_type == "Reports Maker")
    {
                        vars.acc_name = "Reports Maker";
                        report a = newreport();
                        a.Show();
                        this.Hide();
```

```
                }
                        if (vars.acc_type == "Information Checker")

                {

                        vars.acc_name = "Information Checker";

                        check a = newcheck();

                        a.Show();

                        this.Hide();

                }

        }
        else

           {

                MessageBox.Show("Your Account is Disable");

           }


        }
        else

        {

                MessageBox.Show("invalid username or password!");

        }
```
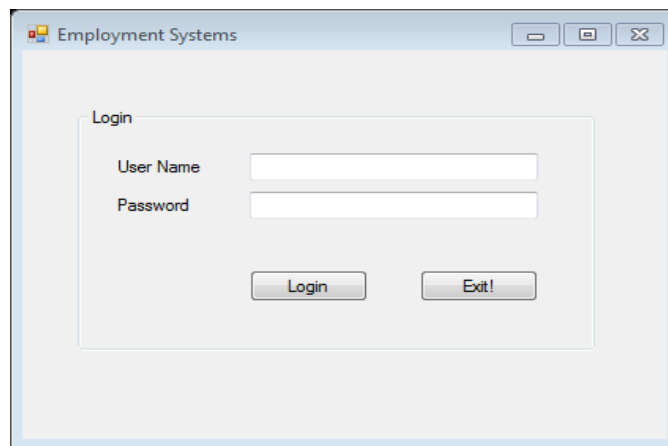

Figure 4.11: Login Window.

4.4.2 Accounts Administration Window.

In this window the administrator permitted to add, update or delete administrator's accounts information, according to the needs of the system such as changing the authority between administrators' accounts.

The Figure 4.12 shows account administration window; it consists of five textboxes (full name, user name, password, and account type and status), three main buttons (create, delete and update) and co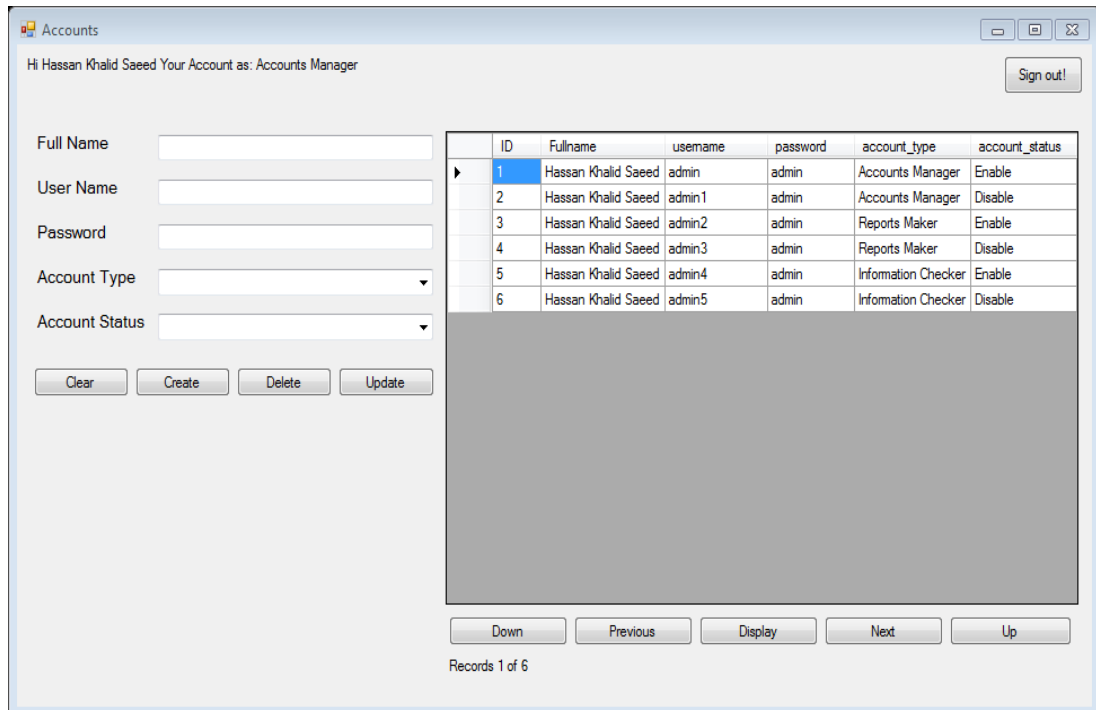nsisting of (Data Grid controller) to view all accounts information with navigation buttons to navigate between accounts' information and make updates or deletions easily. This window likes other windows having a logout button, which is responsible for logging out the user from the current application window and go back to the login window.

Figure 4.12: Accounts Administration Window.

4.4.3 Report Management Window.

In this part, the application is responsible for preparing reports concerning the submitted information from the users (citizens) who want to get a job in the government institutions as employees. Reports can be generated in several forms and can be classified according to several inputs, for instance, they can be classified depending on the location of residence, competence, age, gender, and etc. Figure 4.13 shows a sample of the report viewer.

The report is implemented by using C# (Report Viewer controller), so we can export the report to multiple file formats with navigation capability and direct print functionality.

Currently report window is not classified; it is lifted to the Ministry of Education in order to classify the report as the ministry's requirements at any time because these requirements can be changed from time to time and according to the requirements of job recruitment so we left this part of the application programmable and updateable.

Figure 4.13: Report Management Window.

4.4.4 Information Checking Window

It is mentioned before that this window is optional, but it is important to check users' information for any fraud and cheating when user submits wrong information. Users need to submit the final report that is generated after submission all the information with a copy of identification and academic documents to the governmental institute; then they will be responsible for this application window to compare the submitted information (on the database) with the information on the documents (hard copy) by

using the information check window of the administration application, the information check window shown in Figure 4.14.

Figure 4.14: Information Checking Window.

By using a barcode reader to read the QR barcode that is placed on the report to read the e-mail of the user, so we can retrieve user's information and put it in a non-editable textboxes. Now, the administrator can compare the information that is retrieved from the server with the original information, if the information is matched the administrator can approve the information by storing the name of checker with checking date in a different database that cannot be reached by users, if the information is not matching, the administrator can cancel the operation and notify the user that there is a problem in the application form.

CHAPTER V

CONCLUSIONS AND FUTURE WORK

5.1 CONCLUSIONS

Some recruitment agencies such New York Employment Services System (2013) play the role of mediator between the citizen and the other side (the government or the private sector), where the agency is limited appointment offer jobs currently available in various fields, and these organizations help in the screening of applicants for the job or recruitment procedures. Thus, they make financial profit through the provision of these services to employers and the businessmen in the private and public sectors [38]. While, our system collect information form the job seekers, identifying their skills through the creation of detailed reports from the information entered into the system, these reports will be submitted to employers who are looking for specific jobs skills possessed by job seekers. Thus these reports will help them in decision-making in the recruitment process. Our system (Employment Agency) is administered by government and provides services without any charge (free of charge).

For our e-government application we expect several benefits for both the government and the citizens. The expected advantages of using the e-form in the web application for the citizens can be described as follows:

- Cost factor: according to Accelio (2002), the use of e-forms can reduce the processing costs up to 90% compared to the traditional form with manual processing. The cost factor may be reduced in another way by using e-form [1].
  - ➢ Reduce printing cost.
  - ➢ Reduce duplicated data entry that result in cloning errors.

- ➢ Collect accurate database far from the need of correction by human intervention to modify the data.

- ➢ The use of electronic forms will reduce the resources needed to correct the possible error may happen in the traditional forms.

- Error factor: collecting data by using e-forms may significantly reduce data entry errors. When forms are designed, one can make each field to hold only a specific model or data style. These masks facilitate the process of collecting all data and information from users in an organized, accurate manner on the same format and also reduce the time that the user needs. If the users enter their information not in the form that is required in the fields of the electronic form, the electronic form returns to the users immediately so as to re-correct the information, either the content or the shape of information. This helps to save time and cost associated with the traditional paper form processing with human intervention. Additional errors could be avoided since the data is captured correctly from the first time, and thus, helping to eliminate the need to manual re-keying after the receipt of a form for treatment.

- Reduce processing time: e-forms can be put online to reduce processing time, and then, data has not to be transferred manually from paper based forms to other ones or the processing system. This information re-keying costs time and money and perhaps increases the error rate. When errors reduced during the data collecting front, growing time is minimized due to the incomplete or incorrect forms. This results in fast completion of the activity where users send their data electronically and provide information instantaneously. Finally, when the e-forms can be accessed through the e-government gate 24-hours per day, this allows citizens or companies to complete and submit forms at their convenience.

The expected benefits for the government obtained from using the employment agency in job appointments at the expense of the traditional operation are as follows:

- Time reduction, usually the time needed for collecting the paper application forms from citizens and then converting into digital reading takes three to five months.

- Eliminating the human resources that are used to put the information on papers and then into computers.

- Because of using modern technologies in data storing, the probability of data lost will be reduced significantly.

- Intermediaries and brokers will be eliminated.

- Reduce the amount of money that is usually spent.

The core of the system is an electronic form that is in charge of several essential things in the system:

- Reduces the costs associated with printing the form and handling. Bill Gates also described the cost of processing paper based form manually with processing automated electronic forms in his own book that released 1999, "Business at the Speed of Thought: Succeeding in the Digital Economy", [15]. As shown in table 5.1.

Table 5.1: Comparison between Cost of Paper and Automated Forms.

	Individual Form	Electronic form	Saving
Preparation and warehouse	$15	$1	$14
Overfilling and reprocessing	$145[1]	$5[2]	$140
Cost for Completed form	$160	$6	$154

- Reduce errors and improve the quality of data with expression validation.

- Provides a full audit, including the entire approval process.

---

[1] Includes employee time to fill the form by hand, directed completed form for approval, guidance to end user, user keying in cost and lost application forms and keying error [1].

[2] Include accomplish form, submitting the form and processing forms data in the database or Microsoft Office application again [1].

- E-forms do not need any high skills; create high-quality e-form that can be filled without need to an expert.

- Standardize information uniformly; information then stored permanently in its correct format in a centralized servers.

- The possibility of using the data stored for further analysis, saving time, effort and money.

In our system design we have used three-tier architecture, where this architecture play an active role in the design of the system features which give scalability, performance and availability for the system. The advantage of three-tier architecture is that the contents of any of the levels/layers can be replaced without making any changes resulting in any of the others. For example: when we need to change one database management systems to the other that involves only changes on the part of the data access layer. Also if there is a changes in user interface (from the desktop to the Internet), just we need to change some parts in the presentation layer.

The other issue raised in this work is to conduct a study on the readiness of the Iraqi citizens to embrace electronic government services which include the distribution of questionnaires in the city of Mosul in paper or electronic results were presented in Chapter four of this work. Where the results were satisfactory there is a good percentage 69% of the citizens they are ready to deal with e-government services. Also there is another factor is important to success of e-government services and it is the number of computers the connected to the İnternet per hundred citizen, the result was very encouraging has reached to 82% of the citizens have internet service. Also there is several percentages related to several issues are reviewed in chapter four.

5.2 FUTURE WORKS

For the development of this work we need to link our system with consolidated database for Iraqi citizens, so we suggest creating a consolidated database that includes all information of Iraqi citizens and to distinguishing citizens with a unique number called (Iraqi National ID). Because of the lack financial support, we could not introduce some new features such as sending alerts and messages to citizens via cell phone and track the progress of the transaction via SMS to create more interaction between the citizen government services.

We can propose a large number of e-government services that can be implemented in Iraq because of the acute shortage of e-government services in Iraq and after the entry of various kinds of techniques to Iraq at the time that the world is witnessing a major revolution in the field of information and communication technologies, these applications could serve a large number of segments of Iraqi society, some of these e-government services (application) are explained below:

- A single database for Civil Information System (National ID Cards), reducing counterfeiting allows the application for 'joint action among the various governmental organizations'. This system provides a high level of transparency and fairness between the government and the citizen, and thus, Satisfaction Guaranteed to the citizen through the elimination of various types of fraud.

- Governmental employee ID system; to find out the number of governmental employees in Iraq, this application helps in cut multi salaries per one employee.

- Health tracking system, the system will track the health status and health history of the Iraqi citizens. The system must register the results from visiting of each Iraqi citizen to any hospital in Iraq.

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APPENDIXES

Appendix (A)

<div dir="rtl">

مديرية التخطيط التربوي
شعبة البحوث والدراسات
العدد ٢٨٨٦
التاريخ ٢٠١٣/١/١

جمهورية العراق
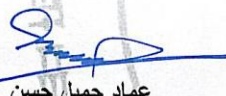وزارة التربية
المديرية العامة للتربية
في محافظة نينوى

إلى/ أقسام المديرية كافة

م/ تسهيل مهمة

تحية طيبة :-

يرجى تسهيل مهمة طالب الماجستير (حسن خالد سعيد)/هندسة حاسبات من جامعة جان قايا/تركيا لغرض اكمال بحثه الموسوم(الحكومة الالكترونية) ....

شاكرين تعاونكم معنا.. مع التقدير

عماد جميل حسن
مدير التخطيط التربوي وكالة
٢٠١٣/١/١٠

نسخة منه إلى//
مديرية التخطيط التربوي / شعبة البحوث والدراسات.

</div>

Appendix (B)

E-government Survey

We are pleased to know your opinions on matters related to e-government services to the Republic of Iraq, and our goal is to live our services to our expectations. Thank you for giving us a part of your precious time, and we promise that we take your opinion into consideration. Your personal information will be used only for the research purposes, will not be shared with third parties.

You can fill the electronic copy of this survey on the following link:

http://msserver.cankaya.edu.tr/surveyen.aspx

1 - Does the concept of e-government and clearly to you?

☐ Yes ☐ No ☐ I do not know

2 - Do you think that e-government is necessary in Iraq?

☐ Yes ☐ No ☐ I do not know

3 - Are you ready to put your personal information in an electronic site for government services via the Internet?

☐ Yes ☐ No ☐ Partly ☐ I do not know

4 - What do you think about services of ministries and agencies in Iraq?

☐ Excellent ☐ Good ☐ Medium ☐ Weak ☐ Very Weak

5- Do you think that e-government services to the Republic of Iraq will improve the performance of ministries and agencies?

☐ Yes ☐ No ☐ I do not know

6 - Are you aware of the existence of e-government services to the Republic of Iraq?

☐ Yes ☐ No ☐ Partly

7 - To what extent government agencies respond to citizens' requests submitted via the Internet?

☐ Quickly ☐ Slowly ☐ Do not respond ☐ I do not know

8 - Do you have an Internet connection (at home, work or mobile phone)?

☐ Yes ☐ No

9 – If the answer to the previous question (Yes) how satisfied you about Internet services?

☐ Excellent ☐ Good ☐ Medium ☐ Weak ☐ Very Weak

If the answer to the previous question (No) Please specify the reason.

☐

10 - Gender:

☐ Male ☐ Female

11 - Email: (Optional)

☐

12 – Age Group:

☐ 18-25 ☐ 26-35 ☐ 36-45 ☐ 46-and more

أستمارة أستبيان حول الحكومة الإلكترونية

يسرنا أن نسمع وجهات نظركم بشأن المسائل المتعلقة بالخدمات الحكومية الإلكترونية لجمهورية العراق، وهدفنا هو أن نرفع خدماتنا إلى مستوى توقعاتنا. أشكرك على منحنا جزءا من وقتك الثمين ، ونحن نعد أن نأخذ رأيك في نظر الاعتبار ، وسيتم استخدام المعلومات الشخصية الخاصة بك فقط لأغراض البحث ، لن تكون مشتركة مع طراف ثالث.

بأمكانك ملئ النسخة الألكترونية للأستبيان على الرابط التالي

http://msserver.cankaya.edu.tr/surveyar.aspx

1- هل مفهوم الحكومة الإلكترونية واضح لديك؟

☐ نعم ☐ لا ☐ لا أعرف

2- هل تعتقد أن الحكومة الإلكترونية ضرورية في العراق؟

☐ نعم ☐ لا ☐ لا أعرف

3- هل أنت مستعد لوضع المعلومات الشخصية الخاصة بك في موقع إلكتروني حكومي للحصول على الخدمات الحكومية عن طريق الإنترنت؟

☐ نعم ☐ لا ☐ جزئيا ☐ لا أعرف

4- ما رأيك في أداء وخدمات الوزارات والهيئات الحكومية في العراق؟

☐ جيد ☐متوسط ☐ ضعيف ☐ ضعيف جدا ☐ ممتاز

5- هل تعتقد أن خدمات الحكومة الإلكترونية لجمهورية العراق من شأنها تحسين أداء الوزارات؟

☐ نعم ☐ لا ☐ لا أعرف

6- هل أنت على علم من وجود خدمات الحكومة الإلكترونية في جمهورية العراق؟

☐ نعم ☐ لا ☐ جزئيا

7- إلى أي مدى تستجيب المؤسسات الحكومية لطلبات المواطنين المقدمة عن طريق الإنترنت؟

☐بسرعة ☐ببطء☐ لا ترد ☐ لا أعرف

8- هل لديك اتصال بالإنترنت (في العمل، المنزل أو الهاتف المحمول)؟

☐نعم ☐ لا

9- إذا كان الجواب على السؤال السابق (نعم) ما مدى رضاك عن خدمات الإنترنت؟

☐ جيد ☐ متوسط ☐ ضعيف ☐ ضعيف جدا ☐ ممتاز

إذا كانت الإجابة على السؤال السابق (لا) يرجى تحديد السبب.

┌───┐
│   │
│   │
│   │
└───┘

10- الجنس:

☐ ذكر ☐ أنثى

11- البريد الإلكتروني:

┌───┐ (اختياري)
└───┘

12- الفئة العمرية:

☐ 25-18 ☐ 35-26 ☐ 45-36 ☐ 46- وأكثر

<center>**CURRICULUM VITAE**</center>

PERSONAL INFORMATION

Surname, Name: SAEED, Hassan Khalid

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EDUCATION

Degree	Institution	Year of Graduation
M.Sc.	Çankaya University – Computer Engineering	2013
B.Sc.	University of Mosul – College of Engineering / Computer Engineering	2005
High School	Abdul – Alrahman Alghfiqi	2001

WORK EXPERIENCE

Year	Place	Enrollment
2007	General Directorate for Education in Mosul	Computer Engineer

FOREIGN LANGUAGES

Arabic, English and Turkish