University of Southampton

Faculty of Physical Sciences and Engineering

Department of Electronics and Computer Science

Using ICT: A Proposed Model for Reducing the Gap Between Citizens and Governments Towards Enhancing Public Services Quality: Case of Saudi Arabia

by

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Thesis for the degree of Doctor of Philosophy in Computer Science

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Abstract

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Information and communication technology (ICT) has been adopted by many governments around the world in the form of e-government to support and facilitate their communication. In addition, ICT offers new ways of delivering government services to the public. Saudi Arabia is an example of a country that has adopted technology with these aims, but it has lacked in enabling the engagement of citizens with government to deliver public service projects with assured quality standards. The failings are blamed on the system's lack of support for stakeholder oversight. In addition, the official monitoring committee performed poorly during project construction and delivery. In light of these inadequacies, more effective monitoring of implementation and operation of projects is required in order to improve the quality of public services from a long-term perspective. Fixes have been proposed to the lack of two-way communication between citizens and the government by inviting feedback from citizens through social media and other communication channels, however, a cohesive overarching model that enables the engagement of citizens with government projects has yet to be devised. There is a clear need for a model that can be used to design official systems to facilitate consultation between the government and the public, and to invite feedback from key stakeholders throughout each stage of the project life cycle.

Therefore, the aim of this research is to develop a conceptual model to engage citizens in monitoring the quality and the progress of public service projects. A model has been designed based on e-participation studies, theoretical work presented in the literature and case studies conducted to analyse and evaluate the available communication channels. As result, 10 different components were identified to assist proposing a model.

The proposed model was developed and then evaluated by 14 experts. This evaluation led to the inclusion of a new component for dealing with emergency situations. Subsequently, an online questionnaire was distributed over Saudi municipality experts in two cities to evaluate and confirm the model components on a wider scale. Accordingly, 85 responses were collected and analysed; the results confirmed the relevance of the 11 model components. Furthermore, 23 experts working in Saudi municipalities were interviewed to identify the challenges that may be encountered on implementing the model. In addition, a revision of the available e-systems offered by the Ministry of Municipal and Rural Affairs in Saudi Arabia was made to determine their similarity to the proposed model. The baseline for comparison was made using the 11 components identified in this study to assist in identifying the challenges more precisely. As result, six main challenges affecting the existing E-Systems along with eight main challenges that may affect the proposed model were identified. Finally, this research recommends technologies and features that might facilitate the implementation of the model.

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Research Thesis: Declaration of Authorship

Print name: Khalied Al Barrak

Title of thesis: Using ICT: Proposed Model for Reducing the Gap Between Citizens and Governments Toward Enhancing Public Services Quality: Case of Saudi Arabia

I declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

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3. Where I have consulted the published work of others, this is always clearly attributed;
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    - Al-Barrak, K., Carr, L. and Ryan, M. (2016) Towards a model for monitoring public services projects in Saudi Arabia. In: *10th European Conference on Information Systems Management (ECISM)*. Evora, PT, 08–09 Sept 2016, 11 pp, pp. 1-11

Signature:	Khalied Al Barrak	Date:	09/09/2018

Dedication

To my late father, Mohammed A. A. Al Barrak

11 Jun 1945 to 24 Nov 2018

Forever remembered, forever missed.

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I would like to thank my parents, brothers, sisters and friends: my heartfelt thanks and gratitude to my late father, who has always been a supporter of me and has contributed greatly to my life, while I have not been able to be with him during his illness. To my beloved mother, who was and always will be near me and who believed in my abilities to achieve all my goals in life.

Last but not least, a special thanks to my beloved wife for being in my life, for her support, and for the most precious gift she gave me, my beloved daughter Norah, who has lit up our lives since the moment of her birth.

Definitions and Abbreviations

ICT	Information and communications technology
Web 2.0	A second generation of the World Wide Web
Web 1.0	A first generation of the World Wide Web
SPSS	Statistical Package for the Social Sciences
PMO	Project management office
GPS	Global positioning system
IVR	Interactive voice response
TAM	The technology acceptance model
UTAUT	The unified theory of acceptance and use of technology model

Chapter 1 Introduction

The speed at which new technologies are adopted continues to increase rapidly and this has had a dramatic effect on the quality and effectiveness of service delivery in the public sector. Information and communication technology (ICT) provides an opportunity for citizen participation and empowerment. In addition, it encourages greater transparency and improves service quality (Cabinet Office United Kingdom 2010). Globally, governments have adopted different forms of technology to interact with and deliver services to citizens, such as e-services, e-participation, e-voting and community development. The Saudi government is just one of the national governments that has begun to realise the enormous benefits associated with the incorporation of ICT since 2005. More specifically, the Saudi government has established the "Yesser" programme in an effort to transform the government into an information society (Yesser Programme 2014).

However, technology has not been incorporated effectively in several public sectors, many of which already suffer from issues of inefficiency. One of the key problems faced by the government is the low quality of public services (AlMouasi 2014; Government Report 2013; Al Dhoky, Faisal Al Zahrani 2014), such as the maintenance of streets, sidewalks, parking, etc., which is a significant issue that should be given more attention by researchers. For example, there are many on-going projects that began many years ago but remain unfinished (Government Report 2013). Furthermore, many other projects have been listed on the government agenda since 1990 and a significant portion of the national budget has been allocated to these services for development purposes. Many of these public service issues can be categorised as follows (Al Dhoky, Faisal Al Zahrani 2014):

1- Completed and used by citizens.
2- Finalised but still not operative (for reasons that remain unclear).
3- Started but stalled at an early stage (for reasons that remain unclear).
4- Complete but not to a high standard of quality.
5- Listed on the agenda but with no physical evidence of project progression.
6- Shortage of public services in neighbourhoods and villages that are far from the main cities and the capital of Saudi Arabia.
7- Fraud by unregulated contractors.

This research considers how the use of technology and the power of citizen participation may contribute positively to the quality of public services by providing a reliable source of

feedback. In addition, it may mitigate the problems associated with the delivery of low-quality projects and could be used by governments, specifically the Saudi government, to better observe the planning and delivery of public service projects.

Many studies conducted in different parts of the world in relation to smart cities and the internet of the future demonstrate that citizens are valuable sensors of service quality and sources of data that can be used to analyse and generate valuable information to benefit all stakeholders (Clay 2014; Hansen & Reinau 2006; Villena-Román 2014).

Therefore, this research focuses on reducing the gap between citizens and governments through proposing a model. The purpose of the proposed model is to increase the engagement process between citizens and governments by increasing the role of citizens in monitoring public service projects. In addition, the focus is extended to provide recommendations regarding features and technologies that may be required to implement the model, such as internet and communication technologies and reporting tools (Mobile and Web Application, and Social media website). Finally, addressing the challenges that may affect the successful implementation of the proposed model is significant. Thus, the challenges facing the existing online platform in Saudi Arabia will be identified along with the challenges affecting the proposed model.

1.1 Research aims and objectives

The aim of this research is to reduce the gap between the citizens and the government of Saudi Arabia in terms of improving and monitoring public services. Technology could be used as a way to achieve this aim, by designing and implementing a mechanism that utilises citizens as sensors for monitoring and reporting their needs and observations related to government public services and projects.

The objectives of this research are listed as follows:

1. To explore the research problem from the citizens' perspective.
2. To identify and analyse the available tools that are used for monitoring and enhancing public services.
3. To identify the most suitable tool for this kind of work, and the features and functionality required.
4. To propose a model to engage citizens with municipalities to monitor public service projects.

5. To Identify challenges that may occur during the proposed model implementation.

1.2 Research questions

To achieve the aims and objectives of this research, the following research questions and sub-questions need to be answered:

RQ1: What is the appropriate model that would enable two-way communication between citizens and the Saudi government for monitoring public service projects?

- RQ1.1) What are the existing systems used for monitoring projects?
- RQ1.2) What are the limitations of the existing systems?
- RQ1.3) What are the components that can assist building a model for monitoring public service projects in Saudi Arabia?

RQ2: What challenges would result from implementing the proposed monitoring model in Saudi society?

- RQ2.1) What are the challenges facing the current online system?
- RQ2.2) What are the proposed model components being implemented in the current online services of municipalities in Saudi Arabia?
- RQ2.3) What are the challenges that might be encountered during the proposed model implementations?

1.3 Thesis structure

The flow of the research methodology is presented in this section, and summarised as shown in Figure 1.The structure of the thesis and chapters are organised as follow:

This chapter provides an overview of the research problem, research aims and objectives, defining the research questions, and the structure of the thesis.

The second chapter provides a literature review and background knowledge related to the research problem. It begins by examining the research areas related to public service projects and their life cycles, and the adoption of ICT by the public sector. In addition, this chapter discusses the role of social media in the Saudi context and goes on to identify the existing systems used for reporting public service issues. It also provides an overview of the role of citizen participation and the participation applied areas and forms. Finally, gaps in the literature are outlined and the research problem is shaped.

Chapter 3 provides the research methodology followed in this study and the methods used for data collection. The research methodology is divided into three phases. Phase 1 is concerned with an exploratory study which focuses on understanding the citizens' perspective regarding public services and their preferences for reporting issues. In addition, it examines the applicability of the available solutions related to this research and identifies the common components used to encourage citizen participation. Phase 2 is focused on designing and building a conceptual model, as well as the evaluation and confirmation process of the proposed model. The last phase is concerned with determining the challenges that may be encountered during the model implementation. The research methods used in the aforementioned phases are case studies, expert interviews and questionnaires that were distributed to experts as well as Saudi citizens.

Chapter 4 presents the findings and discussion for an online questionnaire distributed to Saudi citizens. The findings include demographic information, and the role of smartphones and social media platforms in Saudi Arabia. Also, it discusses the quality of Saudi public service projects from the Saudi citizens' perspective. Finally, it presents public service issues and the preferred means for reporting issues.

Chapter 5 focuses on the model development process. It presents three different case studies used to assist the development of the model. The first part provides the findings of the first case study, which is concerned with an in-depth analysis of twitter posts. Next, the second case study findings are related to the researcher's involvement with the Southampton people's panel project. Subsequently, the findings of the third case study are also presented, which provide an in-depth analysis of the existing online platforms available for monitoring public services. The chapter ends by determining the common e-participation components used in the aforementioned case studies.

Chapter 6 illustrates the proposed model. It starts by explaining the model components and how they are related. Next, it constructs the model over three different steps. The final model is presented, containing 10 components, along with a model architecture that explains all the possible interactions between the stakeholders to assist in the implementation of the model. Finally, the recommended technologies to be used for model implementation are suggested.

Chapter 7 presents the findings of the proposed model evaluation and confirmation. A mixed method approach is used for data collection. The first part discusses the findings of the experts' interviews, which aim to understand public service issues as well as evaluate

the proposed model components. Next, the findings of the experts' questionnaire are presented, which focus on confirming the model on a wider scale.

Chapter 8 presents an overview of the Saudi e-government transformation initiative challenges. It also discusses the findings of experts' interviews utilised in this study. The first part of the findings defines the challenges facing the current e-system used by Saudi municipalities, while the second part describes the challenges that may arise during the proposed model implementation. Finally, it explains the relation between the existing communications means used in Saudi municipalities with the proposed model in order to define the expected challenges that may be encountered on implementation.

Chapter 9 concludes this thesis by providing an overview of the research. It highlights and discusses the contributions of this research and its limitations. It also discusses gaps in the research and makes recommendations for future work.

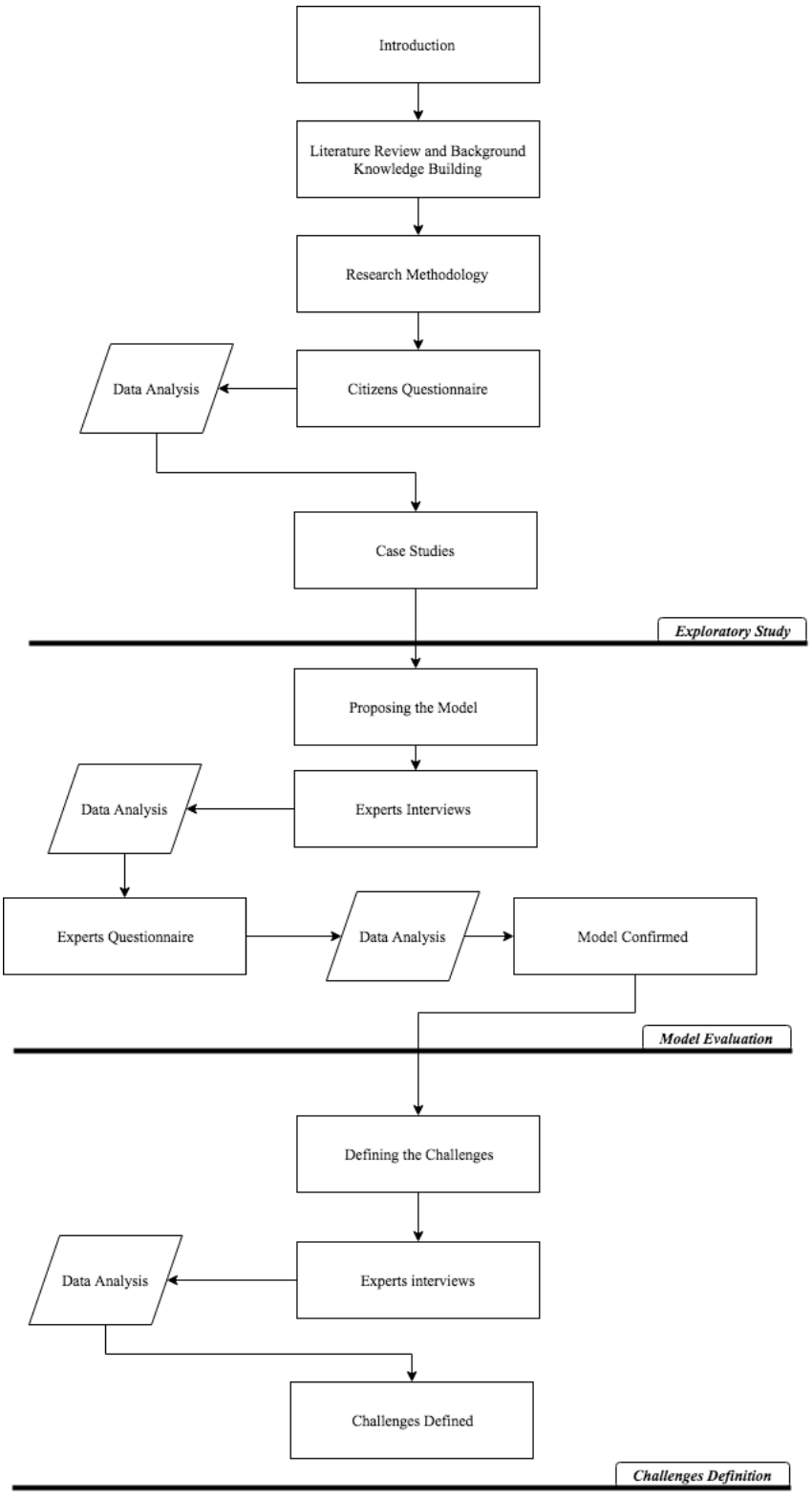

Figure 1: Research flow summary

Chapter 2 Background and literature review

This chapter aims to provide an introduction and background to public services in general, and the problems related to them. In addition, it discusses the role of ICT, citizens' participation and the applied areas and forms, as well as providing a summary of the available reporting tools and the most recent work in this area. For elaboration, Figure 2 presents the main areas that will be covered and their roles, which together make e-monitoring effective.

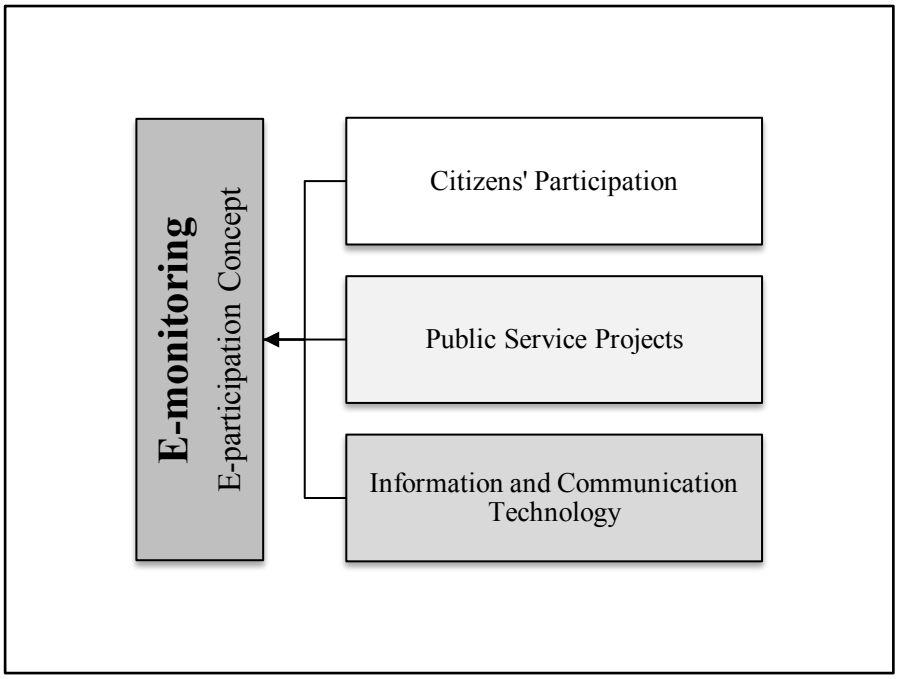

Figure 2: Components that play a role in e-monitoring public services

2.1 Public services

Public service has been defined as a "service that is provided by a government to people living within its jurisdiction, either directly through the public sector, or by financing private provision of services" (Howieson et al. 2014). Also, it has been defined as "market and non-market services which the public authorities class as being of general interest and subject to specific public service obligations" (Szyszczak 2011). Public services can include education, emergency services, environmental protection, public transportation, public housing, town planning, waste management, water supply networks etc. Regardless of income, public services should be provided to all citizens and it is a widely acknowledged public agreement that certain services should be made available to all, regardless of income or social standing (Public Services International 2015).

2.1.1 How are public services managed and constructed?

Almost internationally, there are two different approaches that public authorities can choose to employ for the management of public services (European Parliament 1997; Ministry of Municipal and Rural Affairs 2002):

Direct management:

Where the public authority is fully responsible for managing and maintaining all aspects of the service. In most cases, this approach is rarely used.

Delegation or indirect management:

Delegation of management to public or private operators is the second approach and local authorities generally prefer to use this approach. In this scenario, the public service mission and the details of its obligations are imposed on the operator by the public authority.

In the case of government construction projects, the public authority delegates construction work to contractors. To demonstrate how this process works, the life cycle of a new construction project is presented in Figure 3.

In Saudi Arabia, each municipality develops a project design and specifications. After that, the project profile will be sent to the Ministry of Finance in order to obtain allowances to build the project (Ministry of Municipal and Rural Affairs 2002). The project will be posted as a public tender for construction companies registered in the government databases. The company that provides the best offer for the project is chosen as the winning contractor and is instructed to begin working on the project once the contracts have been signed. During the construction process, public authorities maintain full control over the monitoring and oversight of the project and deal with all relevant complaints.

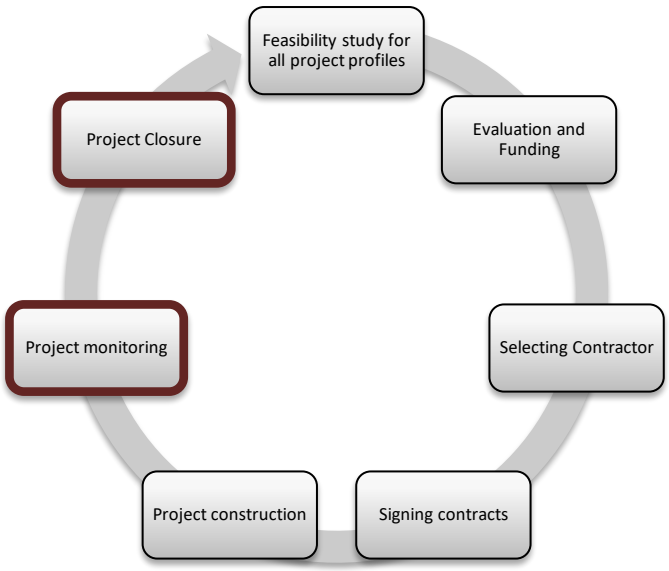

Figure 3: A summary of the public services projects' life cycle. Project failure occurs during the last two phases of the cycle.

2.1.2 Public service issues in Saudi Arabia

Saudi Arabia is considered to be a developing[1] country and it is always seeking to pump money from the annual budget into the development of the state infrastructure in different sectors. However, as in many other countries, Saudi Arabia suffers from difficulties in various aspects of the public services provided to its citizens. Al-Kharashi and Skitmore (2009) found that the most significant problem that Saudis experience is delays in the timely completion of projects according to the plans. This is due to a number of factors, including a lack of qualified staff and the undersupply of manpower.

Assaf and Al-Hejji (2006) found that 70% of projects in the eastern province of Saudi Arabia encountered time overruns, while Al-Khalil and Al-Ghafly (1999) stated that there are a number of factors that lead to a lack of quality in public services and the delayed completion of projects. These factors include cash flow and financial difficulties, obtaining permits, assigning projects to the lowest contractor bid without considering the capability of the contractor, and owners underestimating project duration. Furthermore, Elawi et al. (2016) found that the most severe reasons for delay included land acquisition, poor site management and supervision, contractors' lack of expertise, design conflicts between owners, delays on the part of the contractor, or change of consultant or contractor during project implementation. These aforementioned factors often lead to an increase in project

[1] Country classification report prepared by the Development Policy and Analysis Division of the Department of Economic and Social Affairs of the United Nations Secretariat

delivery time, resulting in loss of project budget, longer delivery times, suffering by beneficiaries (citizens and residents), and roads that are sometimes closed for long periods of time.

Mohammed Sheriff, head of the Anti-Corruption Commission in Saudi Arabia, has identified significant reasons behind project failure and the low quality of service delivery (Al-Sibai 2011). There is a lack of supervision during the construction of the project and the final committee members are ineffective as they are unable to highlight the flaws and shortcomings in the implementation of the project. These factors tend to have an impact in the last two phases of the project construction life cycle (see Figure 3).

2.2 ICT benefits, challenges and its role in e-government transformation

In the mid-1980s the British PICT initiative, a programme related to the concept of Information and Communication Technology, was introduced (Dutton & Peltu 1996). It has been defined in the programme leader's summary as "all kinds of electronic systems used for broadcasting, telecommunications and computer-mediated communications" (Dutton & Peltu 1996). Dutton provided some examples of ICT, such as personal computers, video games, interactive TV, cell phones, the internet and electronic payment systems (Wyatt 2000). The previous definition and examples can provide a general sense of what ICT means and could include.

Since then, ICT has changed the way that citizens and governments interact. In fact, it offers an opportunity for governments to engage deeply with citizens. In addition, it affects the quality of service delivery positively by providing convenient and effective ways to access most of the available services. Social media, mobility, the cloud, big data and analytics are the main technology trends that could lead to a deep reform in government services, processes and technologies (Le Masson & Al-Yahya 2014).

2.2.1 The adoption of ICT by the Saudi government

The government of Saudi Arabia started to adopt the idea of ICT in 2005. It has established the "Yesser" Programme, which aims to digitise and transform the government into an information society to reap the enormous benefits of e-government concepts for the national economy and service delivery (Yesser Programme 2014). This aim became a reality in 2014, when Saudi Arabia was ranked 5th in a comparative study of digital

government performance across 10 countries (UK, USA, UAE, Singapore, Saudi Arabia, India, Brazil, Germany, Korea, Norway) (Le Masson & Al-Yahya 2014). Furthermore, many other e-government indexes have ranked Saudi in advanced positions: 36th in e-government development, 20th in e-government services, 8th in e-transactions in Asia (United Nations 2014).

The Saudi government initiated action plans in order to implement the Yesser Programme. The first action plan implemented the project in the public sector from 2006 to 2010, with the vision of providing better government services to users (Yesser 2017c). The government wants to provide better services to the user by developing reliable infrastructure on which quality e-government services can be provided. The second action plan was started in 2012 and completed in 2016. The goal of the second action plan was to build a sustainable e-government force while developing a culture of collaboration and innovation (Yesser 2017c). A third action plan is being prepared by Yesser to further improve the implementation of the system in the government (Alfayad & Abbott-Halpin 2017). These action plans can be understood as stages of development, where the Programme works with different government agencies and entities to achieve the goals of e-government (Alfayad & Abbott-Halpin 2017). The Saudi government's e-Programme includes three main projects focused on the development of the engagement between the citizens and government (F.El-Sofany et al. 2012). These projects include the E-payment gateway to facilitate payment between government and businesses, businesses and businesses, and government and citizens. The government also aims to develop smart cards to store citizen information in an accessible manner. Lastly, the government also aims to develop the Ministry of Interior (MOI) e-services named "Absher", which is a portal from which the citizens can obtain identification cards and any other documentation that a citizen may require (F.El-Sofany et al. 2012).

In addition, the Saudi Arabia government passed resolution no. (40) dated 27/2/1427H, which states that government entities should implement a biannual score to measure how much they have achieved in the e-government transformation (Yesser 2017c). Moreover, to measure the performance of the government entities that were involved in the Yesser Programme, a general methodology was developed that tested the effect of the Programme on the efficiency of the government entities through different stages of e-government transformation. As the measurement of e-government transformation was still considered unprecedented in Saudi Arabia, the measurement methodology took into account that e-government transformation does not mean a complete technological transformation. Rather

it is considered to be an ideological transformation for acceptance of such a technological transformation. Other principles were also taken into account while developing the measurement methodology to ensure that the transformation was measured according to the clear vision of the Programme (Yesser 2017c).

Table 1 and Table 2 present the results of the 1st and 7th measurements of the performance of the government entities (Yesser 2017a; Yesser 2017b). It may be seen that the achievement percentage of the different groups changes as time goes on.

Table 1: The government entities' performance in the 1st measurement.

Name of group	***Achievement percentage***
Ministries	60.1%
Hospitals	59.3%
Presidencies	55.4%
General corporations	60.3%
General authorities	53.6%
Universities	46.2%
General directorates	45.5%
Councils	38.9%
Municipalities	41.9%
Governorates	40.1%
Diwans	38.2%
Other entities	39.8%

Table 2: The government entities' performance in the 7th measurement.

Name of group	***Achievement percentage***
Hospitals	84.44%
Ministries	72.82%
Public Institutions	68.71%
Universities	64.23%
Bureaus	63.98%
Other	59.30%
Municipalities	58.56%
Authorities	58.51%
Public Directorates	57.63%
Diwan	54.50%
Emirates	42.04%
Presidencies	38.03%

During the implementations of the action plans outlined above, the government identified a number of challenges and issues that limited the success of the Programme. The main issues that were identified by the government included the lack of qualified personnel in government organisations. Moreover, since the government intends to digitise the information of citizens, privacy concerns also posed a major concern. Lack of collaboration between different government departments and the weakness of the IT infrastructure in public organisations also caused issues during the implementation of the Yesser Programme (Alfarraj et al. 2013).

Yesser also noted that the lack of money also significantly held back the implementation of the Programme in the government. The fact that ICT infrastructure is expensive to implement and there was limited spending on ICT meant that the Programme could not meet its full potential. Lastly, Yesser noted that the lack of marketing related to the benefits provided by e-government Programmes also resulted in limited use of the systems by the end-users, who are the citizens. The general lack of belief in change by the employees and the top management, lack of documentation and lack of engagement by the government with the private sector and universities during the implementation of the e-government services caused many issues in its implementation. These issues prevented the Yesser Programme from reaching its full potential and need to be addressed before further implementation (Alfarraj et al. 2013).

2.2.2 The adoption of ICT in public services

The advent of new collaboration technologies, specifically Web 2.0, has encouraged governments to adopt technology over the past decade. As it facilitates communication between citizens and governments, the majority of developed countries have applied ICT technologies throughout many sectors in order to provide citizens with the most effective and efficient services (Gupta et al. 2008). In addition, some independent organisations have begun to provide tools for the public services sector, such as FixMyStreet[2] and SeeClickFix[3]. These allow citizens to monitor and report issues in relation to public services directly to the local government. The use of ICT has also created a culture of transparency and a higher level of engagement between societies and governments (Bertot et al. 2010). Recently, developing countries have recognised the importance and value of

[2] A non-profit online reporting tool funded by the charity Mysociety: https://www.fixmystreet.com/
[3] SeeClickFix: an online reporting tool focusing on United States cities: https://seeclickfix.com

these technologies and how they could potentially be used to accelerate national development. Most of the Gulf countries such as Saudi Arabia and the United Arab Emirates, have adopted ICT in order to offer their citizens effective e-government services (Omari 2013).

However, the use of ICT should be expanded in order to further increase citizen engagement and transparency. The secretariats and municipalities in Saudi Arabia are trying to keep abreast of global technical developments, as a number of them have developed many internal systems for employees, and external systems that benefit citizens and residents (Hirst & Norton 1998). The most prominent examples in Saudi Arabia that are associated with the engagement of citizens and residents are the "Adaa" programme and the "Balady" system. In addition, the Ministry of Municipalities and Rural Affairs aims to offer different means for reporting public service issues by citizens such as telephone, email, social media and smart applications.

With regard to smart applications, the Ministry provides the authority for each secretariat to develop its own application based on the specifications and standards imposed by the Ministry. Thus, the mobile application of the Eastern Region Secretariat, "Balagati 940", was selected as a sample to be studied in this research. The following sections will provide an overview of the aforementioned platforms, including the "Adaa" programme, "Balady" system, "Balagati 940", "FixMyStreet", and "SeeClickFix" application.

2.2.3 Adaa programme

The local government of AlMadinah AlMonorah in Saudi Arabia established the Adaa programme in 2014. It is a web application that ensures transparency in terms of budget spending, progress and constriction of public services (Adaa Programme 2014).

The aim of the Adaa programme for AlMadinah AlMonorah[4] is to develop a technical environment specialised in the monitoring of public service project construction. Currently, there are 32 different official departments participating in this programme, such as municipalities, universities and independent government organisations. In addition, the Adaa programme, in the near future, will invite participation from the private sector (Adaa Programme 2014).

[4] AlMadinah AlMonorah is a city located on the west side of Saudi Arabia, along the Red Sea coast. It has a population of 178,1733 and covers an area of 151,900 km² (stats.gov.sa))

Figure 4:Snapshot of a project summary from an Adaa web application

The Adaa web application provides a series of functions and a graphical user interface that allows project supervisors to record data gathered from the field and post daily updates concerning the construction progress of each project. Furthermore, it provides a visualisation interface showing detailed information for each project. Citizens can also access the Adaa web application with some restrictions; for instance, the public can only view the progress of each project and add comments. However, these comments remain invisible until they have been reviewed and deemed acceptable for publication by the web administrator. Figure 4 shows a snapshot of a project summary from Adaa that includes the project name, starting date, end date, budgeting and spending, contractor, project location and the status of the project. The main functionalities of Adaa are as follows:

- Performance indicators for projects and contractors.
- Information on the actors involved and budget data.
- Information on contracts, implemented projects and status updates.
- Information on project distributions in the area of Medina.
- Information on the observation of contracts, projects and follow-ups.

2.2.4 Balady system

Figure 5 : A snapshot of the Balady system control panel

The municipal sector transformation programme aims to improve the level of satisfaction of the beneficiaries and improve the quality of life and prosperity in Saudi cities. In late August 2016, the "Balady system" was announced as the national gateway in support of the municipal community. Its aim is to meet the aspirations and needs of current and future generations of residents. This portal was officially released for public use in January 2017. The Balady system provides three main services (see Figure 5):

1. Interactive services: to help promote the concept of community partnership and improve the quality of services provided to beneficiaries by gathering their opinions and ideas.
2. E-services: to assist in the submission of electronic applications to obtain the most frequently demanded licences. This service includes: construction licence services, professional licence services, schema approval services, shelter of accommodation facilities and investment opportunities.
3. Informatics Services: Providing information to assist beneficiaries in making relevant decisions and understanding the procedures of government transactions when submitting applications such as building a house or searching for engineering offices, requirements and procedures. This service provides the requirements for municipal activities, takes enquiries over immediate licences, and allows access to

the directory of engineering offices, municipal fees calculator and a geographic services explorer.

By providing these services, the Balady online portal aims to improve the quality of municipal services provided to all the secretariats and municipalities of the Kingdom, to activate the role of beneficiaries as active partners, improve their level of satisfaction and enhance transparency among the municipal sector.

2.2.5 Balagati 940

The Eastern Region Secretariat announced the launch of the "Balagati 940"[5] mobile application on smart phones in November 2015 and it has been updated continuously until the latest version was released in October 2017. The application allows residents of the Eastern Region to report any irregularities related to municipal services provided by the Eastern Region Secretariat and to direct the reported issues to the Centre for Communications and Emergency 940. The users can report issues related to the following: markets and public health for example (food and expired items, in-house restaurant, municipal requirements); environmental sanitation and vector control for example (control of flies, marshes, stagnant water, rodents and reptiles); street maintenance and public networks for example (a hole in the street and lack of rainwater cover); parks maintenance and municipal facilities such as (leaking water, fallen trees blocking the road, broken pavements).

2.2.6 FixMyStreet and SeeClickFix

Many independent organisations from different parts of the world have developed effective tools for reporting, viewing or discussing local problems with public services and other non-emergency issues in the region. FixMyStreet and SeeClickFix are the leading web applications in this field and have the same aim as the present research study but they use a different approach. FixMyStreet, for example, has been operational since 2007 in the UK (Crowley et al. 2012; Nesta.org.uk 2014). Many local city councils have adopted this tool and have integrated it into their non-emergency reporting channel alongside the traditional communication channels (email and phone). The main issues that can be reported using this tool include breakages, dirt, damage or dumped refuse, and any items or infrastructure that need fixing, cleaning or clearing (graffiti, dog fouling, potholes or street lights). Both

[5] Balagati 940 mobile application launch and its aim: https://goo.gl/w6SSvX

of these tools are somewhat similar in terms of how they work in reporting an issue (Nesta.org.uk 2014; Berkowitz & Lasater 2008; Sjoberg et al. 2015).

2.2.7 E-government initiative challenges

The adoption of ICT has a pioneering impact on the public sector, since it offers great opportunities for e-government in term of increasing efficiency of operations, service quality, innovation, learning and comfort. Although ICT is an essential component of e-government's sustainable development, there are a number of challenges that can affect the successful implementation of e-government initiatives (Dardha 2004).

Researchers and governments have invested efforts into addressing the barriers for e-government implementation (Signore et al. 2005). Generating a single, generalised list of challenges that will work in all countries can be imprecise, as each country has different political, economic and social trends and barriers to a successful transformation to e-government (Athmay & Alaa-Aldin 2013; Gil-García & Pardo 2005).

However, it is important to build an understanding of the shared challenges related to e-government. Some theoretical foundations have been set by Gil-García and Pardo (2005) to identify the primary challenges in general, and these have been categorised into 5 different aspects. There are information technology challenges, which highlight usability, compatibility, complexity and lack of technical skills as important factors to be considered while implementing IT projects. Likewise, data and information challenges focus on data quality and accuracy. In addition, there are organisational challenges such as resistance to change, and the variety of users. Law and regulatory challenges are mainly related to strict regulations. Lastly, security and privacy issues fall under environmental challenges. Moreover, Dardha (2004) stressed the aforementioned challenges and also added the leadership role, which includes motivation, involvement, influence and support.

To narrow down the challenges to the focus of this research, Alsaeed et al. (2014) has revealed 4 general categories of challenges after reviewing 35 publications related to e-government challenges in developing countries for the period 2000-2013. These categories are human challenges (such as awareness, attitude, e-readiness and training); infrastructure challenges (such as computer scarcity, data possession, data standards and information sharing); political challenges (such as legal framework, freedom of the press, data privacy legislation and regulatory issues); and organisational challenges (management support, change management, transparency and implementation guidelines).

2.3 Social media

Social media sites have been defined as "a group of Internet-based applications that build on the ideological and technological foundation of the Web 2.0, and that allow the creation and exchange of User Generated Content (UGC)" (Kaplan & Haenlein 2010). Although there is much confusion between the concept of social media and Web 2.0, it appears they are the same. Web 2.0 is the second generation of the web and it is a platform that allows the end-users to utilise web content and applications in a participatory and collaborative way to create and publish web content such as blogs, Wikis and social networking websites. On the other hand, Web 1.0 is a platform that allows content and applications, such as personal web pages or encyclopaedias, to be created and published by individuals (Kaplan & Haenlein 2010; Coyle & Vaughn 2008).

2.3.1 Social networking sites

Social networking sites are a part of the social media concept for text-based content generated by end-users for the purpose of communication over the web. They enable the sharing of pictures, videos and other forms of media. Twitter and Facebook are the most popular social networking sites based on the high number of users for these websites (Coyle & Vaughn 2008). Twitter, for instance, has 302 million monthly active users, 500 million tweets are sent each day, and 80% of these are from a mobile (Twitter.com 2014).

This high penetration usage of social networking sites has pushed business marketers and some governments to adopt them for different purposes such as marketing products and conducting scientific research, and as communication channels (Lorenzi et al. 2014).

2.3.2 Social media and the Saudi citizen

Social media has been growing rapidly in the Arab World since 2011. By 2014, there were 5.79 million active Twitter users in the region. Saudi's users account for about 40 percent of all active Twitter users in that region – there are around 2.4 million people using Twitter actively (Statista 2014). An active user is defined by Twitter as someone who logs in at least once a month. ICT infrastructure and the younger generation have played a very important role in the adoption of social media. According to the Saudi Communication and Information Commission, there are more than 51 million internet mobile subscribers with a population penetration rate of 169.3%. Broadband subscriptions are 24 million and there are 188 registered mobile phones for every 100 Saudis (Ministry of Communications and

Information 2016). These numbers indicate the familiarity and interest that Saudis have in technology and the internet. As a result, the Saudi government and many enterprises engage in the use of social media as a single means of communication, in order to deliver information and marketing for their services (Abdurabb 2014). Today, most of the public authorities have their own profiles on Twitter – even the King of Saudi Arabia has a Twitter account (@KingSalman) with more than 3 million followers. Although the main posts from the king's account are updates about his decisions and daily life, this affects the citizens positively by making their relationship with the government much closer.

An analysis of Twitter feeds has shown two reasons (Chapter 5) why the government uses social media as single means of communication. The first is the lack of seriousness of some citizens. The second is the use of anonymous identities, which may result in generating spam information that makes it difficult to track views and opinions.

However, it is clear that some of the public authorities, such as the Minister of Commerce and Industry, have realised the high engagement of citizens with social media, so he has paid more attention to the hashtag trends related to the ministry. He replies to some of the citizens' concerns through his Twitter account, and in addition, he has launched "Balag", a mobile application that allows citizens to report issues related to commercial fraud.

2.3.3 Saudis and the use of Twitter – why does it have a greater impact in Saudi Arabia than elsewhere?

The main reasons why Saudis use Twitter can be summarised into two categories. The first is for entertainment purposes and that can include getting news about famous actors and football players, or something related to their field of interest, sharing poems and quotes and sharing music and videos (Al Jabre 2011). The second is for formal use, which can include an open discussion about international and local political issues, government decisions and services, campaigns for social causes, and for business and marketing (Vale 2014).

Twitter has a great impact in Saudi Arabia as it gives "a space of freedom without censorship" (Hebblethwaite 2014). It is considered a platform where people can discuss topics that do not have an official process to handle such discussions. Usually, citizens share their opinions and needs through tweets. Also, it has become the fastest and most widespread way to receive news about what is really happening in the country. For instance, many Twitter accounts are dedicated to posting and sharing issues about public

services and current and future public service projects. Many hashtags have also been created to open discussions about certain issues. To confirm Saudi citizens' usage of Twitter for public services, a preliminary analysis for "#حفريات" (#pothole hashtag) showed 2,036 tweets in 14 days from 14/04/2015 to 28/04/2015. The analysis details are described in Chapter 5. Besides that, the hashtag '#جدة_سيول' has been used in Saudi Arabia since 2011. It is related to the disaster that happened in Jeddah, Saudi Arabia, when a heavy rainfall over 4 hours caused the death of more than 100 people and losses of more than 6 billion Saudi Riyals. The fragile infrastructure and poor monitoring when developing the sewage system were the main reasons for this tragedy (Edreeas 2011). The same hashtag is still being used in 2015 to follow up the investigations into the case and punish the perpetrators.

2.4 Citizens' participation

Citizens' participation aims to utilise community members for decision making and for influencing institutions and the services related to them. It employs citizens' skills and observations to enhance community condition and quality (Florin & Wandersman 1990). There is a variety of ways in which an individual may participate, for example as advisors or consultants on committees, as influencers of municipal policies, developing local activities, and in social movements. Citizen participation provides a positive addition nationally, locally, interpersonally and personally. Also, it has been proven that citizen participation has a great impact on improving neighbourhoods (Wandersman, Abraham Heller et al. 1984).

2.4.1 E-participation

The leverage of technology, Web 2.0 specifically, has empowered citizens' interactions with the political and administrative sphere in the form of e-participation. The term 'e-participation' focuses on the relationship between the citizens and the political sphere, as well as referring to a new communication channel for citizens and administration (Sæbø et al. 2008; Le Masson & Al-Yahya 2014).

In order to elaborate on this issue, the next subsections will provide an overview of some of the areas and forms of electronic participation that we include in the proposed model. The categorisation of these area and forms are based on the research conducted on the topic of e-participation by the European Network of Excellence (DEMO-net). DEMO-net

is concerned specifically with the role of ICT in citizens' participation processes (Avdic et al. 2007; Ergazakis et al. 2011)

2.4.2 Applied forms and areas of e-participation

This section provides an overview of the applied forms and areas of e-participation. Thirteen different forms and areas have been determined and these include Consultation, Deliberation, Polling, Voting, Campaigning, Electioneering, Petitioning, Decision making, Service delivery, Spatial planning, Information provision, Mediation and Community building. The definitions, purpose of use and application of the aforementioned areas and forms are presented below.

Consultation:

This is the process of obtaining citizens' opinions/feedback based on the information provided to them, usually in the form of questions, which is then used as source material by decision makers. This process is a form of two-way communication between citizens and decision makers (Braak, 2008). A successful project conducted in 2004 by the Environment Group of the Scottish Executive engaged citizens through an e-consultation system. This informed people about the key issues facing Scotland and asked them to give their views on a range of issues (Macintosh 2004).

Deliberation:

This is an open discussion for evaluating the available options and understanding the problems inherent in important policy issues. Such a discussion will be held at an early stage of the decision-making process, usually prior to voting. This ensures a high level of transparency throughout the decision-making process, which strengthens the bond between citizens and decision makers. In addition, this will result in the creation of a diverse community based on the common interests of the citizens. It will reinforce common opinion with strong and well-formulated arguments, essentially empowering citizens to express their opinions confidently and openly (Rose & Sæbø, 2010). Many projects have been established based on the e-deliberation concept, such as SMARTiP (Mechant et al. 2012). It aims to enable the implementation of open platforms based on citizen-centric and internet-enabled services in different cities, in order to stimulate citizen engagement and encourage them to be content creators, and informed and involved users.

Polling:

Polling is the process of conducting surveys to observe citizen's opinions (targeted citizens) on a variety of topics. The citizens involved in polling are usually selected in a scientific way (Bruschi et al. 2005).

Voting:

When it comes to elections, voting is a means of electing something that serves the interests of the majority. During the voting process, every individual can vote for the matters that concern them. ICT plays a crucial role in the voting process as it enables people to vote without being physically present, perhaps by using mobile phones, counting voices automatically or offering a convenient way for elderly and disabled people to vote by improving accessibility functionality (Xenakis & Macintosh 2004).

Campaigning:

ICT plays an important role in campaigning as it supports the campaigning process, which involves organising and achieving the goals of a campaign strategy and seeking to influence the decision-making process. The use of web technology and social media has a great impact on campaigns as it facilitates reaching the targeted audience and measuring the set goals (Baringhorst 2009).

Electioneering:

This is a political campaign run by a candidate using several activities to target the electorate via a variety of communication channels, such as social media, which are used to spread the candidate's messages (Ergazakis et al. 2011).

Petitioning:

This is a formal request signed by a number of citizens about issues related to them. ICT will support petitioners to disseminate information about the issues and encourage more participants to sign as it offers a convenient means of discussion (Mosca & Santucci, 2009). Since 2000, the Scottish Parliament has established an e-petitioning web-based system. This system simulates the normal business of the Parliament through the Public Petitions Committee. It supports creating, viewing and signing petitions. In addition, it allows citizens to post background information and join discussion forums. More details are provided in Macintosh et al. (2002).

Decision making:

ICT provides maximum participation in the decision-making process so that individuals can agree on a final choice from the alternatives options. This is due to its ability to offer rich information about the problem that affects the stakeholders, and the fact that it allows participants to express their thoughts (Ergazakis et al. 2011).

Service delivery:

These are all the services provided by government through the internet that allow citizens to carry out transactions in an electronic form. This area of e-participation is related to e-government, as more e-services will result in more citizen participation (Fraser & Adams 2003).

Spatial planning:

This is a process of monitoring and managing space and development on a local, regional, national and international level in order to achieve a better distribution of people and activities according to the needs of society, the economy and the environment. Using ICT, GIS systems in particular, in conjunction with useful information about regional municipality decisions, it is possible to reduce conflicts between opposing sides in a fast and transparent manner (Ergazakis et al. 2011).

Information provision:

Information provision is a critical factor in any e-participation programme as it determines the success of individual participation. It supports participants by providing them with in-depth knowledge of specific issues by posting well-structured, up-to-date and accurate data. Thus, a more valuable contribution could be made by participants if they have access to the required information, as this enables them to formulate strong arguments (Ergazakis et al. 2011).

Mediation:

Mediation can be an appropriate dispute resolution process that helps several parties to reach an agreement. ICT assists in the meditation process by offering a wide range of tools for connecting and initiating discussions between parties to achieve a dispute resolution (Ergazakis et al. 2011).

Community building:

Community building is achieved by formulating a group of individuals from the same regional area who share common characteristics. It enhances the community through the foundation of political groups, social clubs, small book clubs etc. ICT supports community building through the provision of social networking technology. Facebook, for instance, has been used to create groups for people with common interests where they share opinions and offer comments or dislikes on the content shared by others (Ergazakis et al. 2011).

2.4.3 E-participation in Saudi Arabia

In recent years, the development of modern technologies and especially web technologies has been significant and has had a positive impact on the government transformation to deliver its services and enhance the citizens' participation through e-participation (Alharbi, Kang & Sohaib 2016; Macintosh & Whyte 2008; Hu et al. 2014). E-participation utilises existing technologies to support and promote the "top-down" or "ground-up" engagement, to foster efforts to empower citizens (Macintosh & Whyte 2008; Hu et al. 2014)**.** Saudi Arabia was one of the countries that sought to adopt technology to facilitate the participation of citizens through the transformation of e-government (Nations United 2014; Alharbi, Kang & Sohaib 2016)**.** As e-participation is one of the main strategic objectives of the second action plan (2012–2016) of the "Yesser" Programme (Yesser 2012), Saudi Arabia sought to focus on e-participation in the government processes that include administrative processes, decision making, service delivery and policy making (Yesser 2012). Although Saudi Arabia has made a significant investment in e-participation services, there is a low level of citizen engagement in e-participation (Alharbi, Kang & Sohaib 2016)**.** According to the United Nations 2018 Survey, Saudi Arabia was ranked 67th in the United Nations e-participation index (Economic and Social Affairs 2018) while in 2012 it was ranked 22nd (United Nations 2012). The rank change in the UN index can be interpreted as a sign of lack of interest in developing and supporting the e-participation process or may indicate the low level of citizen engagement (Alharbi, Kang & Hawryszkiewycz 2016).

The Saudi government has attempted to address the issues with citizens' engagement in e-participation by implementing tools to assist encouraging citizens' participation (Alharbi, Kang & Hawryszkiewycz 2016). However, Saudi Arabia provides only 51% of all the e-participation services determined by the United Nations (2012). Although there are over a thousand e-services offered in the Saudi government portal to the public, very few target empowering citizen participation (Al-Aama 2011). The e-participation tools offered by the

Saudi government are online surveys, blogs and the use of social media (Alharbi & Kang 2014; Halpern et al. 2012). However, there are many other tools and technologies that could be used for e-participation that include chat rooms, online forums, e-Petition, e-Panels, e-Communities, e-Voting, e-Polls, e-Consultation tools, decision-making tools, webcasting tools, and platforms for interaction, collaboration, and sharing (Alrashedi et al. 2015; Mislove et al. 2007).

Several previous studies have explored the e-participation concept in Saudi and the models used to enhance it from different directions (Macintosh & Whyte 2008; Hu et al. 2014; Alharbi, Kang & Hawryszkiewycz 2016). Three main approaches were followed in these studies. Studies following the first approach focused on identifying the factors influencing citizens' intention to engage in e-participation from different perspectives (Hujran et al. 2011; Alomari et al. 2012; Hung et al. 2006; Rehman et al. 2012; Alrashedi et al. 2015; Alharbi, Kang & Sohaib 2016; Alharbi, Kang & Hawryszkiewycz 2016). The second approach was related to promoting participation initiatives through the adoption of social networking (Halpern et al. 2012; Taylor-Smith & Lindner 2009). In the third approach studies measured and proposed schemes to evaluate and identify the status of e-government websites, e-participation, and e-services (Al-Aama 2011; Al-Nuaim 2009; Athmay & Alaa-Aldin 2013; Alharbi & Kang 2014).

Furthermore, emphasis was placed on the research carried out on the e-participation related to municipalities and public services, which shows that there has been little focus in this area. To the best of our knowledge, the available studies that have focused on public services were conducted by Al-Nuaim (2009) and Al-Aama (2011). Al-Nuaim's (2009) research was based on the evaluation of six Arab capital municipal websites, including that of Saudi Arabia, by using a checklist; the results of Al-Nuaim's (2009) study found that these websites were not citizen-centered. Al-Aama's (2011) research focused on a proposed sophisticated evaluation scheme for assessing the electronic services provided by municipalities. The proposed evaluation scheme assessed the complexity or abundance of the services provided by each municipality in Saudi Arabia. However, there was no focus in the literature on strengthening or proposing communication methods to enhance citizens' engagement with municipalities in Saudi Arabia. Recent initiatives in this area were based on the online platforms and services provided by governments as mentioned in Section 2.2. Those platforms and services provided by the Ministry of Municipal and Rural Affairs and municipalities were Balagati 940 for reporting public services issues, the Adaa online system for providing information on the progress of public services projects, and the

Balady portal that aimed to activate the citizens' participation in a number of ways, but all had some drawbacks, as studied in Chapter 5. The next section provides examples of projects and research conducted to focus on the citizens' participation for monitoring public services projects.

2.4.4 Monitoring public services projects through citizen participation

In recent years, numerous researchers and governments have conducted projects, and research has gone into engaging citizens in monitoring public services (Tsega et al. 2013) or, as it is called, community-based monitoring (Huma et al. 2005). From all of this work, this section will report on some of the related work that motivates this research. In addition, it is possible to apply some of concepts used to Saudi Arabia as it shares many common issues in public services with other countries that use ICT to solve their public service issues.

The idea of getting the citizens involved, and encouraging them to collaborate with the government to enhance cities, has been shown to yield very significant improvements, as Lorenzi et al. (2014) and Zeiger and Huber (2014) have noted. David's study was about how social media, specifically Twitter, can be used to create a two-way communication channel between the government and citizens. Basically, the concept of their work is to allow an individual citizen to report a problem related to basic public service issues such as garbage removal or graffiti cleaning. This can be done by posting a tweet using the Twitter application, mentioning the local government Twitter account and including a pre-specified hashtag defined by the system developers. A centralised server will then collect the tweets and store them in an SQL database for further analysis. This work can be used but with many improvements and modifications, such as minimising false citizen reports by setting a trigger for each problem report. In other words, at least two or three citizens should report the same issue in a specific amount of time (24 hours for example).

A project in Afghanistan, called Integrity Watch, designed a toolkit that involves community-based monitoring in the scrutiny of reconstruction and development projects (Huma et al. 2005). Integrity Watch believes that the experience of monitoring in a conflict- and corruption-ridden environment has generated a flexible model for community-based monitoring. This can be performed by educating certain "selected volunteered citizens" with technical skills related to construction materials used in public services. However, this work has been running without the support of ICT, as they have been using traditional paper surveys and data entry to transfer data to an analytics tool.

The government of Spain has been working on several projects leading towards a smart city concept (Ciudad 2020 2014; Clay 2014). Their goal is to complete the project by 2020. One aspect of the research conducted on this project is the use of a tweet alert (Villena-román & Luna-cobos 2014). The idea is to design a system to provide public entities with a powerful tool, allowing them to rapidly and easily understand citizens' behaviour trends and their opinions about city services, events, etc. It might also be used as a primary alert system to improve the efficiency of emergency systems. The citizens are seen as proactive city sensors here. They are capable of generating an enormous amount of rich, high-level and valuable data through social media platforms. After this is properly processed, summarised and annotated, it allows city administrators to better understand citizen necessities.

In Uganda, a random experiment in primary health that did not use ICT, tested whether social heterogeneity can explain the reason why some communities manage to push for better health service delivery, whereas others do not (Björkman & Svensson 2010). The study aimed to enhance community involvement and observation in the delivery of primary health care. This has been arranged by selecting four communities in different cities with a specific number of people for the study. They held a community meeting, a staff meeting and an interface meeting in which baseline information on service provision (so-called report cards) was discussed and analysed. They applied ethno-linguistic fractionalisation (ELF) analysis to the dataset of 50 primary health care providers with the aim of generating real evidence to support the right of the citizens and renew Ugandan polices (Barr et al. 2012). Although the result of the study was positive, the lack of involvement of ICT may enhance and facilitate study analysis and data gathering.

2.5 Discussion and summary

This chapter began by providing background information about public services, specifically their meaning and definition and how they are managed and constructed. It also discussed project quality constraints in Saudi Arabia. It is important to explore this side in order to understand the fundamental aspects of the research problem. The causes of problems in public service projects have been explored in general, with the emphasis on identifying the main reasons for the poor quality of public services. Therefore, the two main issues in the project life cycle have been identified. Project failure occur during the project closure phase and during project monitoring phase, both during the development and after the completion of projects, according to the head of the Anti-Corruption

Commission in Saudi Arabia (Al-Sibai 2011). In addition, the benefits of ICT, its applications and challenges, as well as the tools used by the private and public sectors for public services, have been discussed. Furthermore, the prominence of social media and its role in Saudi society were reviewed, with an illustration of the adoption of Twitter as a means of expressing opinions. Many members of Saudi society use Twitter to criticise and report public services issues. This may indicate the need to offer an approach that supports citizens' engagement with the government. In order to understand the significant means of citizen participation, whether in traditional or electronic forms, the citizen participation applied areas and forms were presented. These applied areas and forms are major classifications agreed on internationally. Related work in the literature was also reviewed to understand the current work and the solutions presented by other researchers.

Previous researchers have taken different approaches to study the role of technology in enhancing government services, citizen participation, and monitoring public services. Table 3 shows examples of the previous directions taken to study citizen participation.

Table 3: Literature directions in citizen participation and monitoring public services projects

#	***Direction***	***References***
1	Identifying the factors influencing citizens' intention to engage in e-participation	(Alharbi, Kang & Sohaib 2016), (Alharbi, Kang & Hawryszkiewycz 2016), (Alrashedi et al. 2015), (Hujran et al. 2011) (Alomari et al. 2012),)Hung et al. 2006), (Rehman et al. 2012)
2	Promoting participation initiatives through the adoption of social networking	(Lorenzi et al. 2014), (Zeiger and Huber (2014), (Villena-román & Luna-cobos 2014), (Taylor-Smith & Lindner 2009), (Halpern et al. 2012)
3	Evaluation and identifying the status of e-government websites, e-participation, and e-services.	(Taylor-Smith & Lindner 2009), (Al-Aama 2011), (Al Athmay 2013), (Al-Nuaim 2009)
4	Activation of Community-based monitoring for public services without the use of ICT	(Huma et al. 2005), (Björkman & Svensson 2010)
5	The use of social networking for monitoring public services	(Villena-román & Luna-cobos 2014), (Lorenzi et al. 2014), (Zeiger and Huber 2014)

Some researchers have investigated, for example, the factors that increase citizen participation, such as Alharbi et al. (2016) and Alrashedi et al. (2015), while other researchers have proposed a scheme to measure the level of citizen participation with governments by evaluating the available e-services and e-participation tools and functions offered by the Saudi government, as presented in Table 3. Other researchers focused on promoting the importance of using social networking sites as a method of communication to raise the level of citizen participation (Taylor-Smith & Lindner 2009, Halpern et al.

2012). Moreover, the literature review also showed that evaluating the quality of electronic services provided by municipalities and the Ministry of Municipal and Rural Affairs in Saudi Arabia is another direction. Considering the research and projects undertaken to improve the quality of public services, the use of Twitter as a means of communicating and reporting problems with public services was an approach also suggested in the literature (Villena-román et al. 2014, Lorenzi et al. 2014).

Huma et al. (2005) and Björkman & Svensson (2010) studied projects conducted in Afghanistan and Uganda which aimed to encourage citizen participation in the monitoring process of public services without the use of ICT. The existing available communication methods for engaging citizens to monitor public services were either provided by government initiatives or third-party agencies, as discussed in Section 2.2. As a result, it was noted that there was no theoretical model available in the literature that uses ICT to engage citizens with governments to monitor public services projects in Saudi Arabia. Therefore, this study will focus on this gap by evaluating and analysing the proposed directions in the literature, and the platforms and tools provided by the Saudi government and the third-party agencies for monitoring public services. The following chapters will discuss the research methodology used to carry out this study, exploring the validity of the existing communication methods and proposed solution from the literature, in order to answer the research questions of this study and to construct a theoretical model.

Chapter 3 Research methodology

This chapter presents the research methodology of this research. It starts by providing an overview of the research philosophies, research strategies, research design, and sampling methods. Later, it discusses the research method used for this study. The study is divided into three major phases. Each phase is discussed and presented thoroughly by including the research methods used for data collection, data sampling, data analysis and the limitations. Finally, the ethical approval details are included at the end of this chapter.

3.1 Research philosophies

Research philosophy can be defined as the discipline that seeks to establish the best ways to obtain knowledge and determine its validity in a given context. In other words, a research philosophy consists of a set of beliefs about how data about a phenomenon should be gathered, analysed, and used. Three of the most commonly used philosophical approaches in contemporary research are the positivist, interpretivist, and critical paradigms (Klein & Myers 1999). The **Positivist Approach** is a rationalistic and empiricist philosophy that has its origin in the works of several philosophers (Mertens 2014). According to positivism, observations and measurements are the appropriate means through which theories can be tested and a phenomenon can be described. In other words, this philosophical doctrine considers observation and measurement as the valid or best sources of knowledge. Through observations, researchers using a positivist approach seek to predict a phenomenon and sometimes to control it. While positivism has been successful in physical and natural sciences, its role in social research can be questioned given the difficulties associated with objectively observing social phenomena (Mertens 2014). The **Interpretivist Approach**, also known as the constructivist approach, does not believe that it is possible to describe reality in objective terms. From this premise, it can be inferred that interpretivist researchers seek to understand the world of human inner experiences (Cohen et al. 2002), an understanding that is assumed to be achieved by understanding the perspectives of the participants emerged in the situation being studied (Creswell 2003). Unlike the positivism approach, interpretivist researchers do not usually start the research from a theory but they generate theories from the data gathered during the research process (Mackenzie & Knipe 2006; Creswell 2003). The **Critical Approach** views all claims and findings with suspicion and makes use of critical thought with the aim of findings flaws and sometimes invalidating claims, particularly absolute claims (Klein & Myers 1999).

One of the main strengths of the critical approach is the belief in the importance of questioning all conclusions in order to enhance the quality of knowledge by rejecting incorrect claims or discovering new truths.

3.2 Research strategies

When conducting a study, one of the most important decisions that a researcher must take is selecting an appropriate research strategy. Research strategies consist of qualitative, quantitative and mixed methods that provide specific frameworks for conducting research (Creswell & Creswell 2017). The differences between qualitative and quantitative research, as well as the possibility of combining them, remain an important topic of debate amongst researchers (Bryman 2017). The selection of a research strategy can be guided by both methodological and practical aspects. For instance, some methodologies may be more appropriate than others, considering the research goals, the type of data that is needed, the necessary size of the sample, and the timing, amongst others. In terms of practical criteria, researchers often have to choose a research method based on the resources available and other factors.

3.2.1 Quantitative strategies

A quantitative research method is a technique that uses closed questions to produce data in a numerical format, by allowing participants to choose from pre-specified answers (Creswell & Plano Clark 2007). Usable statistics can then be produced from the respondents' feedback to discover and explore different defined variables such as attitudes, opinions and behaviours from a part of the population. Quantitative methods have been used in many different contexts such as in economics, scientific experiments and surveys (Berg 2001; Thomas 2003). Two types of quantitative strategies have been the focus of Creswell and Creswell (2017):

- *Survey*

  A survey design is used to obtain a quantitative description of the attitudes or trends of a population by studying a sample of that population. Statistical surveys are used with the goal of making statistical inferences about a population being studied and such inferences depend to a significant extent on the survey questions used. Examples of quantitative studies that use the survey methodology include public opinion pools, market-research surveys, and governmental surveys (Creswell & Creswell 2017).

- *Experimental research*

  An experimental design is used to test the impact of an intervention on an outcome by applying it to a group of individuals and withholding it from other groups in order to assess and compare the outcomes. In an ideal experimental design, researchers successfully control all other factors that might influence the measured outcomes (Creswell & Creswell 2017).

3.2.2 Qualitative strategies

A qualitative research method is mainly exploratory and provides researchers with a better understanding of the perceptions of the targeted participants, their attitudes, decisions and actions relating to specific topics or matters (Berg 2001; Creswell & Plano Clark 2007). This technique uses open-ended questions. It helps researchers to obtain a better understanding of social phenomena and it provides insights or hypotheses into problems or potential research rather than facts (Creswell & Plano Clark 2007; Anderson 2010). According to Creswell and Creswell (2017), there are many valuable strategies for conducting qualitative researches and the most commonly used are as follows:

- *Ethnography*

  Ethnographic research consists of studies of intact cultural groups and it takes place in natural settings over an extended period of time. Data is typically collected through observations and interviews (Creswell & Creswell 2017).

- *Grounded theory*

  Grounded theory is a research strategy through which abstract theories of a process, action, or interaction are derived from the views of the participants (Creswell & Creswell 2017).

- *Case studies*

  Case studies involve the exploration of a single type of event, activity, process or individual (Petersen et al. 2015). In case studies, researchers typically collect information for a prolonged period of time (Creswell & Creswell 2017).

- *Phenomenological research*

  Phenomenological research consists of exploring the human experiences of a given phenomenon from the perspective of the participants. The procedure commonly involves studying a small number of subjects through consistent engagement (Creswell & Creswell 2017).

- *Narrative research*

  A strategy for studying the lives of individuals from the stories about their lives is regarded as narrative research. The information obtained from the individuals is commonly combined with the views of the researchers in order to obtain what is regarded as a collaborative narrative (Creswell & Creswell 2017).

3.2.3 Mixed-method strategies

A mixed research strategy is one where both quantitative and qualitative data are gathered, analysed and interpreted. Because mixed-method research studies can make the best use of both qualitative and quantitative information, Johnson and Onwuegbuzie (2004) believe that it can offer superior research in specific contexts. Creswell and Creswell (2017) illustrated three main methods as follows:

- *Sequential methods*

  In sequential mixed methods, researchers start with one research methodology and continue with another, with the hope that each method will offer unique types of valuable information that will enrich the findings of the other methods used.

- *Concurrent methods*

  Concurrent mixed methods consist of collecting quantitative and qualitative data at the same time, with the goal of providing a comprehensive analysis of the object of study.

- *Transformative method*

  In transformative mixed methods, researchers use both quantitative and qualitative data together with a theoretical framework that guides the selection of research topics, data collecting methods, and the expected outcomes of the study.

3.3 Research design

The research design can be defined as a plan for the research. It guides the decisions made by the researcher, and this in turn establishes the design of the study and how to investigate the research problem and answer the research questions. The research design consists of all decisions, including the philosophical worldview of the study, the strategies of inquiry, data collection, and data analysis and interpretation. The decisions that a researcher takes as the design is being established are influenced by several factors: the research problem to be investigated, the researcher's experience and the audience of the study (Creswell &

Creswell 2017). The decisions may also be influenced by research purposes, with each research method being used for different research purposes. Robson (1993) defined 4 research purposes: Exploratory, Explanatory, Descriptive and Improving.

In this research, the interpretivist approach along with the sequential mixed-methods strategy will be adopted in order to answer the research questions. As we are employing sequential mixed methods, the research is divided into three phases based on the research purposes defined previously. The first phase will be constructed based on the research problem and research objectives. Subsequently, each phase will be constructed based on the findings of the previous one, which will result in different parts of the research problem being answered sequentially (Figure 6). The first phase focuses on the methods used during the exploratory study. This aimed to investigate the research problem by distributing an online questionnaire to Saudi citizens in order to explore and understand their experience of dealing Saudi municipalities and to outline their preferred approaches for communicating with the authorities. In addition, it aimed to identify and analyse the available solution offered by the public sector and third-party companies in order to determine their applicability to the research problem. The second phase will demonstrate the research methods used for evaluating and confirming the proposed model. The evaluation of the proposed model will be based on conducting interviews with experts in the field, while the confirmation will be based on circulating an online questionnaire, targeting experts who are working in Saudi municipalities in different departments and with different expertise. Lastly, the third phase will present the method used for defining the challenges that may arise during the implementation of the model. Expert interviews is the method used for this phase in order to understand in depth the possible challenges facing the current online platforms used in Saudi Arabia, as well as the proposed model.

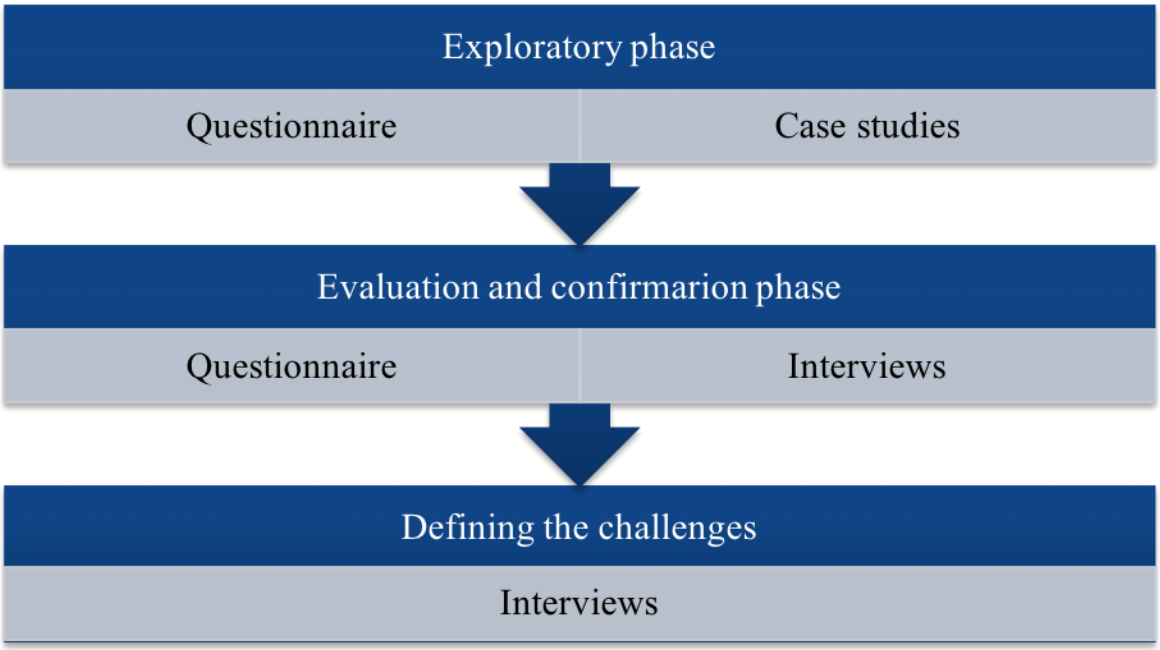

Figure 6: Research design

3.4 Sampling methods

Sampling is one of the central elements in both quantitative and qualitative research. Defining the target sample consists of applying inclusion and exclusion criteria for potential participation, also taking into consideration the required sample size (Robinson 2014). This involves analysing the theoretical and practical considerations of the research, which helps to establish the duration and the resources required for the research (Robinson 2014). Therefore, the appropriate number of responses or observations has to be determined for robust research prior to the data collection (Curry et al. 2009; Banerjee et al. 2009). Generally, this provides the researcher with a clear insight into the portion of any population required to be surveyed or interviewed in order to obtain in-depth analysis and to effectively explore a phenomenon. Defining the sample size is important in any empirical study in order to produce an accurate result with the minimum sample size required to make inferences about a population (Newman 1975). The sample size needed for quantitative studies is generally much larger than for qualitative studies because quantitative research is concerned with production of generalised hypothesis statements, while qualitative research is concerned with meaning (Curry et al. 2009; Baker & Edwards 2012; Newman 1975). There are many factors that need to be considered when determining sample size, such as type of study, research scope, saturation, confidence level, margin of error and population size (Banerjee et al. 2009; Baker & Edwards 2012).

The next sub-sections will explain the sample size needed for the questionnaire and the interviews.

3.4.1 Questionnaire sample size

Choosing a sample size for questionnaires is a topic of much debate in academic and marketing research. Many factors may affect the sample size, yet it is important to determine the minimum sample size to produce reliable results. Researchers have defined different rules for the sample size such as the rule of 100, which recommends at least 100 participants even if there are fewer than 15 variables (MacCallum et al. 2001). Others have used statistical calculation to find the appropriate sample sizes (Bartlett et al. 2001). The calculation requires a set of variables to be determined that have a specific confidence level, sample or margin of error and population size or effect size (Bartlett et al. 2001).

3.4.2 Interview sample size

Qualitative research is more focussed on fewer participants but it entails a greater depth of discussion related to a certain topic or the precise research scope to identify all of the aspects and issues surrounding a phenomenon (Bonde 2013). Researchers have debated the ideal sample size but there is no agreed sample size for expert interviews related to content validity. The type of research and the targeted participant are some of the factors that help to determine the sample size. Some academics claim that a single participant can be enough in some conditions for certain types of qualitative research. Others have suggested that more than 100 participants should be targeted, depending on the research scope, the investigated phenomenon and the expertise of the participants (Bryman et al. 2012). Some researchers have suggested 6 to 20 participants if the participants have rich knowledge in relation to the topic of inquiry (Baker & Edwards 2012; Guest et al. 2006). Other researchers have suggested using the saturation method, which means data collection will continue until a point of redundancy is reached, or no more insights are revealed (Bryman et al. 2012; Gerson & Horowitz 2002).

3.5 Data collection methods used for exploratory study

This section presents the methods used for the data collection process during the exploratory study. The questionnaire and case study methods were employed to collect the

data in this phase. In addition, detailed information about each method is provided in the next sub-sections.

3.5.1 Questionnaire

This sub-section discusses the questionnaire sampling size and the design process for the conducted study, which aims to understand Saudi citizens' opinions regarding public services.

3.5.2 Questionnaire sample size

The goal of this survey is to understand the general opinions of Saudi citizens regarding the quality of public services, their experience with Saudi municipalities, and their preferred approach for reporting issues. Therefore, the confidence level has been set at 95% as this level of confidence is commonly used in academic research. Furthermore, the margin of error or confidence interval was set at 10% with a population size of 25 million citizens. Thus, to calculate the minimum sample size for the questionnaire, an online sample size calculator provided by the National Statistical Service Australia[6] was used. This gave a result of 97 with a standard error of 0.04592. For further confirmation, statistical power analysis software (g-power) was used to calculate the sample size with the aforementioned variables. The value given for significance level was 95%, alpha = 0.5 (type error I), type error two or power (1-β) = 0.95, and effect size = 0.4 (Cohen 1988; Bartlett et al. 2001). The minimum sample size was 70 with an actual power of 0.95241. Therefore, the aim of this study was to collect data from more than 70 participants.

3.5.2.1 Questionnaire design and data collection process

One of the key problems faced by the government is the low quality of public services (AlMouasi 2014; Government Report 2013; Al Dhoky, Faisal Al Zahrani 2014), such as the maintenance of streets, sidewalks, parking, etc. The focus of this research was on how technology and the power of citizen participation contribute positively to mitigate these problems and raise the quality of public services. The studies in Chapter 2 indicated the high interest that Saudis have in technology and social media. Understanding the citizens' perceptions of the problem and their overall experience with public services is crucially important. Thus, the questionnaire was designed to investigate the research problem, the

[6] NSSA Sample size calculator: http://www.nss.gov.au/nss/home.nsf/pages/Sample+size+calculator

quality of public services, and the preferred communication channels. A self-administered online survey was used to collect data in order to capture attitudes, knowledge and behaviours by asking predetermined questions.

The survey targeted Saudi citizens as this research focuses on studying the quality of public services and monitoring methods in the Saudi context. The survey included 4 sections, each of which contained closed questions with a total of 17 main questions (some of the questions were divided into sub-questions). The first section provided the research information sheet, with the 2nd section focusing on obtaining demographic information. Sections 3 and 4 investigated the quality of public services, the use of technology and government online services, and the tools for reporting issues. The survey was constructed using multiple choice questions for the demographic information (single and multiple answers were used), and ratio scale questions such as Likert-type scales. The survey was written in Arabic and English and was generated and distributed with the help of Google forms service. This questionnaire was distributed to Saudi citizens during March 2016. The number of respondents was 116 citizens from different parts of Saudi Arabia and from different backgrounds, ages, levels of education and proficiency. The majority of the respondents were from the young generation (age range 20-45 yrs) as they represent 60% of the Saudi population[7]. The English version of the survey was proofread by the second supervisor (see Appendix A). On the other hand, the translation and piloting of the Arabic version survey was done with help of 4 Arabian researchers at the University of Southampton.

The questionnaire limitations were as follows:

- This questionnaire was distributed via e-mail, Twitter, and some social networking platforms. Thus, a portion of the Saudi population who are not using online services may not have had the chance to participate in this survey.
- The questionnaire distribution did not use random sampling as the researcher sent an online link to a list of contacts belonging to the researcher, such as Twitter followers and e-mail contacts, due to the lack of funding and time. However, the participants were asked to resend the link to their contacts in order to increase the randomness level.

[7] General Authority for Statistics: https://www.stats.gov.sa

3.5.3 Case studies

Before starting to develop a model to overcome the research problem, a set of case studies was designed. Although no specific approach was available to follow, based on the literature reviewed in Chapter 2, it was clear that governments, researchers and third-party companies have exerted efforts to develop communication approaches between citizens and the government in order to monitor public service projects. Among these approaches are adopting social networking websites, developing online tools, or even conducting lectures and training sessions to increase awareness and build communities. Thus, it was important to investigate these approaches in order to determine the most appropriate method for engaging citizens with governments for the purpose of monitoring public service projects and increasing their quality. Three different case studies will be conducted. The first is a Twitter case study, which will focus on collecting Twitter feeds and analysing the collected data. The second case study will focus on analysing existing online solutions offered by governments and third-party companies. Lastly, the third case study explain the Southampton People's Panel project that the researcher has joined. The next section will provide details of the methods used for each case study.

3.5.3.1 Case study 1: The role of social media platforms in public service: Twitter as a case

Due to the important role of social media (specifically Twitter) in Saudi Arabia and the previous studies that have adopted Twitter as a method for reporting issues in public services, this case study was conducted in order to investigate the applicability of using Twitter as a means of communication between the government and citizens.

The data collection process was focused on collecting Twitter feeds related to public service issues such as potholes, streets, projects not completed, etc. The search process for the aforementioned issues was based on Twitter hashtags, which can facilitate finding related topics. In addition, an online Twitter scraper tool named FollowTheHashtag[8] was used to track and collect live stream data, as Twitter archives posts from search results if they were posted over a week ago. Since this case study was focused on the Saudi context, the Arabic language was used during the search, collection and analysis process.

The analysis of the collected data was made with help of the aforementioned tool as well as manual sample checking by the researcher to identify the actual meaning and the purpose

[8] Online tools help for tracking, analysing, and measure Twitter feeds: https://www.followthehashtag.com/

of the tweets. Chapter 5 will present the results and provide additional details of this case study.

3.5.3.2 Case study 2: Southampton City Council – People's Panel Project

The People's Panel project was established by Southampton City Council (Southampton City Council 2014) with the aim of building connections with local citizens in order to understand their needs with the help of online polls. This project targets citizens by inviting them to provide their feedback, by studying behaviours and increasing awareness of different subjects related to the community. The aim of this project is similar to some extent to that of the Integrity Watch project, which was conducted in Afghanistan, as it focuses on community-based monitoring for reconstruction and development projects (Huma et al. 2005). Therefore, the objective of this case study was to investigate further possible solutions that might be used to tackle the issues in public services and citizens' engagement in Southampton. Identifying the engagement approaches and the ways of handling issues can help to build a base model that can be applied to the Saudi context. In addition, participating in the project may assist with determining the components needed to develop a conceptual model that can be used as a solution for related issues.

The data collection in this case study can be perceived as the observations and experience that were gained by the involvement of the researcher from November 2014 to May 2015. Results and more details are provided in Chapter 5 .

3.5.3.3 Case study 3: Critical analysis of the available online platforms and tools.

A general overview was presented on a number of online platforms and mobile applications offered by the private and public sectors for monitoring public services and reporting problems in Chapter 2. In addition, great efforts and investment have been made by governments to support the transformation of e-government. Therefore, it is important to conduct this case study with the objectives of examining and studying the characteristics of these systems, in order to determine the effectiveness of their use, and to distinguish the most common characteristics of these systems, the technologies used, and the existing limitations that can be solved in the future. Five different online platforms and mobile applications have been nominated for the data collection process. These systems are FixMyStreet, SeeClickFix, Adaa, Balaghati 940 and Balady. The analysis and evaluation of the e-government platforms required careful preparation. There are many theories used to evaluate technical solutions from different perspectives. The technology acceptance model (TAM) by Davis (1989), the unified theory of acceptance and use of technology

model (UTAUT) proposed by Venkatesh et al. (2003) and several other evaluation models have been used by researchers to assist with analysing and evaluating new technologies from different angles. However, it is difficult to find a particular evaluation model that can be applied to all systems and platforms. Thus, the analysis for the aforementioned systems will be performed on various aspects identified by the researcher, including limitations, main functionality and applicability to the research problem. The outcomes of this case study will contribute to identifying gaps and important elements that may contribute to the development of the proposed model.

3.6 Data collection methods used for the evaluation and confirmation phase

This section presents the methods used for the data collection process during the evaluation and confirmation study. Interview and questionnaire methods were employed to collect the data in this phase. In addition, detailed information about each method is provided in the next sub-sections.

3.6.1 Expert interviews

This sub-section discusses the interview sampling size and the design process for evaluating the proposed model.

3.6.1.1 Interview sample size

As indicated in section 3.4, many methods can be used for calculating the sample size for interviews. The saturation method suggested by Bryman et al. (2012) and Gerson and Horowitz (2002) was considered to be applicable for the aim of the study. Therefore, the sample size for the experts' interviews will depend on reaching the saturation point.

In this study, the researcher stopped interviewing the experts at interview number 14 as no new information had been gleaned from the experts, which means that the point of redundancy had been reached.

3.6.1.2 Design for the expert interviews and data collection process

Interview design is a major step to consider and careful planning and design are required for this research as this will affect the results and the research outcomes. Thus, the targeted experts interviewed in this study should have direct involvement with local municipalities,

public service projects and information technology. The experts must also have at least five years' experience of working on public service projects in Saudi Arabia. This study was conducted in the Saudi Eastern province municipality and the Al-Ahsa municipality within two construction consultancy firms in April 2016. These places were chosen as they were closely related to the research problem and are among the leading municipalities in Saudi Arabia in terms of performance, technology adoption, and the number of public service projects currently being worked on[9]. The interview questions were designed using a semi-structured format which included open and closed questions. The questions were formulated so that they would elicit information on the monitoring process for public service projects and the use of technology for service delivery. They also asked the experts to review the model by evaluating and confirming each component. The semi-structured interviews were conducted with 14 Saudi experts from different departments or with different proficiencies, in different locations. Some interviews were conducted in the workplace and others in cafes. Face-to-face interviews were used to interact directly with the interviewees and to allow for further questioning based on the interviewees' answers (Valenzuela & Shrivastava 2002). The Arabic language was used in all of the interviews, and when typing the transcripts to achieve accurate analysis. Appendix C provides the interview questions in a bilingual version. The closed questions focused on the model confirmation while the open questions focused on investigating how Saudi municipalities work, how public service projects are managed and monitored, and how technology is used for delivering services. The closed questions were constructed using rating scale questions with the following ratings: important and not important. An additional comments box was included to help understand the reasons for choosing an option.

3.6.2 Expert questionnaire for confirmation

This sub-section discusses the questionnaire sampling size and the design process for confirming the proposed model.

3.6.2.1 Questionnaire Sample size

The goal of this questionnaire was to confirm the findings of the interviews conducted with experts in order to evaluate the proposed model components on a larger scale. Therefore, to calculate the significant sample size for this study, the confidence level was set at 95% as

[9] Measuring the performance of the Saudi secretariats and municipalities: https://www.momra.gov.sa/baladyatPM.aspx

this level of confidence is commonly used in academic research. Furthermore, the margin of error or confidence interval was set at 5% with around 700 experts working in Al-Ahsa and the Eastern region municipalities. Thus, in order to calculate the recommended sample size for the questionnaire, an online sample size calculator provided by the National Statistical Service Australia[10] was used. This gave the minimum sample size as 67 with a standard error of 0.02551. For further confirmation, statistical power analysis software (g-power) was used to calculate the sample size with the aforementioned variables. The value used for the significance level was 95%, alpha = 0.5 (type error I), type error two or power (1-β) = 0.95, and effect size = 0.3 (Cohen 1988; Bartlett et al. 2001). The minimum sample size was 54 with an actual power of 0.95003. Therefore, the aim of this study is to collect data from more than 54 participants.

3.6.2.2 Questionnaire design and data collection process

The design of the questionnaire was based on the proposed model in Chapter 5 as well as the findings from the expert interviews. The aim of this phase is to confirm the findings gained from the experts after they had evaluated the proposed model in depth. Since 14 participants were involved in the model evaluation process, it was important to validate and confirm the model on a larger scale. A questionnaire is considered to be a useful approach for collecting data for this kind of study (see Section 3.2). Thus, a self-administered online survey was used to collect data and to capture experts' opinions of the proposed model components by providing predetermined questions. The questionnaire targeted Saudi experts who are working in Saudi municipalities and secretaries. The questionnaire included 5 sections, which contained 14 closed questions and 2 open-ended questions. The first section provided the research information sheet and the field for the participants to show their agreement to participating in the study. The second section focused on obtaining demographic information, while sections 3, 4 and 5 asked questions about the proposed model components. The questionnaire was constructed using multiple choice questions for the demographic information (single and multiple answers were used), and ratio scale questions such as Likert-type scales for the remaining sections. The questionnaire was written in Arabic as all of the experts were native Arabic speakers and it was generated and distributed with the help of Google forms service. This questionnaire was distributed in the Saudi Eastern province municipality and Al-Ahsa municipality from May 2017 to June 2017. The researcher's contact information was provided to allow the

[10] NSSA Sample size calculator: http://www.nss.gov.au/nss/home.nsf/pages/Sample+size+calculator

participants to contact the researcher if any questions were unclear and needed to be explained further. However, none of the participants contacted the researcher during the data collection process, which might indicate that the questions were clear for the participants. The number of respondents was 87, from two different cities in Saudi Arabia. The participants had different backgrounds in terms of expertise, ages and years of experience. The questionnaire was initially written in English and proofread by the second supervisor (seeAppendix D). On the other hand, the translation and piloting of the Arabic version survey was done with help of two Arabian researchers at the University of Southampton.

The questionnaire's main limitation was as follows:

- This questionnaire was distributed via an e-mail address belonging to the IT department of each municipality. Thus, a portion of the experts who had not checked their emails during the data collecting process may not have had the chance to participate in this survey.

3.7 Data collection methods used for defining the challenges

This section presents the methods used for collecting data related to the third phase. The purpose of the study is to identify the challenges facing the current online platforms offered by Saudi municipalities to beneficiaries, as well as the challenges that might be faced during the proposed model implementation. The interview method was employed to collect the data in this phase. Detailed information about this method is provided in the next sub-sections.

3.7.1 Interview sample size

It is essential to choose the participant sample carefully. In order to accomplish the goal of this study, it was useful to invite experts with different backgrounds and experience to participate, in order to acquire their observations regarding the challenges they face currently and those they might face in the future. Thus, the sampling method used for this phase was the saturation method (Bryman et al. 2012; Gerson & Horowitz 2002). As previously mentioned, this method allows the researcher to continue interviewing the experts until the saturation point is reached, when no new information can be discovered. In this study, the researcher stopped interviewing experts at interview number 23 as the

participants had not revealed different challenges to those already noted by the other experts. This means that the saturation point had been reached.

3.7.2 Interview design for the experts' reviews

The aim of this phase was to identify the challenges that may be faced during the proposed model implementation. Therefore, the targeted participants for this study were experts who were working in Saudi secretaries and municipalities as those government sectors are the main stakeholders dealing with public service projects. They offer online platforms and are responsible for receiving complaints. The experts must also have at least two years' experience working in Saudi secretaries and municipalities.

Thus, this study was conducted in the Saudi Eastern province municipality and Al-Ahsa municipality from 1 April to 30 May 2017. Those places were chosen as they are related to the research problem and are among the leading municipalities in Saudi Arabia in terms of performance, technology adoption and the number of public service projects currently being worked on[11]. The interview questions were designed using a semi-structured format that included open and closed questions, in order to understand the background experience of each participant and to determine the challenges they faced when adopting ICT for the purpose of engaging citizens in the monitoring of public services. The questions also asked them about the challenges that may be faced with the proposed model implementation.

The semi-structured interviews were conducted with 23 Saudi experts from different departments and with different proficiencies, in different locations. The interviews were conducted at the experts' offices and in meeting rooms. Face-to-face interviews were used to interact directly with the interviewees and to allow for further questioning based on the interviewees' answers (Valenzuela & Shrivastava 2002). The Arabic language was used in all of the interviews as all of the participants were native Arabic speakers, and a voice recording device was used to record their answers, alongside note taking, in order to achieve accurate analysis during the analysis phase. Appendix E provides the interview questions in a bilingual version.

[11]Performance measure of secretariats and municipalities: https://www.momra.gov.sa/baladyatPM.aspx

3.8 Data analysis methods

This section presents the data analysis methods used for analysing the collected data. Descriptive analysis was mainly used for analysing the data collected from citizens and experts' questionnaires. Thereafter, the thematic analysis technique was used for analysing the data collected from the expert's interviews.

3.8.1 Descriptive statistics

A descriptive analysis consists of calculating and describing the research data in a meaningful way. Descriptive statistics can be reported numerically and graphically and they provide information about the central tendency and variability of the data (Vetter 2017). While descriptive information can provide valuable information for a research study by itself, it is often used in a more complex analysis such as group comparison. Therefore, the descriptive statistics in the Statistical Package for the Social Sciences (SPSS) software was used as a tool for analysing the collected data. In addition, the arithmetic mean and standard deviation functions were also used.

3.8.2 Thematic analysis

Thematic analysis is a technique that allows researchers to discern patterns or themes within qualitative data. More specifically, this technique is used with the goal of identifying patterns in the data that provide relevant information. The identified themes are used to say something about an issue related to the research (Maguire & Delahunt 2017). Braun and Clarke (2006) consider two levels of themes, namely semantic and latent. Semantic themes consist of the explicit meanings of the data where the researchers only extract what someone has said or what has been written. The latent level, on the other hand, not only considers what has been said, but also consists of identifying underlying conceptualisations, ideologies, ideas and assumptions. Braun and Clarke (2006) propose a six-phase protocol for conducting thematic analysis: becoming familiar with the data; generating the initial codes; searching for themes; reviewing themes; defining themes; and writing up the results. It is not necessary to move through these phases linearly and researchers can move backwards and forwards between them more than once if necessary.

3.9 Ethical approval

Ethical approval is a major step required by the Ethics Committee at the University of Southampton. Careful planning and a long procedure are required to meet the ethical requirements.

The ethical approval process is conducted over two stages. The first stage is gaining the approval before starting to disseminate the exploratory questionnaire to citizens and conducting the interviews with experts for the evaluation of the proposed model. Ethical approval was gained from the Ethics Committee at the University of Southampton for the first stage with reference number 18549 on 3rd February 2016. The second stage was gaining approval before distributing the expert questionnaire that focused on confirming the proposed model after the evaluation, and before conducting the experts' interviews for defining the challenges that may arise during the model implementation. Therefore, the ethical approval was gained from the Ethics Committee at the University of Southampton for the second stage with reference number 25956 on 22nd March 2017.

3.10 Chapter summary

This chapter began with presenting a general overview of the research philosophy, research strategies and research design. The following sections focused on demonstrating the techniques used for data collection for this study. A mixed-methods approach has been adopted in different phases. The methods used for the exploratory phase were a questionnaire and case study. Following that, to evaluate and confirm the model, interviews and a questionnaire were used. Finally, the expert interview method was chosen to assist with defining the proposed model challenges.

Chapter 4 Data analysis and results for the exploratory study

This chapter presents the data analysis and findings for the exploratory study. An online questionnaire was used for this study to understand and acquire Saudi citizens' opinions regarding public services projects provided for them. Also, it will help to identify a convenient approach to offer a channel of communication with local municipalities when citizens would like to report a problem or request a service. The data collected can help confirm some aspects related to the research problem, shape the proposed model and understand how the model can be successfully implemented to fulfil citizens' needs.

In designing the questions, the level of knowledge of the Saudi citizen was considered. Thus, the survey asked about participants' personal experiences of the quality of public services, competent authorities, and their use of technologies and social media platforms. The responses to some questions may also help shape the proposed model, and identify participants' preferences of the communication methods with competent authorities. The survey was distributed online and was carried out over a period of eight days between 13th March and 21st March 2016.

4.1 Demographic information

Table 4 shows the demographic information for Saudi citizens involved in this survey, where 70% of the participants were male and the rest were female. The participants were from different age ranges, from 18 to over 55 years old. The majority were between the ages of 18 and 44 years old. The reason for this might be because the survey was submitted online. Different occupations were found among the participants' responses, as 32% worked in the private sector; 25% in the public sector; 30% were students or retired while the rest of the participants answered that they were not employed. The survey was distributed over different regions in Saudi Arabia to try to investigate opinions and public services availability in different cities or villages. A majority of 86% were from the eastern region, due to the focus of the research on studying that area; 8% were from the western region; 5% were from the central region and the rest were from the northern. Responses were mainly provided by citizens living in provinces and some of the main cities.

Chapter 4

Table 4: Demographic Information

Variables	***Options***	***Responses***	***Percentage***
Gender	Male	81	70%
	Female	35	30%
Age	18–24	25	22%
	25–34	34	29%
	35–44	30	26%
	45–54	12	10%
	55+	15	13%
Occupation	Private sector employee	40	32%
	Public sector employee	31	25%
	Student	18	15%
	Retired	18	15%
	Unemployed	6	13%
Field of work	Health sector	3	2%
	Education	30	26%
	Economics	8	7%
	Technology	12	10%
	Engineering	8	7%
	Construction and contracting	9	8%
	Administration	31	27%
	Agriculture	1	1%
	Industry	6	5%
	Others	8	7%
Region	Eastern region	100	86%
	Western region	9	8%

Variables	*Options*	*Responses*	*Percentage*
	Central region	6	5%
	Northern region	1	1%
	Southern region	0	0%
Lives in	Province	49	41%
	Village	5	5%
	Main city	57	49%
	Capital city	5	5%

4.2 The role of smartphones and social media platforms in Saudi Arabia

The survey found that 58% of the citizens use smartphones as the main device for browsing the internet and communicating with others (Figure 7); laptops were ranked second with 20%; then, desktop computers and tablets were the last option with 12% and 10%.

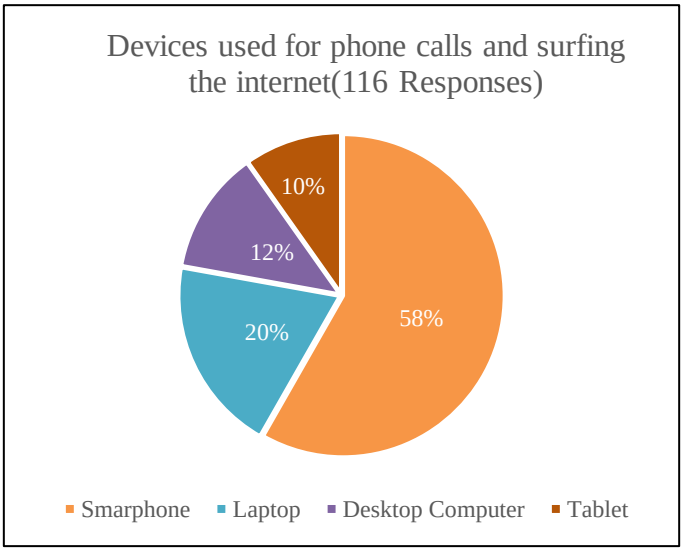

Figure 7: Survey results for electronic device preference

The results for preferred social media platforms showed 23% chose Instagram as their preferred platform; then YouTube and Twitter had 22% and 21%; Google+ was fourth with 17%; while Facebook and LinkedIn were lowest with 11% and 6% (Figure 8).

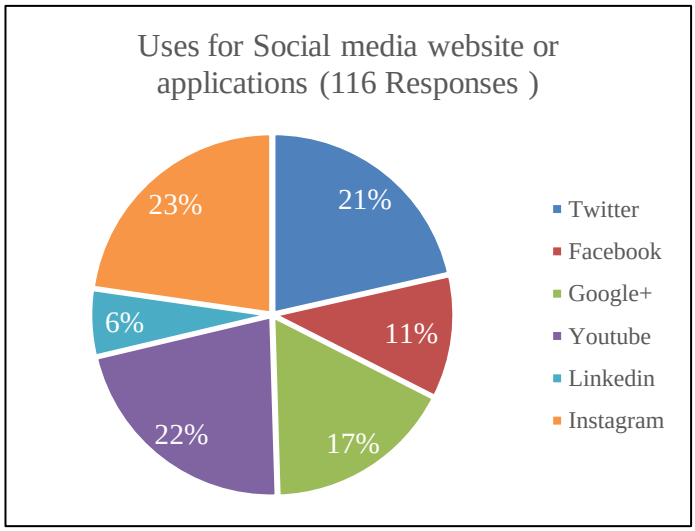

Figure 8: Survey results for Saudi citizens' social media preference

4.3 Public services projects quality from the Saudi citizens' perspective

Table 5 displays results for eight questions investigating public service projects from different dimensions. In addition, it provides results for seven questions focusing on the maintenance of public services. There was almost equal agreement and disagreement on providing detailed project information on sites, 44% agree and 42% disagree. More than 50% of the citizens indicated that they have not received a notification when there were road works near where they live. Additionally, 70% of the respondents indicated that projects take a long time to deliver, longer than expected. Furthermore, more than 50% indicated the quality of the delivered projects is not excellent and does not meet quality standards. Besides that, 46% of the responses show the health and safety plan is not always considered during construction projects. A total of 51% of citizens indicated that requesting new services to be developed is time consuming and not easy, while 20% said it is easy. Not only that, but 48% of the responses showed that citizens think their requests to add a new service will not be considered, while 20% think it will be considered.

The analysis of the collected data also found that living areas are constantly cleaned but street maintenance is not carried out with the required quality or on a daily basis. More

than 60% of responses indicated that roadworks cause traffic jams and 50% said safety procedures are not taken into consideration during the roadworks, which may cause accidents. Thus, reporting issues on the streets may be necessary to avoid accidents. As 46% of the respondents indicated that they did not know how long it would take to respond to a citizen's complaint, this can mean that citizens usually avoid reporting issues found on the street to local councils, or that there is no standardised timing to respond to citizen reports. Of the responses, 50% showed that, in general, public services are not maintained on a daily basis and more than 60% indicated that development work done by public utility companies affected street quality and usually left streets in a worse condition than they had been in.

Table 5: Survey results for public services projects and maintenance

Public services projects					
Variables	***Strongly agree***	***Agree***	***Neutral***	***disagree***	***Strongly disagree***
During the implementation of projects, in your area or the nearby areas, detailed information about the project is set at the project location	8.62%	35.34%	13.79%	28.45%	13.80%
A notice is sent to nearby residents before the construction starts	7.76%	13.79%	17.24%	29.31%	31.90%
Projects are delivered at the specified time	3.45%	9.48%	18.10%	19.83%	49.14%
Implemented projects are delivered with high standards and excellent quality	3.45%	20.69%	18.97%	21.55%	35.34%
Health and safety plan is taken into account during construction work	6.90%	26.72%	18.10%	25.86%	22.41%
Procedures to request new services to be added in your area of living are easy	4.31%	15.52%	28.45%	23.28%	28.45%
Your request will be taken into consideration when you apply to add new public services in your area	6.90%	14.66%	30.17%	25.00%	23.28%
Public services maintenance					

Variables	*Strongly agree*	*Agree*	*Neutral*	*disagree*	*Strongly disagree*
Your area of living is constantly cleaned	17.24%	47%	14.66%	13.79%	6.90%
Road maintenance is done on an ongoing basis and perfectly	4.31%	19.83%	17.24%	29/45%	30.17%
Road maintenance works don't cause any traffic jams	1.72%	14.66%	19.83%	19.80%	44.00%
Safety procedures are taken into consideration during maintenance work	2.59%	29.31%	20.69	27.59%	19.83%
When you make a report to the competent authority, they respond to your request for maintenance in a reasonable amount of time (24 to 72 hours)	4.31%	18.10%	45.69%	13.79%	18.10%
Maintenance work for public services in general is done on a regular basis across the regions	4.31%	15.52%	30.17%	30.17%	19.83%
Streets remain as they used to be after the completion of the development work by public utility companies such as electricity and water	5.17%	15.52%	18.97%	20.69%	39.66%

4.4 Reporting public services issues and the preferred reporting methods

Since this research is focused on monitoring public services and reporting tools, further questions were included in the survey to explore users' experiences. Figure 9 shows that 53% of the respondents have never reported an issue or requested a new service before, while the rest may have reported an issue or requested new services. Exploring the reasons behind this is important as it will help enhance and validate the proposed model.

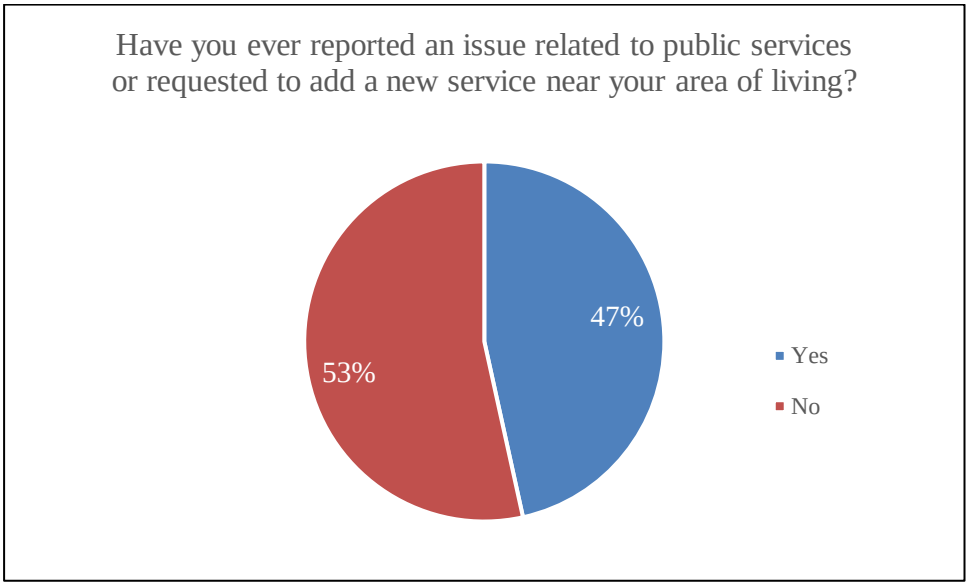

Figure 9: Survey results on user experience on reporting issues

As can be seen in Table 6, six different questions were included in the survey to understand the reasons for not reporting issues. More than 50% mentioned that lack of knowledge of available communication channels with local councils is one of the reasons for not being able to report issues, while 55% of participants agreed that some citizens prefer not to get involved in government procedures or take on some responsibility. Furthermore, unsuccessful previous experiences and the complicated procedures when reporting issues were considered the two main reasons, with a total of 63% and 64% choosing these reasons. On the other hand, citizens think that their reports will get less attention compared to frequent group requests. Lastly, the claim that citizens prefer not to share their personal information is not completely true, as more than 40% indicated that they would share their personal information while reporting an issue to a competent authority.

Table 6: Survey results for the reasons behind the reluctance to report public services issues.

Reasons behind the reluctance to report public services issues by citizens			
Variable	**Agree**	**Neutral**	**Disagree**
Lack of knowledge of communication channels with the competent authority	53%	28%	20%

Reasons behind the reluctance to report public services issues by citizens			
Variable	**Agree**	**Neutral**	**Disagree**
Unwillingness to get involved in governmental procedures and carry responsibility	55%	29%	16%
Unsuccessful previous experience	63%	27%	10%
Reporting an issue requires complicated procedures	64%	23%	13%
Giving less attention for individual request compared to frequent requests by individuals for the same issue	59%	34%	7%
I prefer not to share my personal information	19%	40%	41%

Since the reasons behind the citizens' ignorance of reporting procedures for public service issues are clear, it is beneficial to explore this area further. Thus, Figure 10 shows the survey results for the preferred communication channel to be used for reporting public service issues. Smartphone apps and social media websites were ranked as the preferred channels to report to or communicate with competent authorities, with more than 66% of the 116 respondents responding positively to this question. The next most popular channel is phone calls with 56% agreement. E-mails and SMS were ranked as the least preferred communication channels. Thus, these responses support the research claim that mobile applications and social media can be utilised to implement the proposed model.

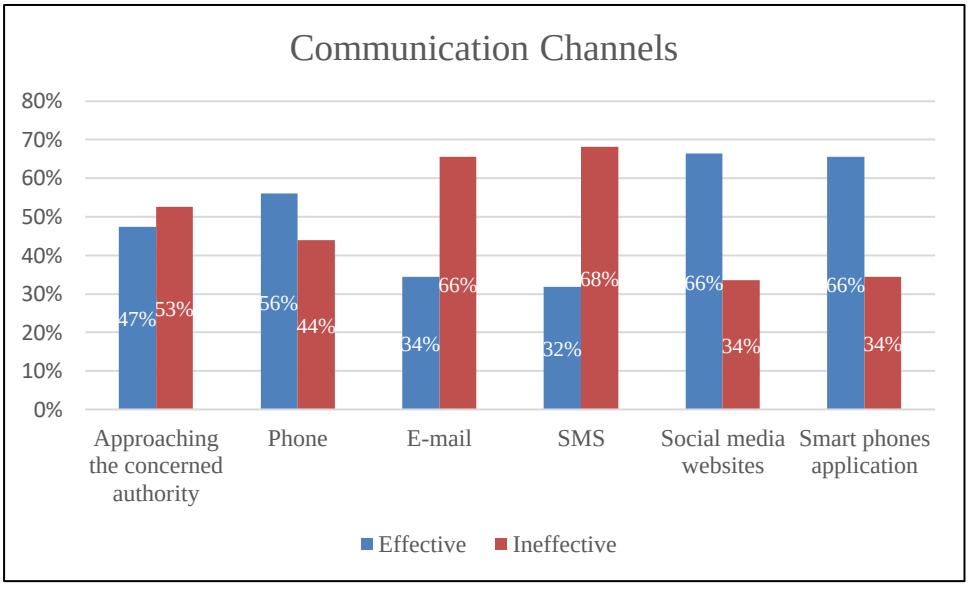

Figure 10: Survey results for the most preferred communication channels

The purpose of Table 7 is to further explore citizens' experiences and opinions regarding reporting non-emergency issues. The result of the consideration for citizens' requests was not clear as the majority stated they did not know, which could mean many have not tried to request a new service before, while 31% indicated that the local council would consider their request; 29% indicated their request would not be considered. The next question focused on investigating the validity of the Voting and Transparency components of the proposed model. In all, 63% of citizens responded that they believed that voting on a request to support it may push local authorities to accept requests for adding new services. In addition, 61% of the responses indicated that frequent reports on the same issue submitted by many citizens may force local authorities to give higher priority to the reported issues.

Table 7 also shows that 45% of the respondents indicated that fixing reported issues took a long time; 31% had no knowledge about the duration for fixing issues, while 22% showed that issues would be fixed within a short time period. Lack of transparency and information provision can be the reason for these unbalanced results. Adopting transparency by providing information related to reported issues and fixes can help to estimate the performance of local councils. On the other hand, the survey asked if a call centre would respond to citizens' complaints instantly: 34% disagreed, while 20% agreed. This can mean the speed of response to a phone call may vary depending on many factors, such as the number of call centre staff, how busy the lines are, staff skills, difficulty in describing the reported issues, etc. While 27% indicated that staff were professional and cooperative during the phone call, 22% said staff were not and 40% were neutral. However, 47% of the responses were neutral when the survey asked if the citizens' calls would be answered, which can mean that phone calls can be ignored. Although 31% also stated that the phone call may not be answered when trying to report issues, less than 20% indicated their phone call experiences were good. This can support the claim of this research that reporting issues using an online system will save citizens time, and guarantees reported issues will be delivered to the competent authority no matter how many staff members they have.

Table 7: Survey results for different variable when citizens report non-emergency issue

Reporting a non-emergency issue					
Variable	**Strongly agree**	**Agree**	**Don't know**	**Disagree**	**Strongly disagree**
Generally, local government will consider a citizen service request	6.9%	24.1%	39.7%	15.5%	13.8%
The participation of other citizens will support a request to add a new service to be accepted	12.1%	40.5%	28.4%	11.2%	7.8%
Competent authority will give higher priority to a reported issue if they receive frequent complaints from many citizens	26.7%	35.2%	23.3%	6.9%	6.9%
Local authority's call centre will respond to your reported issue instantly	10.3%	19%	36.2%	17.2%	17.2%
Reported issues will be fixed in a short amount of time	7.8%	15.5%	31.0%	23.3%	22.4%
Staff are professional and cooperative	10.3%	26.7%	40.5%	14.7%	7.8%
No one answers your call while you are trying to report an issue	11.2%	20.7%	47.4%	13.8%	6.9%

The last part of the survey focused on exploring citizens' knowledge regarding e-government service availability and adoption (Table 8). The survey found that 86% of the participants have browsed or used government websites. This can indicate that the majority of citizens are aware of technology and the internet, and are interested in finding information or services online. On the other hand, 68% of the participants have used government mobile apps, which can mean that lack of knowledge or limitation of services offered by those apps has reduced the number of users. Finally, 89% of respondents support the adoption of mobile applications as the main method for communication and reporting issues.

Table 8: Survey result for e-government services adoption

Adoption for e-government services			
Variables	**Yes**	**No**	**I don't know**
Have you ever browsed the government websites?	86.2%	5.2%	8.6%
Have you ever used one of the government mobile apps?	68.1%	5.2%	26.7%
Do you know the available services in the government mobile application?	56.0%	13.8%	30.2%
Do you support the adoption of mobile apps as the method of communication and dispense with the old communication methods?	88.8%	4.3%	6.9%

4.5 Discussion and summary

From the citizens survey analysis, it can be seen that participants were from different age categories, different fields of work and had different levels of education, but the focus was on the younger generation as they are the majority in Saudi Arabia[12]. However, the majority indicated that mobile phone is the preferred electronic device to use. All the participants indicated that they use social media, including the older generation. This may indicate that there are some technology skills which can be supportive to offering e-services.

In terms of the quality of public services, the majority indicated that the projects were completed and delivered late, 57% mentioned that they do not reach quality standards and 52% indicated that they had not received a notice before construction started. In addition, more than 50% found that requesting a new service required very long procedures and the request may be ignored. However, 59% suggested that citizens' support for a request can provide more importance and attention from the official authorities.

[12] General authority for statistics in Saudi Arabia: http://www.cdsi.gov.sa/ar/3131

In relation to public services maintenance, some services were well maintained while others were not. For example, 60% indicated that roads were not well maintained, road works caused traffic jams, and safety procedures were not taken into consideration during service maintenance. Furthermore, the maintenance work for public services in general was not performed on a regular basis, while services would not be at the standard they used to be at if public utility companies did some service development. Thus, local municipalities should put more effort into monitoring and quality checks.

Although it is clear that citizens are facing issues with public services, 53% indicated that they have never reported an issue or requested new services. Reasons behind that vary: 53% mentioned their lack of knowledge of the proper way to reach the competent authority; 55% don't want to be involved and carry some responsibility; more than 60% had an unsuccessful experience or found that it required complicated procedures to report an issue. However, only 20% indicated that they preferred not to share their information. This may show that citizens are willing to be involved in the monitoring process if they receive some support and have a proper way to submit their views.

On the other hand, 66% of the citizens have indicated that they prefer to report issues by using mobile apps or through social media platforms, while 89% support the adoption of mobile apps to be a new method for communication, as some citizens had an unsuccessful experience using traditional methods. Adoption of technology may allow other citizens to support a request or complaint, and facilitate the existing procedures.

As a result, there is an indication that citizens face issues with public service projects. The majority of participants agreed that they had encountered issues with the quality of public services, they had not received a notice before construction started, and requesting a new service required very long procedures after which the request may be ignored. On the other hand, the need for a proper medium to reach the competent authority in a manner that can fill the gap in the existing means of communications is indicated by the questionnaire results. Therefore, it is important to further investigate the research problem by examining the available solution and tools indicated in Section 2.2 as well as Subsection 2.4.4 to determine the strengths and limitations, and to assist in proposing a new approach for citizens to communicate with local municipalities for the purpose of monitoring public services projects. Thus, the next chapter will present three case studies that will assist in answering the research questions by evaluating the existing tools and solutions.

Chapter 5 Model development

This chapter provides an overview of three case studies conducted to assist answering the first key research question, RQ1) What is the appropriate model that would enable two-way communication between citizens and the Saudi government for monitoring public service projects? Since the question is quite broad, it is divided into three sub-questions. Therefore, this chapter focuses on answering the first two of these.

RQ1.1) What are the existing systems used for monitoring projects?

RQ1.2) What are the limitations of the existing systems?

Using the case studies, we focused on three main aspects. The first is to study the role of social media platforms in public services, particularly Twitter as a case study. The aim of this experiment is to examine the Saudi citizens' usage of social media in reporting public services issues, as well as to study the effectiveness of using it for this purpose.

The second aspect is to highlight the most important issues and difficulties facing Southampton's local council compared to Saudi municipalities. This was achieved through the "People's Panel Project" that the researcher took a part of during its first stages. Finally, study and analysis were carried out on the platforms and tools currently used in the public services sector to expose the limitations and to highlight the characteristics to be considered during the design phase of the proposed model. These platforms and tools are: FixMyStreet, SeeClickFix, Adaa, Balagati 940 and Balady.

5.1 Case study 1: The role of social media platforms in public service: Twitter as a case

This experiment was conducted due to the vast usage of social networking sites, specifically Twitter, and research discussed in Chapter 2 that adopted Twitter as a platform for reporting public services issues. Thus, this research has examined the validity of using Twitter as solution to overcome the research problem in the Saudi context.

5.1.1 Data collection and analysis

An online analysis tool, "FollowTheHashtag", was used for a preliminary analysis to investigate thoroughly the Saudi citizens' opinions about some pre-stated hashtags, such as

public projects, water, Jeddah, and some other hashtags related to public services issues as shown in Table 9. The data collection process was from 31st March 2015 to 12th September 2015. A tracking function of keywords/hashtags was used to collect all tweets posted within the specified dates.

Table 9: Sample of the trending hashtags related to issues in Saudi public services.

Hashtag	***Translation***
#حفريات	Pothole
#مطبات	Street pumps
#أمانة_الجوف_بلا_أمانة	Al-Jouf municipality dishonest§
#ماذا_ينقص_الدمام	What does Dammam lack?
#وزارة_الإسكان	Ministry of housing
#وزارة_الصحة	Ministry of health

The motivation of many citizens is clearly seen from their personal effort in creating dedicated Twitter accounts related to this matter without government support. Table 10 lists some of the available accounts that are interested in providing information about public service projects in Saudi Arabia. Clearly, the massive number of followers for such Twitter accounts shows how concerned society is about public services projects in Saudi Arabia.

Table 10: Sample of personal accounts used to monitor public project and services.

Account name	***Purpose***	***Number of Followers***	***Number of tweets***
مشاريع السعودية @SaudiProject	Provide information about everything related to development projects that will change the future of Saudi Arabia (news, photos, reports, videos). Anyone can send data to this account to share it.	157,328	5043
#مشاريع_سعودي @Armon9	Follow-up the local facilities and stadiums projects in Saudi Arabia.	18,727	2,087

Account name	*Purpose*	*Number of Followers*	*Number of tweets*
عداد مشاريع جدة @3adad	Monitorn existing projects in the city of Jeddah and follow up the completion dates.	69.664	5,428
مشاريع تبوك @Engineer1113	This account mainly focuses on the City of Tabuk (small city located in the north west of Saudi Arabia) to monitor developments of public projects as well as provide solutions and ideas for future development.	1,786	3,332

In terms of using hashtags, Table 11 shows a summary of the data analysis results for the "Pothole" or "حفريات" hashtag. More than 6,000 tweets were collected from 5,380 users who posted topics related to potholes in streets. Of those who posted these tweets, 85% were from Saudi Arabia. This can indicate that Saudi citizens face issues with the public services they are using as well as the need to offer an official approach to report these issues to the competent authority (detailed analysis is provided in Appendix B).

Table 11: Sample result of the "Pothole" hashtag.

	Results in 165 days
Total tweets	6,001 tweets
Contributors	5,380 users
Total impressions *(Total number of timelines tweets were delivered to)*	100,459,253
Total audience ***(****Sum of all contributors' followers)*	71,667,950
Tweets / Contributor	1,40 is the average number of tweets per contributor
Tweets language	Arabic
Geo-location of tweets	Around 85% from Saudi Arabia
Relative interest *(Number of tweets/population)*	100% in Saudi Arabia
Most tweets are from	35 % Central province (Riyadh, Qassim), 25% Western province (Jeddah, Mecca), 20% Eastern province (AlHafouf, AlKhobar), 10% Northern province (Tabuk, Hail), 10% Southern province (Abba, Najran)
Multimedia type if exist	Videos and pictures

5.1.2 Discussion and result

The results show a massive number of tweets generated by a single hashtag within a short period of time, yet there is a number of reasons which may affect the adoption of Twitter for engaging citizens with governments. Those reasons are:

1- The use of a single hashtag "pothole" or "حفريات" for several purposes in different contexts, such as 1) Information relevant to the hashtag's purpose: Figure 11 shows a snapshot of a tweet posted from Saudi Arabia reporting a street problem in Rafha city. 2) Information irrelevant to the hashtag's purpose: Figure 12 shows a snapshot about a person who is using the word "pothole" or "حفريات" in a sarcastic manner. 3) The use of trending hashtags for advertising purposes: Figure 13 shows an advertisement for car paint protection products. 4) Different actual meanings for a single hashtag: Figure 14 shows a tweet by an online newspaper about an article discussing a new fossil discovery. In the Arabic language, the word fossil "حفريات" or "أحفوره" is a synonym of pothole "حفريات". Thus, this may lead the Twitter search engine to retrieve inaccurate results.

2- Many user accounts are anonymous, which may reduce their credibility.

3- Twitter has a 7-day limitation policy on retrieving old tweets and archiving content, which can be a barrier to collecting old content to understand a problem during the analysis.

4- It is difficult to track the meaning and the purpose of the tweets, as they come in an unstructured format, unless the local government uses and educates citizens about pre-stated hashtags and keywords for reporting issues (Lorenzi et al. 2014).

Figure 11: A tweet uses the hashtag for related information as it is updating road works in Rafha city.

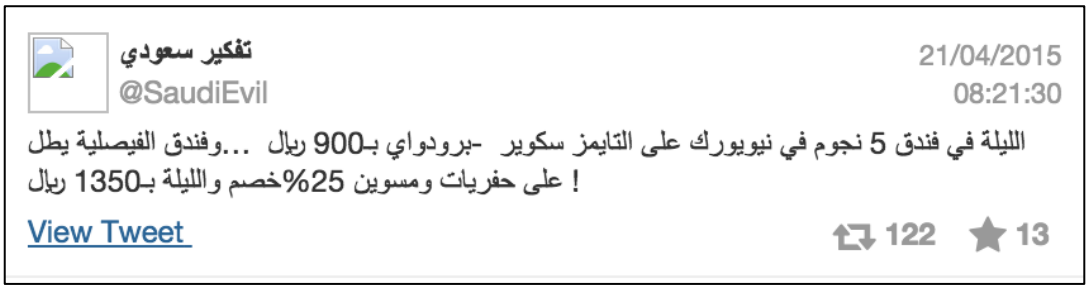

Figure 12: A tweet uses the hashtag for unrelated information.

Figure 13: A tweet uses the hashtag to advertise for car protection products.

Figure 14: A tweet uses a different meaning for the hashtag to update about a new fossil discovery. The word fossil in Arabic is "حفريات" or "أحفوره"

As a result, using Twitter as platform to communicate with citizens may not be effective as it has some limitations. Thus, further investigation is necessary to find or develop a new means for communication.

5.2 Case study 2: Southampton City Council – People's Panel Project

The People's Panel Project is a group project that is being undertaken by a group of researchers from different disciplines at the University of Southampton, to achieve the aims of the Southampton City Council. The motivation behind joining this project was to support this research to determine the differences between the issues facing Southampton

City Council and the Saudi municipalities. In addition, the project enabled further investigation into the possible solution that might be used to tackle the issues with public services and the citizens' engagement process and, in particular, to determine the factors needed to develop a conceptual model that can be used as solution for related issues.

5.2.1 Project aims and objectives

Southampton City Council aims to provide its citizens with pleasant experiences when they use the services it offers in terms of the quality and type of services needed by citizens. Engaging the citizens of the city of Southampton can be a way to achieve that aim. Therefore, they have started to build connections with local citizens to understand their needs, with the help of online polls. Those polls are part of research conducted to seek resident participants in the "People's Panel", to find out about their visions and opinions on different topics related to local services (Southampton City Council 2014).

5.2.2 Project implementation

The first phase of the project concentrates on waste recycling as a case study. This is because, at only 28%, the rate of recycling in the city is low in comparison to other cities. Contamination rate is about 12%, but as high as 28% in some areas inhabited by students, newly settled immigrants, deprived and transient communities. The suggested solution for this matter is to understand the precise issue. This will provide a way to increase citizens' awareness, to reduce contamination and increase the recycling rate (Marshall 2015).

The step taken by Southampton City Council to encourage citizens to develop their society is remarkable. In other countries, such as Saudi Arabia, citizens are trying to take part in improving public services. They use social media as an alternative way to share opinions and concerns as the Saudi Government does not offer a proper communication channel to involve the citizens.

5.2.3 Proposed solution by the researcher

The current system used by Southampton City Council for this task is simply a "Snap Survey Tool"[13]. This tool is a desktop and web application that allows the People's Panel staff to design a survey using the desktop application, upload the survey to the web

[13] Snap Survey is a company providing survey solutions and research services: https://www.snapsurveys.com

application, choose the recipients, run the survey within a specified amount of time, view the submitted forms and apply some basic analysis. The services offered by the Snap were insufficient for the city council to achieve the goal. Their goal was to be able to understand each individual who participated and what each individual's opinion was over a period of time. In addition, they needed to understand further how opinion can change over time by running more surveys.

Snap only offers the ability to recognise the participant by adding a unique hidden ID in each survey sent to the participants.

A solution for this issue was proposed by the researcher; this was to design a web application developed and hosted by the University of Southampton. It would allow a citizen to register, create a profile, and personalise it, and then they could receive surveys depending on their preferences. The People's Panel staff would then be able to upload all the data gathered from surveys and an automated algorithm would read the data file and insert it into the relational database management system (RDBMS). The RDBMS would help to organise citizens' opinions in an effective way. This may allow for comprehensive data visualisation and tracking of participants' feedback and opinions from the uploaded data, thereby facilitating an understanding of opinion changes over time. Figure 15 provides an illustration for the proposed system model. However, the proposed solution was not adopted by the Southampton People's Panel nor has it been implemented to test its applicability to fulfil the project requirement.

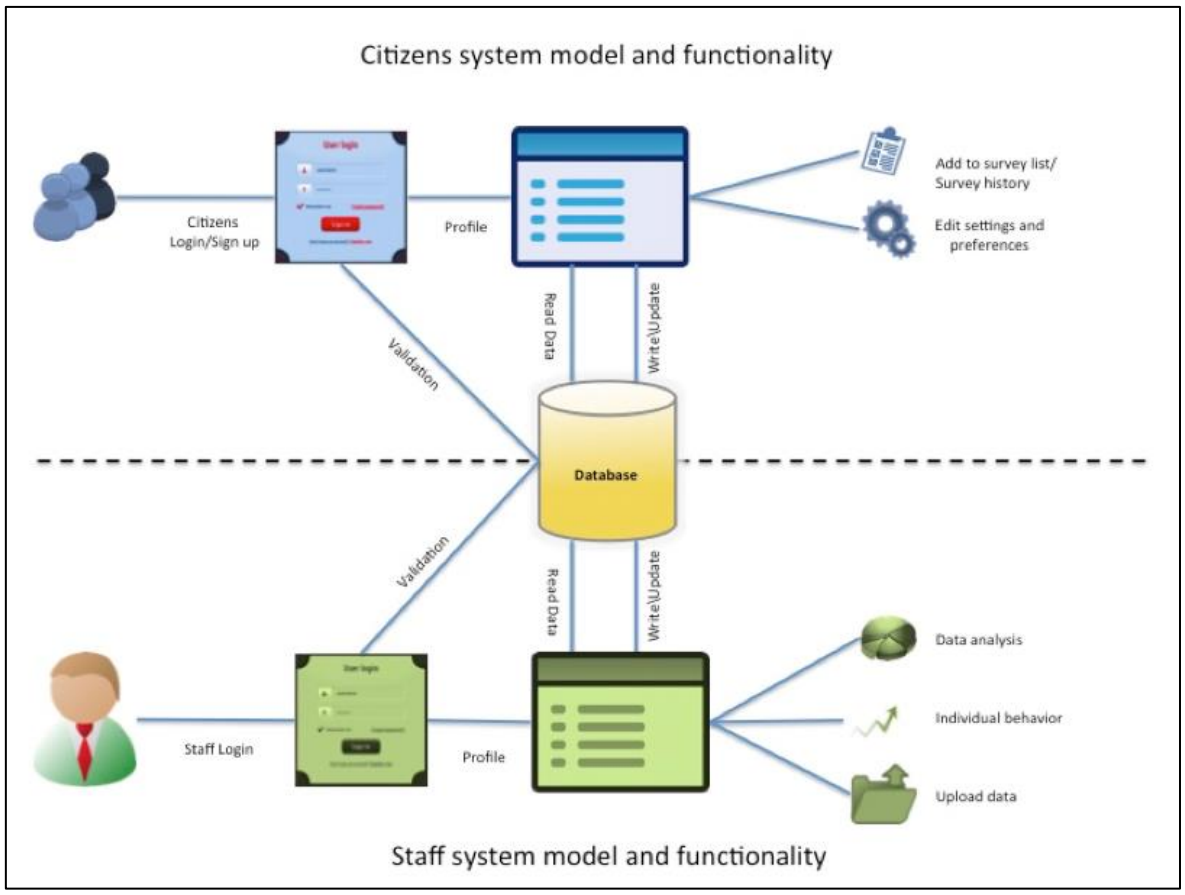

Figure 15:A proposed People's Panel system model (Source of icons: pixabay.com)

5.2.4 Result and discussion

The approach used in this project to overcome the issues related to the citizens' engagement might not be applicable for this research. A model was proposed by the researcher for this project; however, the model has not been considered or implemented at this stage. The People's Panel Project targets citizens by inviting them to provide their feedback in order to study behaviours and increase awareness, while this research is investigating the possible approaches to build two-way communication channels between government and citizens. Thus, the researcher limited his involvement in this project to focus more on other possible methods.

5.3 Case study 3: Analysis of the public services related online platforms and tools

In Chapter 2, a general overview was presented on a number of electronic systems and applications used by the private and public sectors for monitoring public services and reporting problems. However, in this section, more emphasis will be placed on studying

the characteristics of these systems in order to determine the effectiveness of their use for evaluation purposes. In addition, the most common characteristics of these systems, technologies used, and the existing limitations that can be enhanced in the future will be identified.

The final results of this analysis will contribute to guiding the researcher to identify gaps and important elements, which will, in turn, contribute to the development of the proposed model based on what is obtained from this analysis. Also, the most important technologies used in existing systems (such as GPS technology, etc.) will be summarised and presented in Chapter 6.

5.3.1 Analysis method used in this case study

Governments are making great efforts and allocating funds to support the transformation of e-government in order to facilitate users' access to online services to communicate with governments with high efficiency. However, many studies have shown that there is a lack in the implementation of these systems due to the failure to execute some essential basis for the evaluation and analyses of these e-government systems, making it more difficult to improve in the future. The study of Heeks & Stanforth (2007) indicates that nearly 80% of e-government platforms fail completely or partially, and do not achieve the intended aims as required. This may indicate the necessity to evaluate these platforms before they are applied to avoid failure during the implementation phase and to achieve the standards and objectives of the systems. To evaluate e-government platforms, there are many methods used to evaluate technical solutions from different perspectives. Among the most recognised examples is the technology acceptance model (TAM), which focuses on ease of use and utilisation of the service provided (Davis 1989) and the unified theory of acceptance and use of technology model (UTAUT) proposed by Venkatesh et al. (2003).

Among the other models used for e-government evaluation, the Sterrenberg (2017) model suggests an evaluation approach for the e-government platforms based on ease of use achieved through three main factors: (1) accessibility of the system, (2) personalisation of the system, and (3) quality of resources of the system.

Kearns's (2004) evaluation model relied on the effectiveness of value-added services for users and did not consider the effectiveness of the major system components and ease of use. Therefore, it is difficult to find a single generic evaluation model that can be applied to all systems and platforms. Accordingly, this case study will assess a number of platforms

and tools used in public services through various aspects identified by the researcher, and will include limitations, main functionality and applicability to the research problem.

5.3.2 Adaa programme

As mentioned earlier in Chapter 2, Adaa is a web application that was developed to monitor public services projects in terms of the progress, construction operations and budget to ensure transparency. The main functionalities of the programme are as follows:

- Performance indicators for projects and contractors.
- Information on the actors involved and budget data.
- Information on contracts, implemented projects and status updates.
- Information on project distributions in the area of Medina.
- Information on the observation of contracts, projects and follow-ups.

Although the implementation of the Adaa programme may have improved the monitoring of public services in AlMadinah AlMonorah, the researcher's inspection of the website found that there are still many issues associated with this system that must be addressed:

- The data displayed on the website may not be accurate as it is updated by project supervisors only and not on a daily basis. This may affect the degree of transparency.
- There is a lack of citizen engagement as they can only browse listed projects.
- Posting a comment on the project web page requires authorisation and filtration for it to be published.
- Discussion between citizens regarding the listed projects is not facilitated by this programme.
- There are some issues with website design, such as a lack of support for accessibility and multilingual functions; it also requires better visualisation widgets.

The resolution of these limitations could be achieved by making some improvements and incorporating additional tools. The application of FixMyStreet or SeeClickFix or other tools (with some modifications) may be an effective way of resolving most of the above issues.

5.3.3 FixMyStreet and SeeClickFix mobile applications

FixMyStreet (Figure 16) and SeeClickFix (Figure 17) are mobile applications used to report any local issues. They also allow the viewing of reported issues or discussion of these issues with public services and others in the community. The main steps for reporting an issue are as follows:

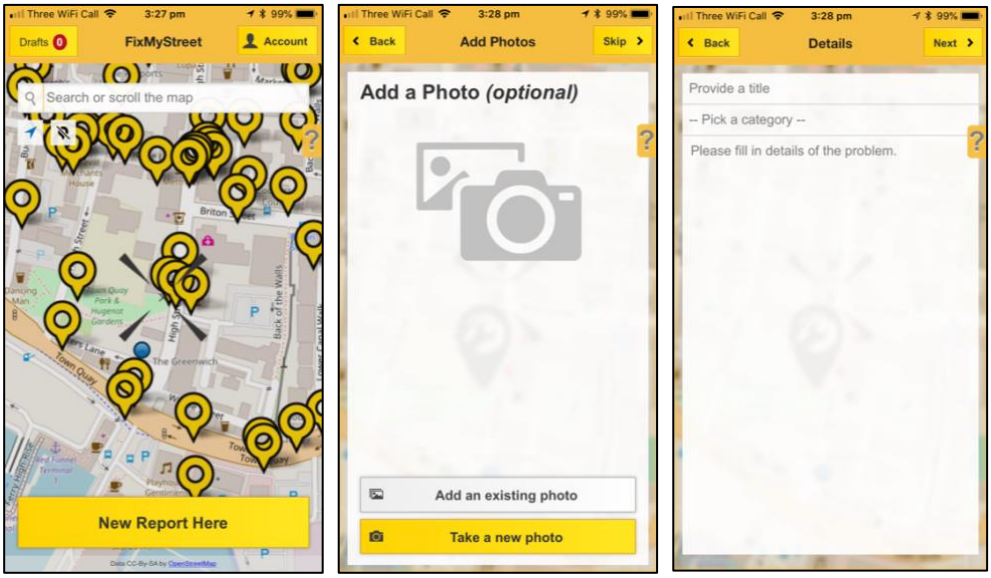

Figure 16: Screenshot of the FixMyStreet mobile application showing the steps needed for reporting an issue.

- Open web application homepage and then enter a postcode, place name or pick 'locate me automatically'.
- Put the pin in the map.
- Type in a description of the issue and press 'send'.
- A confirmation email is sent to the user; click on the contained link.
- Revisit to add comments (optional).

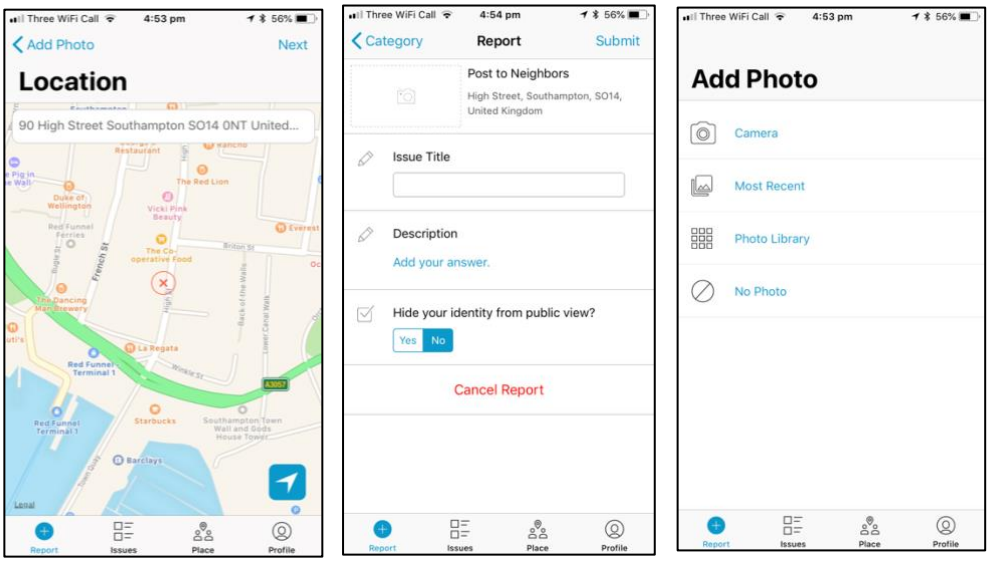

Figure 17: Screenshot of SeeClickFix mobile application showing the steps needed for reporting an issue.

In addition, Table 12 shows the main features and the major differences between FixMyStreet and SeeClickFix. The categorisation of the comparison is based on the researcher's analysis of the mentioned systems and identification of the common features discussed in Chapter 2.

Table 12: Comparison between FixMyStreet and SeeClickFix

	FIX MY STREET	**SEE CLICK FIX**
User interface: for citizens	Website/Mobile App	Website/Mobile App
User interface: for councils	Receives reports in form of e-mails or an integrated system directly with council	Integrating customer relationship management system and mobile app
Citizen privacy	All reports are public but you can hide your e-mail and contact info. Although, councils have the ability to access it	All reports are public but you can hide your e-mail and contact info. Although, councils have the ability to access it
Availability	Ability to generate reports online/offline (draft reports) on iPhone and Android	Ability to generate reports online/offline (draft reports) on iPhone and Android
Type of reports	Broken, dirty, damaged, or dumped, and need fixing, cleaning or clearing (graffiti, dog fouling, potholes or street lights)	Issues of quality-of-life, from simple problems regarding street and environmental conditions to more complex issues about the health of citizens and communities

	FIX MY STREET	SEE CLICK FIX
Voting for reports	No	Yes
Accessing reports/open data	All reports are available to view but without data exporting option. Advanced options available in the integrated system used by local councils	Available for governments
Analytics tools	Not available	Basic and advanced analytics tools are available for governments
Validation (when closing a report)	Not available, users not even required to be at the physical location of the issue when they close it but they have to be registered or have to confirm their comment using a link sent to user e-mail	Not available, users not even required to be at the physical location of the issue when they close it but they have to be registered or have to confirm their comment using a link sent to user e-mail
Functionality	- Auto detect location maps view - Upload photos, profile for registered users - Report history for registered users Find issues close to user's problem	- Auto detect location maps view - Upload photos or video, profile for registered users - Report history for registered users - Find issues close to user's problem - Q&A Blog - Watch areas and real-time news about user's local area
Registration	- Not required to make reports but personal e-mail should be provided - Confirmation link required	- Not required to make reports but personal e-mail should be provided - Confirmation link NOT required
Accessibility	Not available	Not available
Tracking the report	Via e-mail alerts only	Yes, create watch areas to monitor
Flagging issues reported	Yes, for reports only not comments	Yes, on both issues and comments
Detailed information about reports (time, id...)	Hidden	Yes
Duration to fix a problem	Not specified or estimated. Many problems have been open for months	Many issues have been closed but specified as closed or have been open for a very long time

Both tools provide excellent functionality beside the usability that is clearly indicated while reporting an issue. However, they still need some modification and enhancement in order to generate better outcomes.

The list below summarises the limitations of both tools:

1- The purpose of use: Most of the existing tools are used for non-emergent public service issues and do not include public services projects or support for emergency cases.
2- Credibility: Any online user would be able to close open cases easily, which would affect the overall quality of public services.
3- Open data: Although users may view the reported issues, the quality and representation of the data requires more enhancement, for example the ability to generate and export reports, analysis tools, etc.
4- False reporting: Although both tools use GPS technology to detect the user's location to facilitate pinpointing the reported issue on the map, any user can report an issue or vote for it even if they are not physically at the same location or nearby. This may result in increasing falsely reported issues.
5- Registration: Users of these tools need to provide only their e-mail address, which may result in untrustworthy reports by some of the reporters.

5.3.4 Balady system

Figure 18: Screenshot of Balady's main control panel which allows navigation through subcategories to services

Balady is the national electronic gate (Figure 18) for the municipal sector, which contributes to improving the quality of municipal services provided to citizens and residents throughout Saudi Arabia, and elevating the citizen's role as an active partner in development through three main services:

4. Interactive services: to help promote the concept of community partnership to improve the quality of services provided to beneficiaries by incorporating their opinions and ideas.
    a. Evaluation
        i. Your city:

            This service offers questionnaires to measure beneficiaries' satisfaction with the quality of the public services provided. Collected data analysed periodically and used in determining the development priorities of the city, which can be reflected positively in improving services.
        ii. Your experience with the municipal sector as an employee (not yet implemented):

            This service offers questionnaires to measure employees' satisfaction with the quality of the direct services provided to them

in the work environment at municipalities. Collected data analysed periodically and used to prioritise development improvement in the level of services provided to the employees.

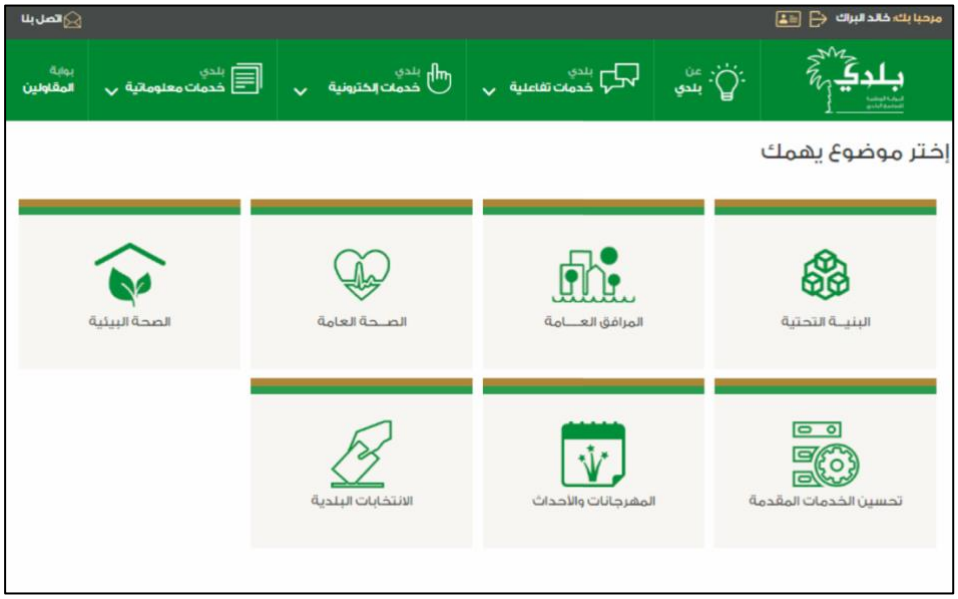

Figure 19: Screenshot of the available subject that users can share their ideas in, which is limited to seven subjects.

b. Ideas
    - Share an idea: allows beneficiaries to share an idea on a subject they are interested in under one of the following topics (Figure 19): General facilities, Public health, Environmental health, Festivals and events, Municipal elections, Improved service provided, Infrastructure.
    - Voting on ideas and comments for the purpose of supporting an idea or discussing it among other beneficiaries.
    - Challenges (not yet implemented)
c. Decision making (not yet implemented): allows beneficiaries to participate in the decision-making process by voting on the most important public decisions that interest the participants and which the municipal sector will adopt based on participants' opinions.

5. E-services: to assist in the submission of electronic applications to obtain the most-demanded licenses. This service includes: Construction License Services, Professional License Services, Schema Approval Services, Shelter or accommodation facilities, and Investment opportunities.

6. Informatics Services: Providing information to beneficiaries to assist them in making relevant decisions and understanding the procedures of government transactions when submitting applications, such as building a house, searching for engineering offices, requirements and procedures. This service includes: Requirements for municipal activities, Enquiry for immediate license, Directory of engineering offices, Municipal fees calculator, Geographic services explorer.

The Balady platform works primarily to enable citizens' engagement and elevate their role as active partners by providing the above services, which are considered to be fairly good at increasing the beneficiaries' satisfaction and enhancing transparency.

However, there is still a major need to improve the current platform. In addition to shedding light on the other services or features that have not been considered, there is a requirement to improve the citizen or resident experience with municipal e-services provided through the Balady platform.

The points below summarise the limitations of Balady platform:

- In the Ideas section users are limited to pre-defined topics, which restrict the scope of sharing an idea.
- There is no indicator for the number of votes given to each posted idea.
- The information provided as a guidance on how to utilise each service is not sufficient.
- This system does not focus on monitoring public service projects, but its main objective is to build a link between municipalities and society through interactive services.
- It does not have the ability to submit emergency and non-emergency requests.
- It does not provide reports and performance indicators.
- The transparency level can be considered as low, since it is only available when beneficiaries post a new idea, while the other services are not accessible to the public, such as the evaluation of services.
- Many of the services in the system ostensibly exist, but are inactive and there is no indication of when they will be launched, such as challenges and decision making.
- There is a significant percentage of the community who prefer to use mobile applications (Section 4.2), however, the system is provided only as a version

that works on a web browser and does not offer a mobile application as an alternative version.

- Privacy matters: Personal information, such as the photo and name of the user, is displayed when participating in the general discussion. The platform does not provide an option to stop some of the personal information from appearing to everyone.
- The system allows users to post a new topic or participate in discussions that will be accessible for users from different cities of Saudi Arabia, without the presence of a filtration feature to show topics related to a specific city. Also, participants may not be familiar with the posted content or discussion as it is related to different geographical scope and this may lead to inaccurate results.
- The Informatics service is not comprehensive; it focuses on very limited aspects; thus, it may reduce the level of awareness required for effective participation.
- Only the Arabic language is supported. While a large number of Saudi residents[14] are from countries that do not speak or read Arabic.

5.3.5 Balagati 940

Balagati 940 is a reporting tool that allows citizens to report only irregularities related to municipal services provided by the Eastern Region Secretariat. After the preliminary steps required for using the application are completed, the application allows users to: report an issue, find a history of personal reports, submit a voice mail or change the application settings (Figure 20).

Users can report issues related to one of the following categories: 1) Markets and public health (e.g. food and expired items, in-house restaurants, municipal requirements), 2) Environmental sanitation and vector control (e.g. control of flies, marshes, stagnant water, rodents and reptiles), 3) Street maintenance and public networks (e.g. a hole in the street, lack of rainwater cover, industrial medicine) or 4) Parks' maintenance and municipal facilities (e.g. leaking water, lifting plants blocking the road, broken sidewalks).

In addition, the following steps must be taken:

[14] It is estimated that 29% of residents in Saudi Arabia are non-Arabic speakers: https://www.stats.gov.sa/ar/indicators/1

- Choose the location of the problem (city, village, etc)
- Select the neighbourhood
- Choose the classification the problem
- Select the sub-classification (if needed)
- Upload visual files such as images or video, or audio recording or file, or enter current location.

Figure 20: A snapshot from Balagati 940 mobile application.

Despite the above, the Balagati application remains limited in that it only provides the ability for reporting incidents, while the citizens have the need for more engagement and transparency.

The points below illustrate the limitations of this platform:

- User support is not available within the application.
- Help section or information about using the application or reporting an issue is not available.
- Transparency: all the reported issues are not accessible by other users, therefore other citizens may report the same issues, which may lead to a duplication.
- Users are not well-updated about the progress of reported issues.
- It does not provide an interactive map for the reported problem.
- Users are limited to reporting issues under very specific topics.
- Redundant requirement for the reported problem location as it is required to enter the location manually while it can be selected from the map at the same time. Also, it allows the citizens to report an issue from different city.

- All issues are managed by the system administration, thus user modification to the reported issues is restricted.
- The application does not support community building by providing interactive services such as; consultation, petitioning and deliberation.
- Does not provide reports and indicators of performance.

5.4 Discussion and results

In this chapter, several case studies were conducted on a number of public services solutions available in the private and public sectors. These case studies were designed to study the efficiency of their use as a solution to the research problem presented in Chapters 1 and 2.

Three major case studies were identified; each case study provided a solution for the research problem from a different perspective. In the first case study, the focus was on social media, especially Twitter, as it is considered one of the most popular platforms in Saudi Arabia and many other countries. Also, the Twitter platform has been adopted by a number of governments and researchers to offer a new means of communication. For this reason, it has been studied to determine if it will be an appropriate solution for this research problem. However, the results showed many positive and negative aspects of adopting this type of platform. The main reasons for avoiding adopting Twitter as a way to engage citizens in public services is the anonymity of identities in social networks in general, and Twitter in particular. In addition, Twitter hashtags are used to share information for purposes other than their intended use. Thus, the Saudi government's officials use social networks only for announcing government decrees, decisions and the government’s internal and external affairs. However, they do not look to or engage the citizens with these decisions because they may have concerns about the authenticity of their identities and claims.

Therefore, Twitter might be an inappropriate solution for the purpose of monitoring public projects and enhancing communication between citizens and governments to improve quality of services. This led the researcher to explore a different solution, which was the second case study. The second case study was a project that the researcher joined in order to benefit from the experiences of Southampton City Council in dealing with the public in order to increase awareness and gain people's opinions on several topics proposed by the Council through polls. It should be noted that this case study broadened the researcher's

horizons in terms of the methods of increasing people awareness through field visits, conducting lectures and other approaches. On the other hand, most of the case study's focus was to raise awareness in general and perceive people's opinions through e-polls, which the researcher considered as different to the goal of this research. It is worth mentioning that a model has been proposed to assist the People's Panel Project objective of following up the different views of citizens during different periods of time regarding some of the topics that were presented to the public. This led the researcher to conduct a new case study that focused on studying solutions that are used and have been developed by the public and private sectors.

The third case study focused on the most important tools and platforms that monitor public services in a number of countries, and the focus was largely on the platforms used in Saudi Arabia. The results of this study found many positive aspects in these tools, which can be used, alongside some negative aspects, which can be avoided.

It has been noted that all platforms and tools depend in their approach on some elements of e-participation areas and applied forms mentioned earlier in Chapter 2. Thus, it is important to compare the conducted case studies with the consideration of e-participation areas and applied forms as criteria of comparisons, as shown in Table 13, to identify the most significant elements that can be useful indicators or components to be considered when designing the proposed model and enhancing future systems.

Table 13: Comparison between the conducted case studies with e-participation areas and applied forms.

Case Studies	***1***	***2***	***3***				
E-Participation Areas	**Twitter**	**People's Panel Project**	**Adaa**	**FixMyStreet**	**SeeClickFix**	**Balady**	**Balagati**
Consultation	√	√					
Deliberation				√	√	√	
Polling		√					
Voting				√	√	√	

Case Studies	*1*	*2*			*3*		
Campaigning	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Electioneering	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Petitioning	√			√	√		√
Decision Making						√ Not Implemented	
Service Delivery	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Spatial Planning			√	√	√		
Information Provision			√			√	
Mediation	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Community Building		√			√	√	

Table 13 summarises a comparison between e-participation applied areas and forms with the platforms and tools discussed in the aforementioned case studies to identify the areas and forms adopted as components directly or indirectly. However, some e-participation areas have been excluded as the analysis results show they are not relevant to the purpose of this study and have been adopted by no more than one of the conducted case studies. The excluded e-participation areas are Polling, Campaigning, Electioneering, Decision Making, Service Delivery, Mediation. The components that have been identified due to frequency and purpose of usage are: Consultation, Deliberation, Petitioning, Voting, Spatial Planning, Information Provision, and Community Building.

Each of the identified components represents a method of engagement and communication between governments and citizens in one way or another. For example, Petitioning represents a formal request to an authority in the form of reporting an incident, obtaining a license, or writing a petition on a matter that concerns the community. This feature existed

in FixMyStreet, Balagati, SeeClickFix. Also, Consultation was represented indirectly in Twitter and the People's Panel Project, as it can be a very effective and motivational approach to increase citizens' engagement and support their opinions. We also note that Information Provision is a fundamental component in the process of participation, for example, the Balady and Adaa platforms provide some information relevant to the platform purpose, yet the available content is limited. This applies to Voting as well, where it has been used in some platforms and tools. All of these platforms were designed for community building and raising awareness. In addition, the adoption of Transparency, in general, was noted in most of the aforementioned applications and platforms, which can be a critical factor in supporting the e-participation process. Therefore, it can be useful to include Transparency along with the identified e-participation applied areas and forms. Finally, the identified applied areas and forms, in addition to Transparency, can be considered as promising components to assist mitigating the research problem. This can be achieved by using the aforementioned components to design and develop a model for monitoring public service projects combining Consultation, Deliberation, Petitioning, Voting, Spatial Planning, Information Provision, Community Building, and Transparency in a single model. The next chapter will discuss the process of designing and developing the proposed model.

Chapter 6 Proposed conceptual model for monitoring public service projects

This chapter provides an overview of the proposed model. The aim of the proposed model is to facilitate the engagement of citizens with governments for monitoring public service projects. The model's design process was based on the literature review discussed in Chapter 2, as well as the identified e-participation applied areas and forms adopted in the case studies presented in Chapter 5. Finally, this chapter provides an overview of recommended technologies and features that can support the model implementation.

6.1 E-MPSP: Proposed conceptual model for monitoring public service projects

The e-MPSP (e-monitoring public service projects) model has been devised based on some of the applied areas and forms of e-participation presented in Section 2.4.2, along with the focus on the issues raised by the head of the Anti-Corruption Commission in Saudi Arabia (Al-Sibai 2011) that occur in the final two stages of the public service projects life cycle, shown in Figure 3. The development of the model started with an exploratory study that focused on understanding and confirming the issues related to public services from the citizens' perspective. In addition, their opinion was sought regarding the preferred way of communicating with the official authorities (see Chapter 4). The outcomes of the exploratory study showed the difficulties faced by citizens with the quality of public services, lack of engagement with official authorities, and their preference for the use of modern technologies to communicate with the official authorities. This has led to the continuation of research into possible ways to enhance the communication process. Therefore, in Chapter 5, three different case studies were conducted to determine the validity of the available approaches relevant to the research problem and to help build the desired model. The first case study was the analysis of social networking platforms, specifically, the case of Twitter, as Zeiger and Huber (2014), and Villena-román and Luna-cobos (2014) have adopted this approach in their research, which was discussed in Section 2.4.4. The second case study was about the Southampton People's Panel that aimed to engage the local residents by conducting seminars to increase their awareness of predetermined topics. This is also similar to the project conducted in Afghanistan and

Uganda, which aimed to increase citizens' awareness (Huma et al. 2005; Björkman & Svensson 2010). The last case study focused on analysing the current systems and tools used in Saudi Arabia and some other countries. These systems and tools included Balady, Balagati 940, Adaa, FixMyStreet and SeeClickFix (see Section 2.2). The purpose of conducting these cases studies was to achieve two objectives: to identify e-participation concepts used in each case study by establishing a comparison table and determining the correspondence between them; and to capture the technologies, functions and features available in existing systems, and tools that can be used during the model implementation.

The results of the analysis indicated that seven of the e-participation concepts were important for building the model: Consultation, Deliberation, Petitioning, Voting, Spatial Planning, Information Provision and Community Building. In addition, through the analysis of the case studies, it was noted that the Transparency concept was adopted in the process of reporting public services issues, sharing citizens' opinions and feedback, and the official authorities' responses to the users. Transparency can therefore be considered as an additional component to the seven components identified previously. In order to help build the model, it is important to identify the stakeholders of the communication process as new components. Thus, the main stakeholders are the citizens and the governments that are represented by municipalities, monitoring committee team, and closure committee team. Accordingly, the proposed model at this stage will consists of 10 components, which are: Government, Citizen, Voting, Information Provision, Consultation, Deliberation, Petitioning, Spatial Planning, Transparency and Community Building.

Including these components may provide an improved way to design an online tool for the purpose of citizen engagement to enhance public service quality and the delivery of public services in a more convenient manner. Figure 21 illustrates the relationship between the identified model components. Both the government and citizens play a role in achieving a high level of engagement. This model suggests governments provide citizens with proper information (Information Provision) to ensure effective participation as they are invited to express their opinions (Consultation), discuss public concerns (Deliberation), request services (Petitioning) or support any participant request (Voting). Improved engagement could improve spatial planning and community building, and may ensure a higher level of transparency.

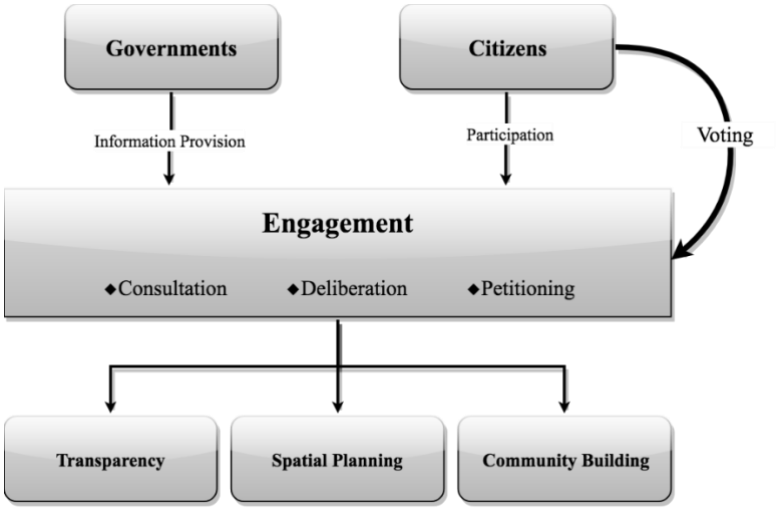

Figure 21: The main components of the proposed model and their relationships

As mentioned in Section 2.1.2, the main causes of poor quality in public service delivery arise during the last two phases of the project life cycle, which involve the monitoring and closure of projects. Thus, by applying three forms of e-participation as model components (Consultation, Deliberation and Petitioning) as shown in Figure 22, the outcome components achieved may result in increasing the level of transparency, enhancing spatial planning and building communities.

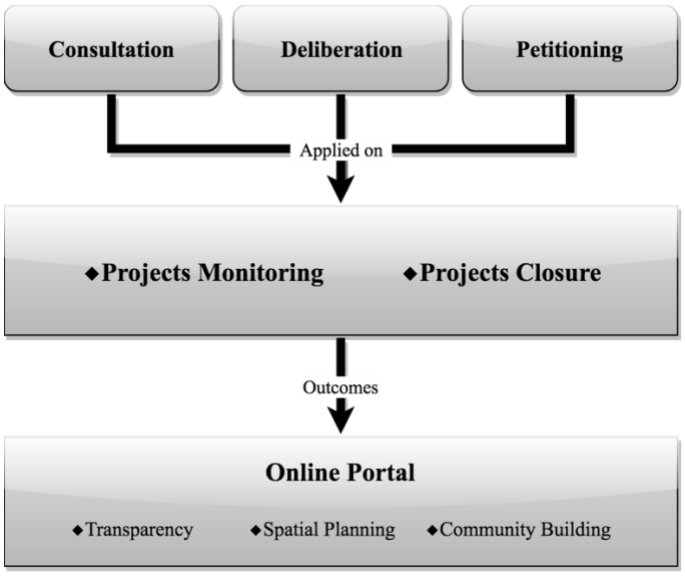

Figure 22: Relationship between components of the proposed models.

Figure 23 presents a detailed model architecture that shows the different possible interactions between different parties involved in the engagement process for monitoring public services. The highlighted boxes in Figure 23 indicate the project phases which include the aforementioned components for citizen engagement with government.

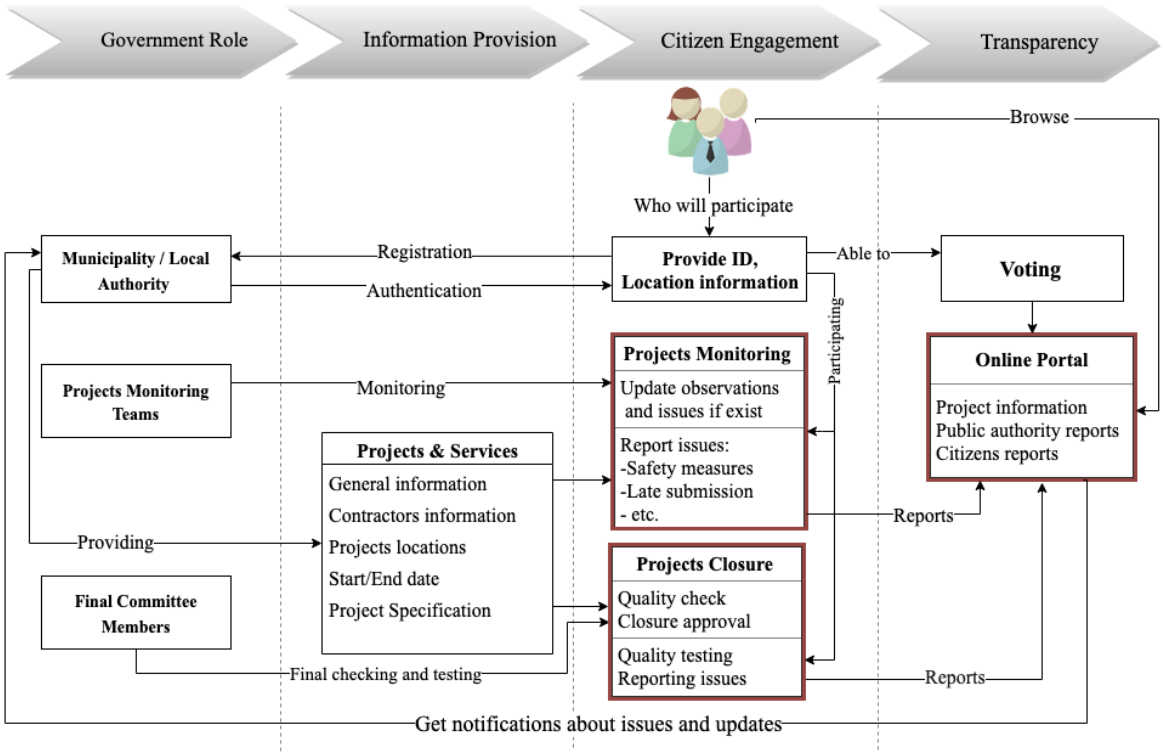

Figure 23: Conceptual model architecture for monitoring public service projects

The proposed model architecture consists of four roles to classify the inter-connected component:

6.1.1 Government role

This includes all parties involved in developing, monitoring and delivering high quality services to citizens. These parties are:

- ***Municipalities or local authorities:*** Responsible stakeholders who manage and provide public services.
- ***Project monitoring teams:*** Municipality employees or third-party agencies that are responsible for observing the on-going construction phases of public services and ensuring progress adheres to a specified scheduled.
- ***Final committee members:*** Municipality staff or third-party agencies that are responsible for measuring the quality and standards of projects as stated in the project specifications.

6.1.2 Information provision role:

This role may help to ensure that citizens are kept informed about all public service projects. In addition, allowing information access may enable citizens to have the

necessary knowledge prior to reporting any issue with public service projects or making an official complaint.

6.1.3 Citizen engagement role:

Citizens will have to register online by providing their ID in order to be authorised to participate in the monitoring phase or project closure phase.

During the project monitoring phase, citizens will be able to report on what they observe during project development, such as project delays or setbacks; they can also request a service, take safety measurements, or report on the disturbance to local residents, etc. On the other hand, during the project closure phase, citizens will be invited to offer feedback on the submitted project in order to determine if the project satisfies their needs and is of high quality.

Citizens' reports will be accompanied by both project monitoring team reports and final committee members' reports in order to provide a more effective resolution to current issues in public service projects for governments, politicians and citizens.

6.1.4 Transparency role:

Any citizen using electronic devices, such as mobile phones or tablets, can openly access all the content generated from phases 2 and 3. Only registered users will be allowed to vote for or against the submitted reports. This may help to categorise these reports according to their priorities.

The suggested implementation of the proposed model requires the use of ICT as it may enhance participation and facilitate communication (Section 2.2). In addition, the high usage of the internet and mobile technology in Saudi Arabia (Ministry of Communications and Information Technology 2012) indicates that ICT may be a key determinant of overall adoption rates and the willingness of citizens to use modern technology for communication purposes.

6.2 Recommended technologies and features for the model implementation

Based on the analysis of the systems presented in Chapter 5, the suggested instrument for reporting issues is a mobile application that combines most of the features available in

FixMyStreet, SeeClickFix and Adaa. In addition, it is suggested that a web page is developed that offers access to all content generated in relation to public service projects and submitted reports. Furthermore, it is advised that such data be made accessible to everyone, even non-registered users.

The features and technologies may include:

- A multilingual system (Arabic and English) to increase participation by allowing non-Arabic speakers to participate. This can be applied in the reporting tool and the online portal.
- A report function using Maps along with an option to post a description about the issue and upload relevant multimedia content.
- A camera for capturing photos and videos taken by citizens while reporting issues.
- A comment posting function for supporting citizens' views via the aforementioned components.
- A voting mechanism which operates on the basis of a 'like' or 'dislike' button to emphasise the importance and priority of the reported issues or citizens' comments.
- Maps to help users locate public services and report issues efficiently.
- A Global Positioning System (GPS) to easily locate a user's location in order to navigate to public service projects in the user's vicinity. In addition, this will help to ensure that users who want to vote on reported issues reside in the same area in which the report is generated. This can serve as a security feature of the programme to ensure that only users close enough to the reported issues will be able to vote. This will also help to reduce the number of false votes registered by people who live in different areas.

As result, the aforementioned features and technologies can assist during the proposed model implementation. It is suggested that an online-based instrument is developed that incorporates the recommended features and technologies in order to facilitate the process of monitoring public services.

6.3 Chapter summary

This chapter presented the process of designing the proposed model for monitoring public service projects (e-MPSP) in Saudi Arabia that aims to enhance the communication and engagement between the citizens and the government. The proposed model components have been successfully identified as a result of the previously conducted studies in

Chapters 4 and 5. The exploratory study has confirmed the existence of the public services issues encountered by the citizens as well as the need to strengthen the method of communication with the provision of technical tools to serve the process. These results prompted further investigation to determine an approach to facilitate the engagement process. This has been done by conducting case studies. In Chapter 5, three different studies were conducted to understand the benefits and drawbacks of current communication methods. The analysis of the conducted studies resulted in the identification of 10 components to construct the proposed model, which are: Government, Citizen, Voting, Information Provision, Consultation, Deliberation, Petitioning, Spatial Planning, Transparency and Community Building. Each of these components has an objective role in the monitoring process. The issues noted by the head of the Anti-Corruption Commission in Saudi Arabia (Al-Sibai 2011) were the main point on which the proposed model was built, as all components of the proposed model were based on the coverage of deficiencies in the last two phases of the public service projects life cycle (Figure 3). In Figure 21 the relationships between the model components were clarified, while in Figure 22 the relationships of the model components with the defined issues in the project life cycle were explained.

Finally, an illustration of the model architecture was presented that can assist the understanding of the inner-interactions of the stakeholders, model components, and the project life cycle issues in an applied manner (Figure 23). The main stakeholders, which are the citizens and the governments (represented by the municipalities in general or specifically the monitoring and project closure committees), were shown as well as their roles. The responsibility of the citizen is presented through the submission of requests, consultations, voting and suggestions, while the government is responsible for providing information on projects and future plans, as well as their monitoring role through their various committees. Finally, the Transparency component emerges in terms of keeping all operations open to all, in order to allow the citizen to know the facts, and to facilitate the participation of others by including their responses on the submitted requests. To support the implementation of the proposed model, recommended technologies and features for the model implementation were identified and included at the end of this chapter. In the coming chapters, emphasis will be placed on evaluating and validating the proposed model by conducting interviews and questionnaires with experts in the field to determine if any components need to be included or excluded. In addition, the challenges that can be encountered during the model implementation will be addressed.

Chapter 7 Proposed model evaluation and confirmation

This chapter presents the findings of the interviews and questionnaires conducted with experts. Different tools and techniques have been used to analyse the data collected from the interviews and questionnaires. First, this chapter provides a detailed explanation and analysis of the data collected from the participants. Next, expert interview findings will be discussed to provide an understanding of the issues in public service projects and how they are managed and monitored. The experts' evaluation and recommendations regarding the proposed model components are also presented. The next part of this chapter presents the expert questionnaire findings. The questionnaire's purpose was to confirm the findings of the evaluated model on a wider scale. The last section discusses the collected data and provides a summary of the findings.

7.1 Interview results and findings

The interview questions were designed in two different styles. The first style used open-ended questions that focus on understanding and exploring different aspects of the research problem. The second used closed questions with the ability to add comments. The researcher used this approach to investigate the relevance of the proposed model components in order to confirm the existing ones, or to add or delete components.

The open-ended questions were divided into different categories: monitoring public services process; use of technology and social media in service delivery; and citizen engagement during monitoring processes. The closed questions evaluated the 10 components used in the proposed model: Government, Citizens, Petitioning, Consultation, Deliberation, Voting, Information Provision, Transparency, Spatial Planning, and Community Building.

The interviews were conducted in the Eastern Province Municipality of Saudi Arabia in two different cities: Al Ahsa and Al Dammam. As a result, fourteen participants in this study were identified and interviewed from different departments.

7.1.1 Monitoring public services process

The first part of the interview was focused on understanding the monitoring process of a public service project during project construction and after its completion. In addition, it investigated the challenges facing local municipalities during the monitoring process. The analysis shows that the monitoring processes in Saudi municipalities differ depending on the environment of the departments and services. For example, there are monitoring committees that focus on public service, quality assurance, and health and environmental projects.

Experts A, D, M and N generalised the main monitoring process in public service projects. They indicated that it can be categorised into two different approaches. The first is to delegate the monitoring to private consultancy agencies that are responsible for quality control and the confirmation of a project. This function is performed alongside municipality representatives, who can be supervisors or general coordinators between the consultant and the contractor, in order to ensure the implementation of the requirements of the project. The second is self-supervision in the form of teams consisting of a single engineer and an assistant for each project. Expert A stated that "*Due to the large number of current projects, we assign many projects to a single engineer and a number of assistants. Each assistant will focus on a single project and the engineer plays the management role; this is not an effective approach to meet the quality standards with the shortage in the number of engineers*".

Experts E, M and N described the quality assurance process. There are two different specialised teams who inspect the quality. The first is the quality control team, which is responsible for performing random checks at every stage of the project construction. Expert E: "*We do a random check by taking sample materials, because we do not have enough staff to check every single aspect of the project*". The second is the project management office (PMO), which is responsible for picking a random project among those under construction to evaluate material quality and finding an opportunity to enhance the materials used. The PMO also evaluate the quality control teams and the project monitoring teams, and provide support if needed. Expert N indicated that "*We just launched the PMO committee to evaluate and support project supervisors due to deficiencies facing the observer, such as the large number of projects given to them, or interfering with some of the government's measures with other departments*".

The frequency of the monitoring teams' visits varies depending on the type of project or services. During project construction, the observers perform daily visits, and the engineers perform weekly visits (Experts A, D and E). In the health and safety department, they use the risk analysis matrix according to the importance and seriousness of facilities. However, this technique is not applied for reasons given by Expert F: "*Realistically, this mechanism is not applied due to the lack of monitoring staff (16 observers monitoring more than 6000 facilities), which leads to a delay in the visits*". Experts A, C, D, E, H, I, J and M indicated that the reporting tools used during monitoring were paper reports alongside photographs, with some recent projects having used live streaming cameras. Although there was some individual effort to adopt technology instead of paper records, such as using excel files and software to provide an indication of the projects' progress, Expert N indicated that "*This software does not provide accurate readings because it is not updated daily and it does not provide detailed information on the project developments of or the reason for the delay*".

Next, the interview asked the experts about the monitoring process after project completion and delivery. Experts C and E indicated that the contractors were responsible for fixing any problem emerging during the year. During that time, municipalities allowed citizens to start using the services and were ready to receive citizens' complaints and issues about them. Some monitoring committees have run daily visits to test projects facilities: Expert C stated "*monitoring committees are supposed to observe project facilities daily but this is not well-activated and our large reliance [is] on complaints we receive from citizen*s".

Challenges during the monitoring process:

- Staff lack of experience and skills in the monitoring process.
- Staff lack of experience and skills when using technology.
- Staff dishonesty.
- Lack of supervision.
- Poor quality of projects reports.
- Random tests.
- Lack of monitoring teams (engineers).
- Poor safety measurements during project consternations.
- Overlapping responsibilities of government agencies.
- Fiscal deficit, which may cause project delays.
- Unprofessional contractors and manpower.

7.1.2 Use of technology and social media in service delivery and monitoring

This section of the interview was focused on understanding the use of technology and social media in the Saudi municipalities in terms of delivering services online. It was found that the majority indicated that the Saudi government has been adopting ICT to deliver their services online in the last five years. This includes municipalities, but the performance in adopting technology varied between cities. Expert J indicated that the Al-Ahsa municipality is considered top in the use of technology as this area has gained many prizes for leading the adoption of technology through their website and mobile applications. Expert M indicated the slow development in the adoption of technology was due to the lack of staff: "*The lack of staff and experience may be the main reason for the delay in the transformation and development of e-services*".

Services include:

- Building permits.
- Suggestions and complaints.
- Information services.
- Registration services.
- Shop permits.
- Urban planning.

Social media platforms have also been used to communicate with citizens for two different purposes: making announcements, and receiving complaints and enquiries.

The available communication channels used for receiving complaints, reporting issues, and making announcements are:

- Interactive voice response IVR at 940.
- 'Balagati 940' mobile application used for reporting public service issues.
- E-mails for general communication and receiving complaints.
- WhatsApp mobile application for receiving complaints through text messages.
- Twitter used for announcements and receiving complaints through direct messages.
- Snapchat live updates regarding projects and marketing services.
- Instagram for project and service information and marking.

Although there are many communication channels available to report issues, Expert N stated that the IVR Interactive system (940) is the main method used. However, Expert F indicated that these methods exist but are not effectively implemented. Expert J explained

that Consultation and Deliberation had been considered, and online platforms named "Al Ahsa Intelligent community"[15] and "Balady"[16] had been developed. Expert K mentioned that the online tools do not support sharing information regarding citizens' reported issues or locations.

Expert interviews show that citizen reports should include problem description, location and user information. However, Experts K and M said a reported problem's location description was one of the reasons for taking a long time to fix it. Also, he mentioned that using GPS services would help to determine the exact location of a reported problem which would enable a fix within a reasonable amount of time.

7.1.3 Citizens' engagement during monitoring processes

This section of the interview focused on understanding the engagement of citizens in monitoring public services and how they could get involved. Three questions were asked:

- How can citizens or residents report an issue in one of the public services projects and what factors affect the speed of the response?
- Do you think citizens could be helpful in monitoring public services projects, and if so, how?
- What kind of information would local municipalities be able to share with citizens?
  A. Projects
  B. Reported issues.

Interview analysis found that any citizen has the right to report issues found in the streets by using one of the available communication channels. Problem details, user information, and problem locations are asked when a problem is reported. The factors affecting the response time to fix a problem are listed below:

- Type of problem (some problems can be fixed in less than a week, while others may need much longer).
- Budget.
- Barriers to access the location of reported issues (e.g. cars parked on potholes).

[15] Al Ahsa Intelligent community: http://community.alhasa.gov.sa/index.php/ar_aa
[16] Balady: a recently established programme by the Ministry of Municipal and Rural Affairs. It aims to provide interactive online services for citizens and organisation to evaluate public services, receive citizens' ideas, improve decision-making, provide e-services such as the construction licenses service, and professional licenses service. Source: https://balady.gov.sa/Pages/default.aspx

- Management of the involved parties.
- Priority (such as increasing number of complaints).
- Emergency situation that require an immediate action.

On the other hand, all of the experts indicated that citizen involvement in the monitoring process is important because:

- They can help to solve minor problems that could have a major impact on the future.
- They draw attention to the problems not considered by official staff because of work pressure.
- They provide the motivation to solve problems due to the need to confirm the existence of problems and follow-up.
- Their participation in the process reduces corruption.
- The citizen population is large compared to the size of the monitoring committee.
- They provide a greater area of coverage.

However, Experts B and I indicated that citizens should not be involved in project construction details due to the lack of expertise, and to ensure their safety. Also, Expert N stated that *"It is very important that the official authorities respond to citizens' complaints to stimulate citizens through rapid response and not to make a negative reaction"*. Furthermore, Expert L said *"Governments must put more effort into increasing citizens' awareness and knowledge about the available communication channels and the proper way to report problems as some citizens call the police to report public service issues due to their lack of knowledge about the official authority"*.

Experts confirmed that the concept of sharing information related to projects is accepted and citizens have the right to find it either on the project site or a municipality website. However, data about the reported problems are not available, although there are no rules against sharing it. Some experts explained the reasons behind that, such as Expert B: *"Some employees believe that the dissemination of information may cause annoyance"* and Expert N: *"We cannot declare the reason; sometimes it is due to the presence of an obstacle caused by another government department as it may create problems between us and citizens will put the blame on the other party"*.

On the other hand, Expert B believed that sharing this kind of data could help to show staff and municipality performance. In addition, Expert C said *"It may save us time to receive*

many frequent complaints on the same issue" and Expert F said *"I support sharing citizens' complaints but citizen information should be protected";* he added *"The idea may be rejected by the staff for not wanting to clarify the course of events"*.

7.1.4 Expert reviews of the model components

The analysis of the expert reviews showed that there was consensus among the respondents on the model components being important. Although the majority have confirmed the proposed components, some of the experts said that a number of components have important limitations, such as Voting and Consultation. Expert G suggested including Emergency as a new component of the model. Furthermore, Expert N did not find Voting to be an important component unless it is applied to specific cases, which will be discussed in detail in the next section.

The following subsections will present each model component and explain the experts' reviews about each.

Government:

Government support and control for online communication platforms is important, as discussed in Chapter 2 regarding government web applications for monitoring public services. Also, issues found in third-party applications should be considered. Government, as a component of such a model, will enable citizens to report their issues, needs and ideas directly to the official authority. Also, reported issues and requests through the Petitioning element will be controlled and managed in terms of closing or resolving issues by government authorities, which will add a level of trust for citizens, believing that their issues will be discussed by a trusted party. All the expert reviews indicate this element is important for many reasons:

Expert H:

An important element. Government support can motivate citizen participation.

Expert D:

Certainly, it has become a necessity to provide and support services electronically. Because e-government promotes transparency and credibility to adjust things which will help to decrease the response time.

Expert C:

One of the competent authority duties is to listen to the citizens without the presence of mediators; also, citizens will be more comfortable when they contact official authorities directly.

Expert B:

Government support is important, since there are many citizens fearing to communicate or reach government departments because of their bad experience when dealing with official authorities.

Expert A:

Supporting the monitoring system for free! By allowing professional community members to be engaged in helping local councils to manage projects such as the Saudi Engineers community.

Citizens:

As discussed in the literature review in Chapter 2, many research studies have been conducted to include citizens supporting the monitoring process through reporting observations. In addition, many governments have considered citizen participation as part of the government system during decision-making. Thus, e-participation forms and applied areas were found to facilitate the process of engaging citizens with governments. During the interviews, participants were asked about citizen engagement as a component to be included in the proposed model. The analysis of the reviews found that all experts indicated that this component is important. A sample of expert reviews is listed below.

Expert E:

Citizens live everywhere in cities ... public projects may be located in front of their houses. Therefore, citizens will be much closer and can frequently notice things if they are not right. At the end, these services are provided to them so they will be more concerned about the delivered services.

Expert F:

Certainly, they are playing an important role in the process, which is why we have specialised teams and departments to receive citizens requests and complaints.

Expert G:

Certainly, citizens are a key partner.

Expert B:

Citizens are a very important factor in the monitoring process, but I believe that their roles should be limited during project construction due to the lack of expertise.

Petitioning:

e-petitioning is one of the e-participation concepts that helps citizens submit their request with the ability for others to sign a petition to support it. The model has included this component to support citizen requests for new services and needs. Expert reviews confirmed this component as important and it was adopted a long time ago in different approaches, such as written petitions and petitions through municipal councils. Some Saudi municipalities have launched web and mobile applications to facilitate e-petitioning. Also, Petitioning can help to give priority to the requests received and issues reported through the Voting element. A sample of expert reviews are listed below.

Expert A:

It is an important component, including this component in online system will help citizens and us to locate reported problems easily which will help us to fix the reported problem and reduce the amount of time. Also, it helps to attach multimedia files to understand the type of problem and the validity.

Expert B:

It is a very important component; actually, we just started to implement this service to facilitate a way to report issues and add requests.

Expert E:

As an administrator at the municipality, receiving requests and reports online will make it easier on us and our citizens. It will mitigate presence and time and space, so that we can work from home or anywhere.

Expert J:

It is important to fulfil the citizens' major needs. Focusing more on important requests depending on the priority by counting the number of voters or signs on requests.

Deliberation:

All experts have agreed that the Deliberation component is important, except **Expert L**, who has indicated that this component should be included if there are filtration mechanisms for important ideas or topics. He mentioned that:

This component is useful, but it is difficult to limit the huge number of topics and proposed ideas. The Voting element will give a positive indication to some extent to support this element.

The other experts have provided reviews about the importance of this component:

Expert A:

It will help to produce new ideas for future planning, understand user satisfaction levels, and provide reviews and opinions on services and what is best for them.

Expert D:

It is important because citizens are mostly the affected party, and we should give them the opportunity to talk, ask questions and discuss their problems. This element is supposed to be carried out by the municipal council a long time ago. Unfortunately, it has not been activated yet.

Expert C:

Providing an opportunity for public debate ... may create new ideas we have not thought of.

Expert F:

Public debates are already implemented in some cities in different ways, such as neighbourhood councils or in electronic form, and are managed by citizens. Technology will contribute to increasing the number of participants in this service.

Expert I:

This is very important because it gives municipalities aspirations and support for the future. It helps officials to discover the general community needs and the difficulties they face in order to improve future urban planning.

On the other hand, **Expert B** has indicated that motivating citizens to participate requires government support as he believes that many citizens will not be interested in participating:

The idea of deliberation is important but many citizens may not be interested in participating. The government should listen more to motivate citizen participation as open forums are the place for producing ideas.

Consultation:

Four experts have indicated that this component is important, but with some conditions that citizen consultations should not interfere with internal decisions, or should be directed to certain matters.

Expert A:

It is important for the intervention/consultation level to be limited on some subjects, as certain decisions require strong expertise in order to provide consultation feedback.

Expert E:

We cannot say that they are consultants. But we can take their feedback for future plans without interfering in key decisions because of the lack of experience and specialisation in work details. For example, they can be consulted on park design and how they want services to be delivered.

Expert F:

It is useful if this element is included with some limitations or in some certain topics as conflict may occur in coordination and implementation.

Furthermore, **Expert N:**

It is important that this does not conflict with the municipal council's decisions and public needs. Also, it does not interfere with the municipalities' private affairs and decisions.

The rest of the reviews confirmed the importance of this component; for example:

Expert J:

It is important, because we will receive feedback straight from the affected parties.

Expert C:

It is very important because the main users for services are the citizens. Thus, we must take their opinions on projects and the methods of delivery into account.

Expert G:

Involving consultation element in an online form is important to reach a wider audience and increase citizen responses.

Voting:

To address this element, interviews were carried out with experts to explore what aspects needed to be considered to confirm the use of voting on reported issues, a petition to support the request, or support ideas in public debates.

Expert G has suggested adding Emergency as a new component; besides Voting, he said that:

Voting is important but it may not be an accurate indicator. The credibility of the vote may not give an overview of the situation unless the voters are registered in our database. Also, I would suggest including Emergency as an element to provide an accurate priority for emergency situations, no matter if the request was submitted by an individual or many.

However, the majority have indicated that this component is important, such as:

Expert B:

It is a valuable component if it is employed in the right way. Otherwise, it would be a confusing component when we assign priorities.

Expert D:

It is very important in supporting discussions and to impose priorities for the reported issues.

Expert F:

Voting is important during the decision-making process. Municipal councils use voting for claims submission.

In addition, three experts have indicated that this component should be included with some conditions:

Expert A:

It is important in requests that affect the community but not individual case requests.

Expert C:

Overall, voting is important, but it may not be an accurate measure to promote problems or opinions. However, it is possible to increase the accuracy when the voters' information is stored in our databases.

Expert E:

I believe that it will reduce repetitive requests and reports. However, the distinction must be made in the case of requests; for example, in individual cases we should not allow this feature, but in general problems, this feature can be greatly beneficial.

On the other hand, **Expert N** indicated that this component is not important unless the voters are among trusted communities such as municipal council members:

Does not give an accurate indicator because of certain situations such as when a person asks his family to support his/her request by voting. However, I can

support this element if the voter is actually a member of the council or a trusted member so we gave him/her the privilege to vote.

Information provision:

The role of Information Provision is important and has been included among the e-participation applied areas and forms identified by DEMO-Net[17]. The interviews have investigated this with experts. Results show that there was consensus among the experts that this component is important; information that concerns citizens should be made available to everyone. The reasons for this are as follows:

Experts A, B, I, J and M:

Increasing citizen awareness.

Expert C:

Increasing the level of participation and contributing to reducing the load of citizen enquires.

Expert F:

Contractors are asked to provide project information in the project sites, as a term of the contract.

Expert G:

I believe it is important since we share projects information through our website.

Expert H:

Project information and any update regarding our services are posted through government websites and our social networking accounts.

Transparency:

Experts were asked during the interviews about the Transparency component. It was divided into two sub-components: the first, Transparency, is about providing future plans, budgeting and spending, and reporting issues related to public services during the

[17] The democracy network (DEMO-net) is a Network of Excellence research project funded by the European Commission 's sixth framework programme: https://participedia.net/en/organizations/demo-net

monitoring phase; the second is about increasing transparency as an outcome of the proposed model. Both scenarios were confirmand by all of the experts.

For the first scenario, experts said:

Expert A:

Save us time replying to frequent enquires and complaints. Also, it will reduce the level of injustice, as the lack of knowledge of land owners for the orientation of the government for urban planning may increase real estate fraud in the purchase of plots of land cheaply and raise the price directly because of their access to future urban planning.

Expert B:

There is no law against transparency in our country, and it is a citizen's right. There are a lot of benefits for transparency such as performance evaluation.

Experts D and M:

It is the citizen's right.

Expert I:

Transparency is certainly an important element. It is representative through the municipal council, and supports the development process and citizen participation.

For the second scenario, transparency as an outcome, experts confirmed that:

Expert A:

Technology will offer a new way to access data for projects and report issues in a convenient and organised way.

Expert E:

Undoubtedly, transparency will increase. Making our data available online will facilitate searching and access to these data,

Expert L:

Certainly, the previously discussed elements will help to increase transparency in general by allowing access to information, public debate and consultation data.

Community building:

Community Building is one of the proposed model outcome components that was included based on the importance of Community Building discussed in Chapter 2. Citizens who may participate will have the ability to be grouped into different communities for the purpose of enhancing public service projects and creating a voluntary community. Expert reviews have confirmed this component as important because of the support of e-deliberations, information provision, and government support components. A sample of the expert reviews is listed below:

Expert A:

Sure, technology will facilitate a method of communication and knowledge sharing which will be reflected by strengthening the role of the voluntary community.

Expert E:

Certainly, because participation in open discussions may be considered an indicator for citizen interest, which may result in increasing citizens' edification and specialism.

Expert G:

Supporting and providing an opportunity for citizens to give feedback and join in with volunteer work will increase awareness and can build different mini-communities with different interests.

However, **Expert B** indicated a challenge in achieving this element:

Building communities is difficult to implement and manage because of our unsuccessful experience with the Municipal Council.

He also mentioned a way to overcome this problem:

Online forums for deliberation may enhance and encourage this in the long-term with government support.

In addition, he confirmed the issue found during the twitter analysis (Chapter 5) for the Saudi citizens' uses for social media:

> *Despite the use of social media, many citizens use it to just express their feelings of anger and some others share false information.*

Spatial planning:

This component represents one of the research objectives which can enhance the process of shaping and delivering public services, as well as the management of space to create better facilities to meet the needs of society. Thus, experts were asked if the proposed model can result in positive spatial planning with technology support. Reviews show that all of the participants agreed that using an online system with previously mentioned components and features (GPS, mobile app, etc.) can result in better spatial planning and provide public services is the cities with the greatest needs. A sample of expert reviews follows:

> **Expert D:**
>
> *Yes, definitely spatial planning can be enhanced by the advanced knowledge of citizens' requests and discussions.*
>
> **Expert E:**
>
> *Of course, deliberation, petitioning, and voting about public services will help to improve our future planning,*
>
> **Expert F:**
>
> *The presence of citizens and studying their needs will contribute to improved urban planning. Problems in many failed projects are due to poor planning, individual decisions and failure to study the community and their needs very well (ex. Jeddah storm).*
>
> **Expert H:**
>
> *Yes, I believe reviewing citizen's debates and requests can help to improve future planning.*
>
> **Expert K:**
>
> *Public debates and advanced knowledge of citizens needs can play important roles in supporting this element.*

7.2 Questionnaire findings

After reviewing the proposed model components using the experts' interviews, a new model was constructed based on their recommendations. In order to confirm the model components on a wider scale, a questionnaire was used to survey experts working in Saudi secretariat and municipalities from different fields of expertise. The questionnaire began with an introduction that provided a brief explanation of the research idea, comprehensive information regarding the model components and the purpose of participating in the questionnaire.

The questionnaire included a number of questions to obtain demographic information about the participants. Some of the questions were multiple choice, including those about age group and number of years of experience. Open-ended questions were also included to identify the job title or area of expertise, and their departments. Then, 11 different questions were asked about the proposed model components. The questions included some examples to ensure that the question was understood correctly. The questionnaire was designed based on the Five-Likert scale, which ranges from strongly agree to strongly disagree for each component. Before the distribution of the questionnaires to the participants, the Arabic version of the questionnaire was initially tested (a pilot test) with three Arabic speakers' colleagues in our research group, and the English version of the questionnaire was checked by the supervisor to confirm the clarity of the questions. The questionnaire was distributed in Arabic and English versions but all the participants were Arabic speakers. The questionnaire was distributed for data collection during the period from 15 April 2017 to 15 May 2017. Responses from 87 participants were collected. However, during the data cleaning process we found two participants had not completed their questionnaires, resulting in their exclusion and the number of participants became 85.

7.2.1 Data processing and cleaning

During the process of cleaning the collected data, some of the questionnaire variables were excluded, such as the field showing the respondent's agreement to participate and the variables that are unrelated to the results, such as the date of participation. The remaining variables that are included in the analysis are:

- Age group.
- Job title.
- Years of experience.

- Administrative departments.
- The 11 variables related to the proposed model.

Therefore, there were 15 variables in this questionnaire and these were used in the statistical analysis process.

Some statistical analysis methods were used in order to understand the expert opinion about the proposed model. The Statistical Package for the Social Sciences (SPSS) software was used to analyse the collected data, using the descriptive analysis function, which helps in the process of explaining the collected data. In addition, arithmetic mean and standard deviation functions were used to determine the orientation of the experts' views of the individual components of the proposed model, regarding whether they should be included or excluded, and also their views of the model overall.

For an accurate understanding of the orientation, an estimate table was created to determine the assessment of the resulting average for each component. Table 14 shows an estimated range for each point in the Five-Likert scale.

Table 14: An estimated balance according to the division of the scale of the Five-Likert scale

Response	***Mean***	***General direction***
Strongly disagree	1 - 1.80	Strong disagreement
Disagree	1.81 – 2.60	Disagreement
Neutral	2.61-3.40	Neutral
Agree	3.41- 4.20	Agreement
Strongly agree	4.21 and greater	Strong agreement

7.2.2 Analysis results and discussion

Table 15 presents demographic information about the experts participating in this questionnaire. The proportion of participants in the age group 20–35 years is 44.7%. The

next largest was the 36–45 age group with 42.4%, 10.6% of the participants were aged 46–55 and 2.4% participants were over 55 years old.

Table 15: Participants age group

Age group (years)	*Responses*	*Percentage*
20–35	38	44.7%
36–45	36	42.4%
46–55	9	10.6%
56 or over	2	2.4%
Total	85	100

This diversity in the age groups may improve the quality of the survey due to the resultant variation in number of years of experience (Figure 24). The largest category of respondents is the age group 20–45 years, which is an age group that has lived through much technological development, and may support the adoption and provision of technology significantly.

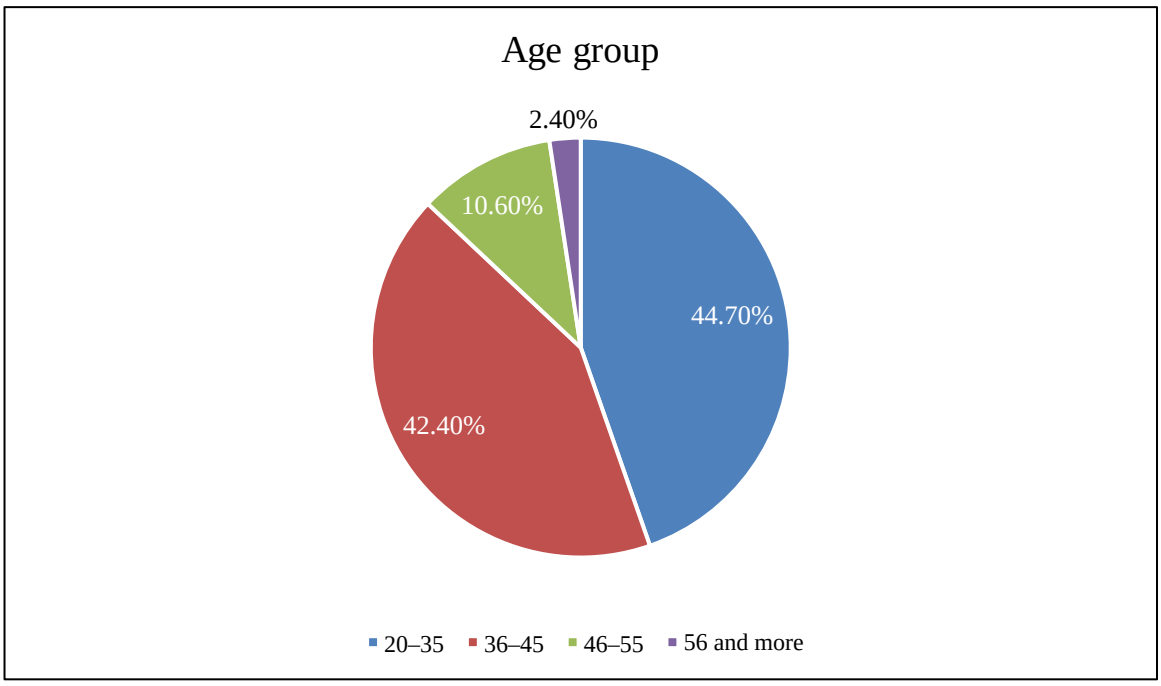

Figure 24: Participants' age groups.

There were also varying numbers of years of background experience and areas of expertise among the participants. Table 16 shows that 33% of respondents have 6 to 10 years of experience, followed by 22% with 16 or more years, 21% with 11 to 15 years, 17% have 4 to 5 years and the smallest group, at 5.9%, had less than 4 years of experience. Figure 25 illustrates the distribution for the participants years of experience.

Table 16: Participants years of experience

Years of Experience group	***Responses***	***Percentage***
1–3	5	5.9%
4–5	15	17.6%
6–10	28	32.9%
11–15s	18	21.2%
16 or more	19	22.4%
Total	85	100%

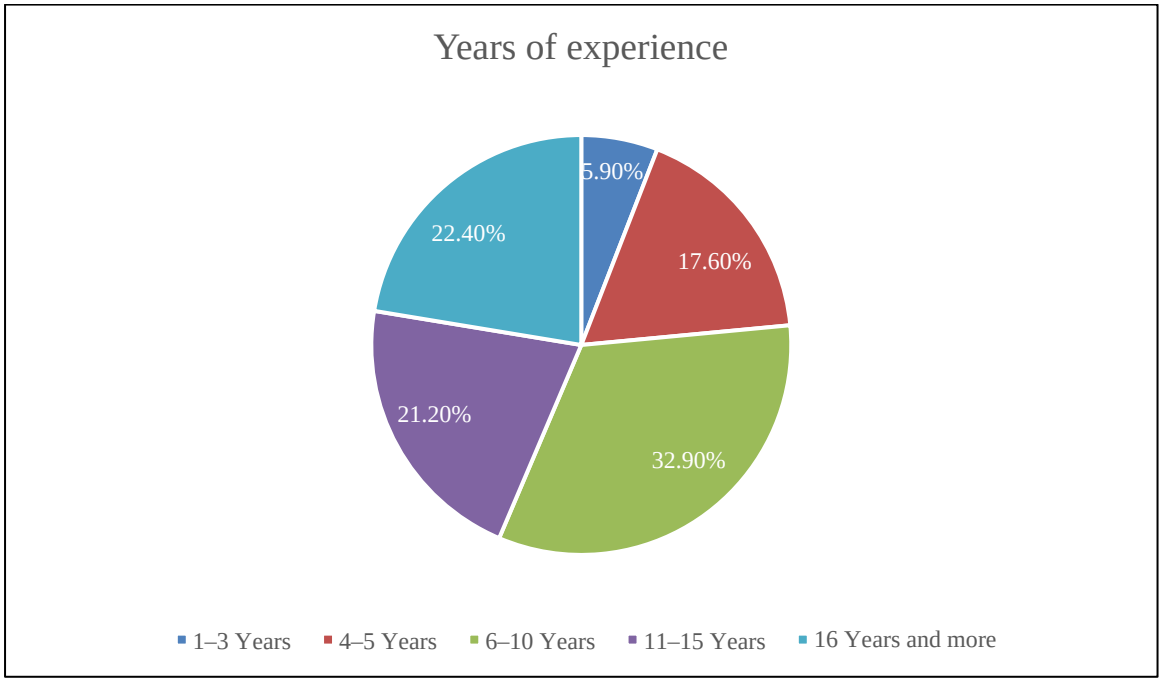

Figure 25: Participants years of experience

For this research, it was important to have participants from several specialities, thus the questionnaire was distributed over the main departments of the secretariats and municipalities.

Participants in the questionnaire were from 28 different departments with the largest percentage of experts coming from the IT department, at 19%, and followed by 9% from the Department of Technical Affairs, 8% from the Construction Agency and Project Management Office and 6% from each of the Services Agency, Department of Administrative and Financial Affairs, General Management and the Human Resources Department. The participants' experiences are very diverse according to the departments they are working in (see Table 17).

Table 17: Departments

	Department	***Frequency***	***Percent***
1	Central Warehouse Management	2	2.4%
2	Communication Department	1	1.2%
3	Construction Agency and Project Management Office	7	8.2%
4	Department of Administrative and Financial Affairs	5	5.9%
5	Department of Budgeting and Promotions	1	1.2%

	Department	*Frequency*	*Percent*
6	Department of Control and Hygiene	3	3.5%
7	Department of Equipment and Vehicles	1	1.2%
8	Department of Public Relations and Information	2	2.4%
9	Department of Technical Affairs	8	9.4%
10	Department of Urban Planning	3	3.5%
11	Development and Control Department	1	1.2%
12	Engineering Consultancy	1	1.2%
13	General Administration for Follow-up and Statistics	3	3.5%
14	General Administration of Electricity and Lighting	2	2.4%
15	General Administration of Investments	2	2.4%
16	General Administration of Land and Property	1	1.2%
18	General Directorate of Environmental Health	3	3.5%
19	General Directorate of Urban Planning	1	1.2%
20	General Management	5	5.9%
21	Geographical Information Systems Department	1	1.2%
22	Human Resources Department	5	5.9%
23	Information Technology Department	16	18.8%
24	Internal Audit Department	3	3.5%
25	Management of Slaughterhouses and Cattle Markets	1	1.2%
26	Procurement Department	1	1.2%
27	Services Agency	5	5.9%
28	Total Quality Management	1	1.2%
	Total	85	100%

Table 18 presents the experts' job titles, including a mayor, general managers, department directors, inspectors, project managers, technical experts, and general services specialists with administrative and technical expertise. This diversity may contribute to enriching participation due to the different areas of expertise of these experts, which in turn may broaden their assessment of the model components.

Table 18:Participants' job titles

	Job Title	*Frequency*	*Percent*
1	Accountant	1	1.2%
2	Application Developer	1	1.2%
3	Architect	2	2.4%
4	Assistant Director	7	8.2%
5	Auditor	5	5.9%
6	Cartographer	2	2.4%
7	Civil Engineer	3	3.5%
8	Computer Technician	3	3.5%
9	Construction Inspector	2	2.45
10	Contracts Specialist	1	1.2%
11	Data Entry	6	7.1%
12	Department Director	7	8.2%
13	Director of General Services	1	1.2%
14	Electrician	2	2.4%
15	Engineer	1	1.2%
16	General Manager	1	1.2%
17	Health Inspector	1	1.2%
18	Inspector	4	4.7%
19	IT Coordinator	1	1.2%
20	IT Department Head	1	1.2%
21	Land Controller	1	1.2%
22	Assistant Manager	5	5.9%
23	Markets Inspector	3	3.5%
24	Mayor	1	1.2%
25	Mechanical Engineer	1	1.2%
26	Oracle Systems Developer	1	1.2%

	Job Title	*Frequency*	*Percent*
27	Personnel Specialist	2	2.4%
28	Planning Engineer	4	4.7%
29	Project Manager	1	1.2%
30	Public Relations Coordinator	2	2.4%
31	Quality Consultant	1	1.2%
32	Supervisor	2	2.4%
33	Surveyor	1	1.2%
34	Systems Analyst	1	1.2%
35	Systems Engineer	1	1.2%
36	Assistant Technician	1	1.2%
37	Tender Specialist	1	1.2%
38	Treasurer	1	1.2%
39	Under Secretary	1	1.2%
40	Veterinary Doctor	2	2.4%
	Total	85	100%

Table 19 presents the results of the questions that were designed to measure the extent to which experts agree on the proposed model components (questions can be found in Appendix D). The table shows the number of participants, and the responses chosen by them to measure each component, as well as the mean for each component according to the Likert scale. In general, the highest proportion of the responses were either strongly agree or agree and the lowest proportion was neutral, disagree, and strongly disagree. The majority of experts' responses was agreement with the proposed model components. The mean and the standard deviation of each component are also shown in the table. The mean for each component was either strongly agree or agree. Furthermore, the mean was consistently greater than four with a standard deviation below the mean, indicating that the majority of responses were very close to the arithmetic mean and the data are not scattered, which may represent the general consensus.

The model components were arranged according to the average ratio. The Petitioning component was the first in order of strength of agreement, with an average of 4.63 and a

standard deviation of 0.703. The last component was Voting, with an average of 4.02 and a standard deviation 1.215.

In order to summarise the results in Table 19, the mean of the means for each component was calculated and the result was 4.33, which can be expressed according to the assessment presented in Table 14 that the general trend of the experts on the proposed model was to strongly agree.

Table 19: Results of the experts' responses analysis for confirming the proposed model components

Model Components	***Strongly agree***	***Agree***	***Neutral***	***Disagree***	***Strongly disagree***	***Mean***	***Standard deviation***	***Rank***	***Direction***
	N	**N**	**N**	**N**	**N**				
	%	**%**	**%**	**%**	**%**				
Petitioning	63	15	5	2	0	4.63	0.704	1	Strongly agree
	74.1%	17.6%	5.9%	2.4%	0%				
Government	59	14	12	0	0	4.55	0.732	2	Strongly agree
	69.4%	16.5%	14.1%	0%	0%				
Emergency	56	17	12	0	0	4.51	0.733	3	Strongly agree
	65.9%	20%	14.1%	0%	0%				
Transparency	50	23	9	1	2	4.38	0.901	4	Strongly agree
	58.8	27.1%	10.6%	1.2%	2.4%				
Citizens	46	23	12	2	2	4.28	0.959	5	Strongly agree
	54.1%	27.1%	14.1%	2.4%	2.4%				
Spatial planning	43	23	18	0	1	4.26	1.025	6	Strongly agree
	50.6%	27.1%	21.2%	0%	1.2%				
Information provision	50	14	15	5	1	4.25	0.875	7	Strongly agree
	58.8%	16.5%	17.6%	5.9%	1.2%				

Model Components	*Strongly agree*	*Agree*	*Neutral*	*Disagree*	*Strongly disagree*	*Mean*	*Standard deviation*	*Rank*	*Direction*
	N	**N**	**N**	**N**	**N**				
	%	**%**	**%**	**%**	**%**				
Community Building	46	20	15	1	3	4.23	1.019	8	Strongly agree
	54.1%	23.5%	17.6%	1.2%	3.5%				
Deliberation	45	20	14	3	3	4.18	1.063	9	Agree
	52.9%	23.5%	16.5%	3.5%	3.4%				
Consultation	48	12	12	9	4	4.07	1.251	10	Agree
	56.5%	14.1%	14.1%	10.6%	4.7%				
Voting	43	16	16	5	5	4.02	1.215	11	Agree
	50.6%	18.8%	18.8%	5.9%	5.9%				
The mean of the model components						***4.33***	***Strongly agree***		

7.3 Discussion

This section discusses the findings of the interviews conducted with Saudi municipality experts and some consultancy agency experts. In addition, it discusses the findings of the online questionnaire conducted with experts working in two different Saudi municipalities. The aim of the interviews was to evaluate the suggested model components and identify whether any should be added or removed based on their effect on citizen engagement in monitoring public services. The purpose of the questionnaire is to confirm the interviews findings.

7.3.1 Interview findings

In the interviews with the experts it was found that all the proposed model components were considered important. However, one expert indicated that Voting is not important because it might not be an accurate indicator of the priority for some cases, although he suggested including it only if the voters are official members. Other experts said it is important, with some limitations, such as not interfering in the public interest, that voters should be registered in order to vote. However, as the results of the majority were found to

be in agreement, the researcher found it necessary to include the experts' suggestions. In addition, one expert suggested the inclusion of Emergency as a new component for cases requiring immediate action by the authorities. To support that, a deep analysis was done on the expert reviews regarding emergency matters. The majority used the word 'emergency' during the interviews. Thus, the researcher found that it is necessary to include it as a new component. Several suggestions were proposed by the experts for the model components Consultation and Deliberation. The suggestions were to limit the citizens' consultation process to general subjects without interfering with top-level management decisions and, in addition, to include a filtration mechanism, such as voting, to highlight important ideas or topics.

In relation to the citizens' engagement in the monitoring public service projects process, the experts indicated that it is essential to engage citizens. Various reasons for this were given. Some experts explained that many challenges are faced during the monitoring process that require citizens' support to fulfil. Others indicated many benefits in involving citizens, such as the size of the citizen population compared to that of the monitoring committee, and the area of coverage, as citizens are spread all over the cities and can observe more.

In terms of technology adoption, there is a clear interest by the Saudi municipalities of including technology during the monitoring process. Several online platforms are offered for consideration, including social media platforms alongside self-developed tools. In addition, all experts found that using online tools is important as technology can help to reach a wider audience and help to locate and categorise reported problems, and more.

After considering the results and the findings from the expert interviews, the model has been developed and is presented in Figure 26.

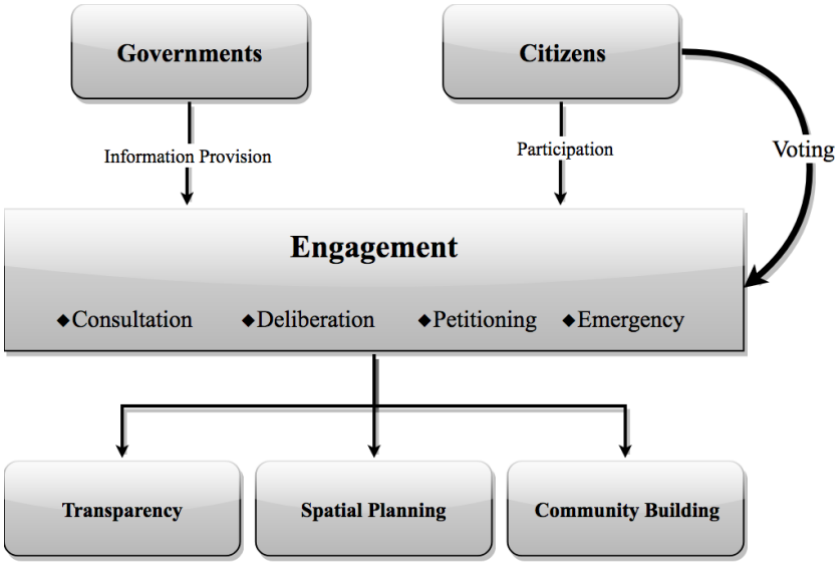

Figure 26: The evaluated model components including Emergency, the suggested new component.

7.3.2 Questionnaire findings

Since the interview findings evaluated the model components and resulted in the inclusion of a new component, Emergency, questionnaires were used to reach larger segments of experts in order to confirm the findings of the evaluated model. The analysis of the collected data showed that participants were from different background knowledge areas and had varying amounts of experience. Experts were from 28 different departments, with the largest percentage of experts coming from IT departments. In addition, the age ranges of respondents were diverse, which may affect the participation quality positively due to the differing levels of experience. The largest category of participation was from the age group of 20 to 45 years. The participants of this age group have lived through major technological development and may understand the adoption and provision of technology significantly. This diversity in ages, levels of experience and departmental backgrounds may enrich the results significantly due to the variation in available expertise, which in turn may broaden their assessment of the proposed model components.

In relation to the proposed model components, the experts' responses varied in evaluating each component. However, the major trend was in support of each component with responses being either strongly agree or agree. The results were very close and even the general trend was convergent, according to the mean and the standard deviation for each component. The Petitioning component was ranked first based strength of agreement. This may show that the experts would recommend offering such a service online. This may also

confirm the finding presented in Chapters 2 and 5 regarding the Saudi use of social media for expressing citizens' needs.

The second-ranked component was Government. This can be interpreted as showing the importance of providing systems for monitoring services to citizens and for governments to understand the need to increase the role of citizens in society. The Emergency component, which was added as a result of the conducted interviews, came in third and this confirms the importance of including it.

Transparency was the fourth-ranked component in the opinion of the experts because of the impact of the lack of transparency, as discussed in Chapters 2 and 5, and also to support enhancing transparency in the existing systems. In addition, it is worth mentioning that the Voting and Consultation components ranked in the last positions. These two components are interconnected to a certain extent and are consistent in one aspect; where voting is a part of the consultation process. This may have several causes, one of which is the weakness of the community's voting and citizens' participation culture in decision-making in general. However, there is general agreement on these components by the experts.

Since the general consensus on all elements was strong agreement or agreement, we can confirm the importance of all the components included in the model, and that the model does not require any additional assessment until it is implemented or evaluated in a different approach or context. Figure 26 represents the components of the final model of communication between governments and citizens to monitor public service projects.

7.4 Chapter summary

This chapter presented the findings of the interviews and questionnaires in the second phase of this research. The semi-structured interviews were used to evaluate the proposed model components discussed in Chapter 6, as well as investigating the research problem. The interview findings show the challenges faced by the Eastern Province Municipality during monitoring processes, the adoption of technology and its importance as a factor for service delivery, the importance of citizens' engagement in the monitoring process, and the expert reviews for model components. Almost all the experts' reviews show that the proposed model components are important. In addition, a new component was suggested for inclusion, which is Emergency. Subsequently, the online questionnaire was used to investigate and confirm the interview findings. The analysis of the results shows that the

majority of the 85 experts have confirmed the relevance of the proposed model components.

Chapter 8 The proposed model challenges

In Chapter 7, the interview findings showed that the Saudi municipalities were adopting many communication channels to receive complaints, report issues, and make announcements. These channels include the interactive voice response system IVR at 940, 'Balagati 940' mobile application, e-mail, WhatsApp, Twitter's direct messaging feature, Snapchat and Instagram for project and service information sharing and marketing. Further investigation will be considered in this chapter to identify the challenges of the new tools that have been recently developed. Therefore, this chapter seeks to answer the second research question (RQ2) and its sub questions, which focus on identifying the challenges that face the adoption of ICT by the Saudi municipalities. Emphasis was placed on identifying the challenges that might face the implementation of the model proposed in this research. Although the identified implementation challenges of the model might be unrealistic because there is no current web or mobile application that adequately reflects or embodies it, the current systems need to be examined in order to gain a precise view of the current situation and so propose possible directions for future applications to take. Nonetheless, the following sections will elucidate these specific challenges by sharing relevant interviewee perceptions. This chapter subsequently closes with a discussion of the meaning and the possible implications of the patterns found therein.

8.1 E-government transformation challenges in Saudi Arabia

Currently, the Saudi government appears inclined to transform e-transactions and e-services via the "Yesser" programme[18]. As a result, a major proportion of government sectors is competing to transform their services into e-services through online platforms and mobile applications. Despite the significant progress made in the provision of electronic services (see Chapter 2), significant barriers have still been encountered by many sectors. Previous studies have recognised the challenge of adopting e-government; however, these challenges vary between countries due to various economic, cultural, social and geographical differences (Athmay & Alaa-Aldin 2013; Gil-García & Pardo 2005). Chapter 2 also presented a general overview of the challenges that arise in various countries, including developing countries. Therefore, it is important to focus on the specific challenges faced by Saudi Arabia in adopting e-government, particularly the

[18] Yesser programme is the e-Government initiatives in Saudi Arabia that aims linking government agencies in their e-transition journey: https://www.yesser.gov.sa/

public services sector, to make inferences about understanding and possibly removing barriers in other developing countries.

A few studies have been conducted by researchers in Saudi Arabia on the existence of these challenges. Table 20 classifies the challenges into four main categories: technical-related challenges, user-related challenges, organisational-related challenges and financial-related challenges. Notably, the ICT infrastructure and trust of e-services offer the most significant technical challenges. Meanwhile, organisational-related challenges, such as the lack of qualified workers and professional training, the need for clear strategic planning, the weakness of policies, and regulation, also affect the implementation of e-government. In addition, user-related challenges, including social characteristics and lack of awareness or knowledge, are considered as another critical barrier, particularly in developing countries. Finally, the indiscriminate barrier of finances clearly influences e-government implementation and ICT infrastructure advancement.

Table 20: Summary of the challenges facing Saudi Arabia e-government transformation

Category	***Challenge***	***References***
Technical-related challenges	Infrastructural	(Alssbaiheen & Love 2015), (Al-Sobhi et al. 2010), (Basamh et al. 2014), (Alsobhi & Kamal 2009)
	Security and privacy issues	(Basamh et al. 2014), (Alshehri & Drew 2010), (Alsenaidy & Ahmad 2012), (Alsobhi & Kamal 2009), (Hitham et al. 2018)
	ICT infrastructure	(Alshehri & Drew 2010), (F.El-Sofany et al. 2012), (Alsobhi & Kamal 2009), (Hitham et al. 2018), (Alfayad & Abbott-Halpin 2017), (Athmay & Alaa-Aldin 2013)
	Privacy, security and trust in e-services	(Al-Sobhi et al. 2010), (Alshehri & Drew 2010), (Alssbaiheen & Love 2015), (Basamh et al. 2014), (F.El-Sofany et al. 2012), (Alsenaidy & Ahmad 2012), (Alsobhi & Kamal 2009), (Athmay & Alaa-Aldin 2013)
	Availability & reliability of internet connection	(Basamh et al. 2014), (Al-Sobhi et al. 2010), (Alshehri & Drew 2010), (Alssbaiheen & Love 2015), (Alsobhi & Kamal 2009)
	Accessibility	(Basamh et al. 2014), (Al-Sobhi et al. 2010), (Alsobhi & Kamal 2009)

Category	*Challenge*	*References*
	Computer literacy	(Basamh et al. 2014), (Alsobhi & Kamal 2009), (Hitham et al. 2018)
	User friendliness of government websites	(Basamh et al. 2014), (Alsobhi & Kamal 2009)
User-related challenges	Lack of knowledge and ability to use computers	(Alshehri & Drew 2010), (Hitham et al. 2018)
	Culture	(Alshehri & Drew 2010), (F.El-Sofany et al. 2012), (Athmay & Alaa-Aldin 2013)
	Education	(Hitham et al. 2018)
	Resistance to change to electronic services	(Alshehri & Drew 2010), (F.El-Sofany et al. 2012), (Hitham et al. 2018), (Athmay & Alaa-Aldin 2013)
Organisational-related challenges	Lack of policy and regulation for e-government	(Alshehri & Drew 2010), (F.El-Sofany et al. 2012)
	Lack of partnership and collaboration	(Alshehri & Drew 2010), (F.El-Sofany et al. 2012), (Alfayad & Abbott-Halpin 2017), (Athmay & Alaa-Aldin 2013)
	Lack of programmes to promote e-government benefits and advantages	(Alshehri & Drew 2010), (F.El-Sofany et al. 2012), (Alsenaidy & Ahmad 2012), (Hitham et al. 2018)
	Lack of strategic planning	(Alshehri & Drew 2010), (F.El-Sofany et al. 2012), (Hitham et al. 2018), (Athmay & Alaa-Aldin 2013)
	Leaders and management support	(Alshehri & Drew 2010), (F.El-Sofany et al. 2012), (Hitham et al. 2018)
	Lack of qualified personnel and training	(Al-Sobhi et al. 2010), (Alshehri & Drew 2010), (F.El-Sofany et al. 2012), (Hitham et al. 2018), (Alfayad & Abbott-Halpin 2017)
	Transparency and accountability	(Basamh et al. 2014)
Financial-related challenges	Expensive internet service	(Alssbaiheen & Love 2015)
	E-government implementation cost	(Basamh et al. 2014), (F.El-Sofany et al. 2012), (Alsenaidy & Ahmad 2012)

Category	*Challenge*	*References*
Technical-related challenges	Infrastructural	(Alssbaiheen & Love 2015), (Al-Sobhi et al. 2010), (Basamh et al. 2014)
	Security and privacy issues	(Basamh et al. 2014), (Alshehri & Drew 2010)
	ICT infrastructure	(Alshehri & Drew 2010)
	Privacy, security and trust in e-services	(Al-Sobhi et al. 2010), (Alshehri & Drew 2010), (Alssbaiheen & Love 2015), (Basamh et al. 2014)
	Availability & reliability of internet connection	(Basamh et al. 2014), (Al-Sobhi et al. 2010), (Alshehri & Drew 2010), (Alssbaiheen & Love 2015)
	Accessibility	(Basamh et al. 2014), (Al-Sobhi et al. 2010)
	Computer literacy	(Basamh et al. 2014)
	User friendliness of government websites	(Basamh et al. 2014)
User-related challenges	Lack of knowledge and ability to use computers	(Alshehri & Drew 2010)
	Culture	(Alshehri & Drew 2010)
	Leaders and management support	(Alshehri & Drew 2010)
	Lack of qualified personnel and training	(Al-Sobhi et al. 2010), (Alshehri & Drew 2010)
	Resistance to change to electronic services	(Alshehri & Drew 2010)
Organisational-related challenges	Lack of policy and regulation for e-government	(Alshehri & Drew 2010)
	Lack of partnership and collaboration	(Alshehri & Drew 2010)
	Lack of programmes to promote e-government benefits and advantages	(Alshehri & Drew 2010)

Category	*Challenge*	*References*
	Lack of strategic planning	(Alshehri & Drew 2010)
	Transparency and accountability	(Basamh et al. 2014)
Financial-related challenges	Expensive internet service	(Alssbaiheen & Love 2015)
	E-government implementation cost	(Basamh et al. 2014)

8.2 Challenges of ICT adoption in public services in Saudi Arabia from the experts' perspective

There is little specific research on identifying the challenges in adopting e-services in Saudi municipalities. Thus, two case studies were conducted in the eastern region of Saudi Arabia. The first case study targeted experts from Al-Asha Municipality. Eleven experts from different departments were interviewed. The second case study targeted experts from the Eastern Province Municipality. Similarly, twelve experts from different departments were interviewed. Table 21, shows the participant's areas of expertise and years of experience.

Table 21:Interviewee characteristics

Expert	**Job title**	**Department**	**Years of experience**
A	Programmer	IT Department	4
B	System Analyst	IT Department	16
C	Call Centre Supervisor	Communications and E-Services Centre	3
D	Communications Officer	Communications and E-Services Centre	2
E	Online Portal Director	IT Department	9
F	Online Portal Manager	IT Department	11
G	Programmer Assistant	Communications and E-Services Centre	3
H	Communications Officer	Communications and E-Services Centre	2

Expert	**Job title**	**Department**	**Years of experience**
I	Network Engineer	Computer Networks and Systems Management	20
J	Technical Support	IT Department	5
K	System Testing	IT Department	2
L	Communications Officer	Communications and E-Services Centre	3
M	Communications Officer	Communications and E-Services Centre	2
N	Communications Officer	Communications and E-Services Centre	3
O	Financial Systems Officer	Employees Affairs Department	10
P	Director	Communications and E-Services Centre	14
Q	Project Manager	Planning and Projects Management	8
R	Under-Secretary for Technical Affairs	IT Department	14
S	System Programmer	IT Department	7
T	System Manager	IT Department	12
U	Application Developer	IT Department	3
V	Network Engineer	Computer Networks and Systems Management	13
W	System Analyst	IT Department	20+

The interview questions were designed as open-ended questions that focus on exploring different aspects of the sub-research questions.

RQ2.1) What are the challenges facing the current online system?

RQ2.2) aboveWhat are the proposed model components being implemented in the current online services of municipalities in Saudi Arabia?

RQ2.3) What are the challenges that might be encountered during the proposed model implementations?

The guide interview questions for this study are presented in Appendix E. A thematic content analysis was performed on the qualitative data. As a result of the analysis, seven themes emerged related to the ICT adoption challenges in the public service sector represented by the municipalities for communication with beneficiaries. The themes are: reporting-related challenges, operational-related challenges, e-service-related challenges,

ICT infrastructure-related challenges, organisational-related challenges, user-related challenges and proposed model-related challenges. Each theme will be illustrated in the following sections based on the experts' interview analysis result.

8.3 Reporting-related challenges

Reporting issues and incidents encountered by the community are an essential component of communication between municipalities and beneficiaries. This approach relies upon well-developed public services that inherently respond to the needs and demands of citizens. Accordingly, there are several methods of reporting issues that entail verbal interaction using voice recording, or written interaction via electronic platforms or e-mail. However, there are many challenges that may face the representatives of the Secretariat in dealing with the reporting process. In interviews conducted with several experts working in this field, many reporting-related challenges emerged. The identified challenges include: the description of the issues, malicious users or reports, contacting several times, location accuracy, usability and efficiency of the reporting tool, and reported issues classification. The highlighted findings for the aforementioned challenges are outlined below.

Description of the issues

This challenge can be defined as the various ways in which problems are described by citizens. The description of the problem can be inaccurate or incomplete. This may force authorities to involve additional activities to obtain an accurate problem description. For example, in order to identify the redundant reported issues, a supervisor should be involved to link those problems together to come up to a conclusion. Three experts out of 23 referred to this issue.

> **Expert P:**
>
> *Sometimes there are multiple reports filed for the same incident, as citizens' ways of describing the problem are different. In such cases, we file two reports, even if it's for the same problem; this is for the purpose of recording all cases. Then, the supervisor links these problems together. Note that each supervisor has a specific area of management. (…) Inaccuracy of the problem's description. For example, the citizen says there is a problem in the sewage system, but upon inspection, it turns out the problem is in the water connections, which are related to other authorities.*

Expert L:

There is a lack of information while reporting issues because we receive vague reports, as citizens do not fill in all the required information.

Expert M:

The problem we face through using methods of communication other than the phone is the incompleteness of information, which forces us to contact the complainant to complete the report.

The challenge mentioned by the experts is the lack of knowledge and motivation to fill out the reports, and inadequate methods of communication which can result in incorrect or incomplete descriptions of the problem.

Malicious users or reports:

Malicious users or reports means that information is provided that can be incorrect, incoherent and untruthful. Also, additional facts may be required to prove a report's credibility. Furthermore, citizens can have insufficient knowledge to analyse the problems that appear in their environment. During the interviews, this issue appeared in four of the 23 interviews. Experts P, I, E and N explain the details and the scope of this obstacle.

Expert P:

If the complaint is malicious or if we have doubts regarding the credibility of the complainant, we request the complainant for additional information to ascertain his credibility. We contact him by phone, then we confirm his report.

Malicious reports, which occasionally occurred as complaints among shop owners and about shop licenses.

The method of communication is an important factor to predict malicious information, according to the experts.

Expert I:

Twitter is excellent, but information may be delivered incorrectly and anonymously. In addition, it is unreasonable to use it as a formal approach for communication.

Expert N:

Some citizens submit false reports and enter incorrect information during telephone calls, as anonymous phone numbers are used. In several practical cases, if the problems recur, we block the caller's number.

Expert E:

The lack of the complainant's credibility

Researcher: Do you mean confirming if the person who submits the report is honest or lying?

Regardless, we generally receive all reports then transfer them to the competent authority or department, and this is because this is outside our area of speciality and they are experienced in that regard.

The authorities usually request additional information if there are doubts about the credibility of information. As these reports can appear anonymously through phone calls or other means the complainants are usually blocked.

Contacting several times

Another challenge that can appear when a single issue is reported by many different people is that of being contacted several times. Authorities are usually prepared to address it in the following way:

Expert P:

Over a single problem, we receive a lot of reports of the same issue, for instance, a pothole. Once we receive the first report, we know for certain that we will receive similar reports. Thus, call centre staff are prepared for responding by saying that "we are already aware of the problem" and that will resolve it without the need to file another report.

However, this issue can be addressed without the authorities' involvement; interactive maps that can display real-time updates of the reported issues may negate this challenge.

Location accuracy

The issue of location accuracy is common for technical reasons. The application used does not make stating the location obligatory. As a result, additional resources are required to confirm the exact place. Experts D, L and E support this statement.

Expert D:

We are facing a recurring issue with the electronic application, which is the inaccuracy of the problem's location. Despite there being a field that should be filled in with the most distinctive place close to the problem. But this field is optional, and the purpose of filling it in is not clear to citizens, therefore, it remains empty. This results in the difficulty of reaching the problem's location and I think this is a disadvantage of the application, as it does not require the complainant to enter this piece of information, along with the weakness in explaining the importance of each field. Consequently, this problem requires us to communicate with the complainant to update the data. From my point of view, the application must be improved in order to suit all groups of society and make its use easier.

Expert E:

The inaccuracy of location while reporting an issue. For example, the citizen notices the problem in front of his home but doesn't report it until he arrives to work. In this case, the work location is taken and we have to call him to confirm his report.

On the other hand, the questions about location can have different meanings; there is a need for coherency, whether it is the location of an incident or the place of submission.

Expert L:

The problem of identifying the reported issue's location, since some don't submit reports from the incident's locations, but from different places (e.g., home). Therefore, locating the report's location becomes an impossible mission. Consequently, errors occur in locating the reported issues.

Expert P:

The exact location of the problem isn't determined even when we ask about the nearest distinctive place to the problem or the location's coordinates.

The accuracy of location depends on the tools used by citizens. For expert M the phone is the most effective way to communicate to avoid incompleteness, while for the expert Q the use of an electronic application is preferable.

Expert M:

The problem we face through using methods of communication other than the phone is the incompleteness of information, which forces us to contact the complainant to complete the report…it's time-consuming for the staff, this is due to the difficulty of the citizen's description of the problem and classifying it that leads to the accumulation of recorded issues. In my opinion, I don't find this an effective way to receive reports.

Expert Q:

Obtaining a reported issue's location using the phone is inaccurate and it is preferable to use the electronic application.

Usability and efficiency of the reporting tool

This challenge is related to a number of communication channels used by municipalities. Among those channels are Twitter, WhatsApp, e-mail and phone. Using these tools for reporting issues can cause some challenges, such as difficulty of extracting the submitted reports, as this requires manual transfer of the information to the internal system for analysis.

Expert E:

Twitter: the difficulty of extracting information and reports from it, as there is no button for transferring information to the internal system for logging reported issues, which makes us transfer the information manually. This is similar to the case of WhatsApp.

Expert Q:

E-mail is not a perfect method of communication. It is only used for sending and receiving notifications.

Reported issues classification

Reported issues are usually classified based on their seriousness or according to the description. Sometimes, it is difficult for the staff to classify the reported issues. Furthermore, some users may not be able to select the appropriate options when they report issues through municipalities' e-systems.

Expert N:

When receiving a report, we submit it to the competent departments. These departments prepare schedules of the feasibility and priority of these reports based on importance in an ascending order. Assessment is based on the status of seriousness. There are three levels of seriousness: serious, urgent, and normal. The status of seriousness is defined based on the description in the report, or we request the attachment of some pictures of the problem in order to identify the status of seriousness. In the event of difficulty in assessing the status, a specialised field supervisor is sent to the problem's location to examine and assess it.

Expert D described this issue more precisely:

Sometimes, we receive incomplete reports, or maybe a report cannot be classified clearly and explicitly, which forces us to choose the most approximate classification of the problem based on the existing classifications listed in the system, in which case we might be right or wrong.

8.4 Operational-related challenges

In order to provide highly efficient e-services numerous elements must be considered. These include the operational processes, which are often the reason for the disruption of the implementation of technical projects as well as having an impact on the efficiency of the solution. The success of any e-service and its continuity in serving the beneficiaries efficiently is coupled with effective operational management of the service provided. This applies to all types of e-services, including e-government.

Operational processes include and are not limited to: IT service management, project management, employee experience and training, and business processes. As with other sectors, the secretariats face some challenges in managing operational processes related to the implementation of new electronic services, as well as the e-government transformation.

The results of the analysis of interviews conducted with experts in the public service sector indicated several challenges related to operational processes. These identified challenges can be categorised into three subcategories that belong to operational-related challenges: employee experience, resistance to change and service delay.

The highlighted findings for the aforementioned challenges are outlined below.

Employee experience:

An employee's experience is defined as the set of knowledge and expertise needed to avoid challenges related to the reported issues. Eight out of 23 experts referred this issue. As the experts I, J, A and G mentioned, lack of experience may result in delays if employees redirect reports before completing all the required information. This may indicate the need for more administrative experience and skills for immediate support service staff.

Expert I:

In 940 call centre: We have the problem of receiving incomplete issues, where the staff respond and transfer them to the competent department before completing the reported issue through contacting the citizens who reported those issues.

Expert J:

Some employees lack administrative experience with regards to the existing divisions and techniques of solving related problems. The main cause of this problem is employees transferring; an employee needs some time to learn and gain experience in dealing with each division.

Expert A:

Employees' incompetence in providing immediate support services. They don't possess the ability to respond and prepare solutions and responses properly due to their lack of experience and training, which forces them to contact specialists for related enquiries. This results in delays in responding to citizens' issues that might need immediate responses.

Expert G:

One of the most important problems in call centres is the lack of employees' experience, which causes a delay in dealing with issues and requests.

The lack of knowledge is mostly related to IT systems and technical support problems, according to experts T and U**.**

Expert T:

Employees' lack of knowledge with regards to dealing with IT systems: We are facing difficulties with employees who are dealing with advanced systems. This is

due to the lack of knowledge about how to use computers. Note that we have provided employees with systems' manuals and training courses on how to use systems and computers in general. Nevertheless, we still receive calls from our supervisors and some employees are unable to work on the system due to minor problems, such as needing to switch the language, or the inability to connect to the system because the employee was not connected to the internet!

Expert U:

Technical support problems. Employees must have experience and knowledge of 90% of queries and issues they might be asked by someone inside or outside the municipality. Technically, the technical support job is transferring the problem to the competent department. However, I believe that the technical support employees' job is not merely transferring or directing problems, but they should be effective in resolving them.

In addition to technical problems, some employees do not have much experience with municipality work procedures and cannot deal with citizens' reported issues, especially during the peak times or emergencies. The experts M and L indicated this component.

Expert M:

Some employees have difficulties in directing received issues due to the lack of experience in the public service sector. We face problems in determining which competent department the report should be directed to.

He also added:

The inability to respond to all calls during emergency cases.

Expert L:

In peak times, we face trouble with citizens due to the inability to receive and resolve all issues.

Resistance to change

Resistance to change is a common characteristic of people in a rapidly changing environment. Employees can struggle with those transitions, even if training is offered.

Expert R:

Resistance to change by employees. We also face problems with some employees upon beginning a transition to electronic systems or creating a new system for them. We notice evasion, and the hesitation to use such systems. Note that we provide employees with training on how to use systems. But at the moment, all employees (or at least most of them) have the knowledge on using computers and experience in dealing with systems.

Service delay

Service delay caused by unorganised management of the internal resources is another challenge defined by the expert H.

Expert H:

Late responses from competent departments in dealing with reports submitted to them. Consequently, we are forced to clash with some citizens about their reports.

8.5 E-service-related challenges

E-services combine online interactive services and content to enable beneficiaries to make use of the related competent authority's processes and technologies, and so strengthen the users' relationships with the service provider (De Ruyter et al. 2001). The analysis of the expert interviews revealed that there are many challenges facing the adoption and implementation of e-services by municipalities, based on prior experiences of using their current e-services to serve the beneficiaries. The precise meaning/theme of e-services in this regard is to focus on the process of transformation from traditional methods of communication and access to the electronic form, with an objective of providing services effectively. The transformation process requires several aspects to be considered, which are the method of service design and planning; the development and delivery of the service; graphical user interface aspects; and the marketing methods and the ease of use of services to ensure acceptance by most segments of society with different educational levels and cultural backgrounds. These aspects have been emphasised during the analysis of interview data relating to the e-services-related challenges.

The results showed that there are ten related challenges, which are user experience by employees and beneficiaries; information security, safety and privacy; technical support availability; service marketing; transparency; service responsiveness; service planning, design and delivery; service quality; service testing and evaluating; and lack of user manuals and information provision. Supporting statements for these challenges are provided below:

User experience:

The user experience refers to how convenient a service is to use, and the person's satisfaction with the service provided. One of the challenges is to construct a platform that is able to interconnect different systems.

Expert J:

Service ease of use is one of the main aspects that we consider when we work on designing system interfaces; by offering a single platform which includes all our services under one umbrella. Currently, there are different systems that are not interconnected with each other and this may make it difficult for citizens to find what they need easily and accurately.

Even with the huge usage of social media by the public due to its convenience, as found in Chapter 4 and mentioned by expert C, it still has some disadvantages. For instance, it is not possible to reply to the complainants if they are not registered or following the competent authority's official account on social media.

Expert C:

Using social media as a method for reporting issues, such as Twitter, where the user communicates with us while he is not following us, and this in turn makes it difficult to contact him back through direct messages or otherwise.

Also, in WhatsApp, the difficulty of including a reported issue's explanation and gathering data, the issue of the weak network with its low transfer speed and lack of availability, etc.

Experts F, O and W are proposing to provide a suitable method of reporting for different segments of citizens with the aim of making the process faster and simpler for the customer, so leading to better service quality.

Expert F:

User experience is very important and should be greatly considered. We are required to make systems very easy to use because of the diversity of users' cultures and level of knowledge.

The information presentation must be innovative and simple, given that every service we have is directed to a certain segment, thus every segment must be studied to provide them with a relevant method of presenting information.

Researcher: What makes phone calls likely to be adopted more than mobile apps?

Ease of use and sometimes a faster approach, especially, in urgent cases; a phone call is just a call whereas the application requires registration and providing information.

Expert O:

Providing information in a simple manner to obviate the need for the citizen to visit our branches to query about things.

Expert W:

Reducing the amount of required data from citizens as much as possible.

Information security, safety and privacy

Information security, safety and privacy are regarded as key characteristics of any operation, especially with e-services due to the amount of personal information stored and the integration of databases, according to experts T, V and J. Meeting global security standards along with maintaining continuous backups may overcome this challenge, as experts T and V indicated.

Expert T:

Security is important; websites and applications must obtain global security certificates.

He also added:

> *The problem of restoring backups is important to be mentioned as we faced certain problems that made us wait weeks to restore backups due to the difference in systems and methods of dealing with them.*

> **Expert V:**

> *We face many issues with computer viruses and piracy, which always tries to stall our services and steal personal information. (…) Real time data backup with full readiness to restore these backups quickly; as we faced certain problems that made us devote weeks to restoring backups due to the difference in systems data formats.*

> **Expert J:**

> *Protection of users' data and details must be considered.*

Technical support availability

Technical support is one of the essential features of any service, but it requires a lot of employees, according to the experts J and O.

> **Expert J:**

> *Providing services continuously 24 hours a day, 7 days a week (…) Fast response with technical support through services like LiveChat, but this requires the availability of a large number of employees, which we lack during night shifts.*

> **Expert O:**

> *Providing support continuously to ensure the constant availability of the service.*

Service marketing

Service marketing is defined as a tool to promote the activities of any organisation. According to the experts, there is a need for attractive advertising and explanations of how to report and reach officials in order to increase citizens' awareness and level of participation. Seven out of 23 experts referred to this issue.

Expert J:

In order to ensure that new services reach as many people as possible, intensive attractive advertisements must be made.

Expert F:

Marketing the system in an entertaining manner may be a way to increase interactions, similar to the efforts exerted in promoting candidates during election campaigns so that people can believe in them and their credibility.

Expert B:

Marketing our e-system is considered to be a major problem.

Expert S:

E-systems are available on a large scale and they are user-friendly for 60% of society; people can easily use them because of the availability of social media; and this is sufficient for society's problems to reach the officials. However, e-services marketing remains a difficult problem, as many people don't know that they can complete their work using one of these means.

Expert L:

Ineffective e-services marketing is one of the most important issues to be considered; there are many citizens who don't know about our communication channels.

Expert V:

The launch of a new service must be advertised intensively to the extent that this contributes to understanding the service.

Expert E:

Marketing the service in a successful and excellent manner, along with ease of use, will help in increasing the usage rate.

Transparency inclusion

Transparency inclusion is another important factor that can be a challenge. It can be defined in this context as the ability to update and notify citizens about reported issues, the

status of these issues, and any other non-personal transactions, according to experts J, F, O, and V.

Expert J:

Transparency in reporting issues and showing the status of reports is an important element to be considered.

Expert F:

Transparency must be increased and the citizen must be notified about the number of existing reported issues and other performance indicators.

Expert O:

The status of transactions must be provided in a simple and up-to-date manner.

Expert V:

As a matter of transparency, citizens should be informed about the status of their requests via SMS; such information may at least include the name of the responsible person in charge and the competent department.

Service responsiveness

Service responsiveness depends on the channels used by the citizens, according to the experts J, F and U.

For example, social media can a play a positive role.

Expert J:

In social media, for example, responsiveness is at its maximum level; as when a problem is posted and traded publicly among a number of people, it gets the attention of municipalities and competent authorities.

Expert F:

Certainly, such as Twitter; issues reported through Twitter will sometimes be solved faster in comparison to the reports submitted from phone calls due to the publicity of this report; whereas the urgency of problem must be the first priority.

On the other hand, expert U indicated that responsiveness is an important aspect of people's confidence with a service.

Expert U:

In order to clarify the idea, when thinking about promoting, developing and directing people towards a particular service, this service must be given the highest priority in the operation compared to other services. Such as when submitting reports through an application, the transaction must be completed more quickly and more effectively than other services in order to win the confidence of the people.

Service planning, design and delivery

This subcategory mostly refers to the limits and areas of opportunity for service planning, design and delivery. One of the limits is an incomplete concept, so there is a need to collect more information, according to expert C. Seven experts referred this issue frequently.

Expert C:

At the beginning of the planning and designing process, we usually do not have a full concept about the types of information to gather from users in terms of which fields to include for cities, areas, districts, details of district's names, and additional fields, such as contact details, geographical location and description, until the service is completed and has come to its final version; we had to contact some citizens in order to collect more information about the reported issues, but that had been resolved.

Another matter to consider is the way in which information can be delivered to citizens. For example, a user-friendly interface with graphics can assist in increasing user engagement with the online platform.

Expert F:

Society accepts anything if the service is provided appropriately; any idea can be presented to society, but the method of delivering it and encouraging society to use it is very important. (…) Getting out of the official template to add a user-friendly interface in terms of using graphics and style; as we notice some fear to use or even try online platforms because of design and font selections, which make them feel that dealing with these agencies will cause problems.

It is known that communication plays a crucial role in people's understanding. For instance, it should be considered that not all users are Arabic speakers or well-educated enough to understand a system interface's content.

Expert A:

It sometimes happens that users are non-Arabic speakers; their transaction will be done if there is staff member who has a background and knowledge of that language; otherwise we can't serve them and the site does not have a choice for another language like English. This is considered to be a problem as there is a large community who are non-Arabic speakers.

Also, not all people can adapt to such a huge variety of proposed channels. The procedure needed to report the problems should decrease and all the system features should be available on all the channels.

Expert D:

The variety of our communication channels may distract the citizen. Some citizens use Twitter to query about the status of their report because this feature isn't available in our application. (…) The absence of the link between the national identity number and our application decreases the seriousness of the reporting persons…Decreasing the time needed to acquire the reporting person's information and the disappearance of the recklessness of some users, such as children who use Twitter for just trying it out or playing.

Expert O mentioned that all e-systems should be integrated to include and offer all the services before launching any service. Also, design should be simplified with consideration of the users' level of skills.

Expert O:

All our systems must be developed on the web, and a mobile application must be developed to accompany the web version of our system that should include all the services that the website offers.

Developing new services on the web with the full support of the internal systems will provide an integrated platform that contributes to the accomplishment of requests quickly and easily for users (citizens) and employees (operators). (…) Most transactions require entering a lot of information in multiple pages and this

is exhausting to deal with for users; so, the design must be simplified in order to be relevant to all types of users. Launching incomplete services may cause some problems; but with the large number of existing services, it is hard to launch a complete service; now, services are being launched in miniature form without correlation between them.

Besides, any system implementation requires an in-depth analysis beforehand to provide sustainable tools and functionality, according to the experts T and R.

Expert T:

A deep system analysis is a very important step to develop e-services sustainably; I notice that the Municipality currently does the analysis after launching the service! Such as, System 940 which was designed to work on windows 2 years ago, and now we face difficulties trying to link it with the mobile application due to lack of proper analysis and planning for this process.

Expert R:

The problem of unifying identity for electronic systems, web pages, websites, applications through design.

Thus, it is important to carry out information collection and analysis, along with careful planning and design of the services, before system implementation.

Service quality

Service quality is another challenge related to meeting or exceeding customer expectations. The challenge of service quality usually appears during transformation in operations, when a person focuses on speed and quantity, without considering the quality of work. Seven experts have mentioned this challenge from different angles.

Expert J:

Operational issues, when launching an excellent and comprehensive electronic service that requires the staff to work on it, the process becomes very challenging as the staff must adhere to the tasks' implementation on time, which leads them to perform the tasks hastily without considering the quality of work and outcomes, which requires us to impose some performance monitoring along with tracking their correct use of systems.

Expert U:

The interest is in launching the service quickly, without considering the service quality, testing it, or training the end users.

Similarly, some challenges of service quality can appear due to the quick implementation without considering all the required steps, according to experts R and F.

Expert R:

Lack of electronic systems' quality: the former director was a leader motivated to accomplish things quickly, observably, and impulsively. This led to making employees' work outputs not good enough to support the capability of covering development requests given to developers for completion in a short time. This led to low quality of the final product. Note that I was against this trend.

Expert F:

The effectiveness of the system in all its internal steps and processes must be considered. Also, the harmony and fast response of the system are very important matters, but the emphasis must be placed mainly on delivering the system's purpose, increasing the user's enthusiasm towards it, and meeting the user's expectations.

Experts D and E also mentioned that the functional limitations of some of the online platforms and applications can affect the service quality.

Expert D:

The 'Balagati' application is considered to be a one-way communication method as its functions are limited to submitting a report ... the application doesn't provide any additional information such, as indicating the status of the report.

Expert E:

The citizen can't track their requests if they are related with other government agencies.

Finally, for this challenge, expert S emphasises that not only the number of e-services is important, but their quality:

Expert S:

There is great progress in technology and the number of systems, but the quality remains poor. If the system isn't effective, society will hate to use it because they realise that there are no benefits of using it.

Service testing and evaluating

Service testing and evaluation is an important step in order to test the functions of the systems and new products, and to identify problems. Testing usually requires the participation of end users. Three experts mentioned this subcategory.

Expert F:

Evaluating the service after its accomplishment is a challenging step as it requires many levels of testing in a short amount of time, which may lead to missing the inspection of some functions.

Expert S:

Interfaces must be tested before launching them to ensure the ease of use, as this is the usual scenario for professional IT companies; they test new products with a segment of volunteers to evaluate the product's condition and monitor any problems.

Expert T:

We test systems with users as we usually implement the new systems according to our managers' visions.

Lack of user manuals and information provision

This subcategory refers to the challenge of the lack of information to support different segments of society during their e-services usage. The experts agree that providing information can simplify the processes.

Expert D:

Some guide books were offered by the municipality, but I think the information presented is weak and not sufficient to support all segments of society. Also, the information must be included within the application under the help section. There is no guidance that explains how to use the application or its functions. There is

no clarity regarding the status of reports; the user isn't able determine the status of his reports, whether they were approved or not.

Expert O:

Providing information in a simple manner to obviate the need for the citizen to visit our branches to query things.

Expert W:

Providing introductory materials and resources so the user could benefit from those services without help.

8.6 ICT infrastructure-related challenges

ICT infrastructure is the backbone of any online service, as it enables users to access services efficiently through a variety of devices widely owned by individuals, especially with the rapid growth in ownership of smart devices that enable access the internet (Oseni & Dingley 2014). The trend of increasing use of internet networks is among the reasons to facilitate the shift to e-services widely. In addition, the advancement of ICT infrastructure has also been effective in facilitating connectivity and transformation. However, many researchers believe that significant challenges might emerge in e-services transformation (see Section 2.3). A number of the experts interviewed has confirmed that there are challenges during the transition process or even after the transition. The competent authorities that are responsible for offering e-services should take this into account before and after the development of e-services.

By focusing on the challenges facing ICT in the provision of e-services, some key elements have been identified through which these challenges can be classified more precisely. These include network availability and coverage, computational power, systems security and protection, IT staff skills, technical problems encountered, and data retention and management. Therefore, through the analysis of the expert interviews, the challenges facing e-services transformation in the public service sector were categorised into the following: functional issues, technical issues, security and privacy aspects, lack of powerful computing, lack of efficient data storage architectures, improper networks and connectivity, data quality standards and lack of IT skills. These emergent subcategories are presented below.

Functional issues

The functional issues are related to the defects in the application, for example, some optional fields should be mandatory to ensure the correct information is provided, or there should be options to allow the modification of information or a mobile number online. Also, the GPS feature used is inaccurate, as mentioned by experts D and A.

Expert D:

We face a frequent problem caused by the application, that is, the inaccuracy of the location of the problem; there is a field that must be filled with the closest electricity meter address to the problem, but this field is not obligatory and its purpose is not clear, thus the citizen doesn't fill it in causing the problem to be difficult to reach. I think that this is a defect in the application because it doesn't oblige the citizen to enter that piece of information (lack of explanation in the application) and there is not sufficient explanation for its function. This problem forces us to contact the complainant in order to update data, thus the application must be improved and simplified to suit all segments of society.

Also,

There is no button for logging out of the application which make some users frustrated if they want to login using different user credentials.

There is no option for modifying the personal or report data; as a user can only modify their name; this isn't logical for me because names are considered to be constant but the mobile number and e-mail address should be modifiable in the first place! But this option isn't available and this forces the user to fully uninstall and reinstall the application to create new account.

Expert A:

One of the most prominent problems is changing a user's mobile number as the citizen needs to visit one of our branches to change his mobile number. We have tried to activate changing mobile number through the website after sending a video demonstrating that process for the client and that try failed. Mobile number is only needed to activate the feature of changing the password of the website when needed.

Expert D:

The GPS feature used is inaccurate... Any user can report an issue in a different place to the issues' location (reporting an incident in Al-Dammam city while he is in Al-Jubail city). I see this as a weakness of the application.

Technical issues

Technical issues are those that can appear during a software update, and also using GPS technologies to determine the location of reported incidents. Furthermore, the content sometimes disappears from the website pages, or calls can be forwarded to the wrong people, according to the experts P, C, A, and T:

Expert P:

Sometimes, our application stops during upgrading our internal systems.

Expert C:

The problem of updating software and compatibility with devices, to ensure that they will work on most devices. However, this problem is easy to tackle by keeping our software up to date with the latest version available. Another technical problem that we faced was determining the location of the reported incidents by using GPS technology.

Expert A:

Sometimes, there are technical problems as some content or fields disappear from pages, and sometimes an individual's problem takes 24 hours to be solved.

Expert T:

One of the technical problems regarding phone calls is that they were sometimes forwarded to an unintended area, for example, a caller from Al-Dammam is forwarded to Riyadh. Also, the overlapping between phone lines and the lack of clarity of calls are issues that happen occasionally.

Security and privacy aspects

The security and privacy challenge is mostly related to virus attacks and occurrences of hacking. Using offline backups, as well as following the international standards of security can help to tackle those problems, according to the experts.

Expert I:

Shamo'on virus encrypted all of our files and, as we were using a virtual server which had been encrypted, this was also controlled by the virus. The biggest problem is that every file has a special encryption which in turn made the problem even more difficult. (…) Currently, we store offline backups to prevent the reoccurrence of the problem; previously, the backups were connected to the network which in turn caused them to be infected with the virus and their content was destroyed.

Expert F:

Electronic systems' hacks occur due to the neglect of institutions in taking daily recognised security measures and procedures. I have seen alarming cases of neglect by those responsible for data management and protection. Considering the international standards of security, taking backups, and distributing those backups to different places and servers can help tackle this issue.

Expert O:

The problems of viruses are present and we faced one this year where we lost half a day's data; the backups saved us the pain of losing all of our data.

Expert K:

The problem of viruses… we learned a tough lesson at both the work and personal level, thus now we take backups continuously.

Expert S:

Consideration of security standards, as we faced critical times when our systems went down because of hacks and viruses.

Lack of powerful computing

Lack of powerful computing is defined as the problem of delays in the internal system hosting the external and internal services. A huge number of requests can cause slow response times. Consequently, citizens' reports or requests cannot be received on time, and this can cause more challenges for the authorities. Four experts referred to these issues.

Expert H:

In peak times, there is a downtime or delay in the internal system, which in turn causes the citizen to wait a long time till the system operates normally.

Expert A:

When the internal systems are down, the e-services that exist on the website go down. There is no alternative solution available so far.

Expert M:

During emergencies, the systems can't keep up with the huge number of requests.

Expert T:

The application is sometimes unavailable because it depends on our internal network, thus the application must depend on other external networks to make it possible to receive reports under any condition. This problem is mainly because of security concerns as when we believe that a hack is going to happen, we close our connection with the internet and work only on the internal network. However, systems that are needed most by the citizen must be available on other external networks.

Lack of efficient data storage architectures

Lack of efficient data storage is associated with data storage architectures and unintegrated databases. In addition, the experts also mentioned the poor design of the forms used for data collection, which may require users to resize the uploaded file. Furthermore, constant data transfer between different systems is important during crises. There is a need to work with cloud services companies and to ensure database integration. Experts I, C, O, and W discuss the issue in detail.

Expert I:

Currently, we are working on transferring our services to cloud systems in cooperation with some private sector companies.

Expert C:

There is a problem with uploading images due to image size, as some face a problem trying to resize the attached images.

Expert O:

Transferring data from different systems causes data loss.

Expert W:

Database integration must be considered in an advanced stage of the system's development.

Improper networks and connectivity

This issue links the problem of cell networks or internet infrastructure in all areas of Saudi Arabia, as there are some villages that might be out of reach. Therefore, citizens who live in these areas may not be able to benefit from the provided e-service.

Expert R:

Due to the lack of internet service quality in some villages, e-services weren't provided to them and the focus was on using the phone.

Data quality standards

Experts D and A indicated the importance of the ability to ensure the data quality standards. One such issue is not entering the international dialling prefix while entering the mobile number in the application. This problem can be tackled with little effort, such as by linking the national identity number with the requester on the website.

Expert D:

The application design has not considered the data quality standards; for example, there is a problem in entering the mobile number as the application couldn't identify the numbers in terms of the international dialling prefix 966; this randomness in entering the phone numbers requires excessive efforts to ensure the integrity of data manually.

Expert A:

Previously, we had a problem in the accuracy of the data submitted by the user. This problem was solved through linking the national identity number API with the requester on the website. This saved us a lot of effort regarding the accuracy of the submitted data, and saved users' time by reducing the amount of data required to be provided.

Lack of IT skills

Lack of IT skills among some of the employees is mostly associated with the inability of programmers to overcome specific difficulties due to their lack of experience, according to expert I.

Expert I:

As network specialist, I request the required network protocols to be enabled from programmers when developing a new application… But the problem is that programmers don't have a background about what protocols should be unlocked, thus we become forced to unlock all of the network protocols and try closing one by one to check how this affects the application functionality, till all required protocols are identified.

8.7 Organisational-related challenges

The restructuring of organisational processes and the development of policies and regulations that align with digital transformation are essential processes that need to be taken into consideration throughout the movement toward e-government transformation (Aichholzer & Schmutzer 2000). The presence of appropriate administrative skills and efficient communication in the top-level management leading the electronic transformation is key for the success of e-government initiatives (Vasiu & Vasiu 2006). Therefore, organisational and managerial challenges are some of the major obstacles to the success of digital transformation initiatives in all government sectors. Interviews were conducted with experts working in the public services, especially municipalities.

The findings identified 17 organisational-related challenges. These challenges are categorised into the following: unclear organisational structure; deficiency of policies and procedures; issues with authority delegation; lack of managerial skills; lack of coordination and communication between concerned parties; manpower shortage; failure to reinforce the benefits of e-government; inefficiency of business processes; lack of leadership support; citizens' involvement; vendor selection and management issues; resource management; lack of performance monitoring; lack of transparency; lack of human resource development; deficiency in the quality of services; and lack of financial support. The highlighted statements for the aforementioned challenges are outlined below.

Unclear organisational structure

This challenge is related to organisational activities and structure, such as employee task allocation and definition, and clarity of alignment of an organisation's processes with its main goals. Issues with these elements can lead to delays and a lack of clarity within the institution, according to the following experts.

Expert F:

System requirements are always a problem. This is due to the fact that sometimes we do not know who the main decision-maker is who we can accurately communicate with to write down the requirements in order to be able to start the implementation. Therefore, procedures take very long time ... The governmental nature of work requires group work to finish a single request, and thus we cannot identify requirements accurately from everyone, due to differences in views and, sometimes, unclear requirements.

Expert R explains an example of organisational-related problems that can provoke a serious regression of the work flow:

Expert R:

The 'Balagati 940' app is managed by the Public Services Department and not the IT Department, which is a big problem, as the database is separate and we have no control over it. Sometimes, this disrupts the progress of work, and that's because of employees' absences from their divisions. Therefore, it's necessary to preserve existing data by creating backups and linking them with our other systems.

Deficiency of policies and procedures

Expert F relates this challenge to the ability to control and manage situations, especially risks. Thus, problem-solving, and risk-management skills are essential to ensure efficient work:

Expert F:

No risk management manuals, clear solutions for operators, technical books on systems' functionality, or solutions are provided. In the event of a problem, personal judgement is used for solving the problem. It is assumed that the official

authority provides its employees with full training and support procedures, to avoid any kind of problems as much as possible.

Issues with authority delegation

This subcategory is mostly related to bureaucratic issues. Maintaining the hierarchy of authorisation in all systems can cause delays and lead to the suspension of citizens' transactions:

Expert O:

The problem of inter-department authorities, as a citizen's transaction gets suspended due to the lack of authority for completing it electronically, and therefore it's transferred to non-competent departments who have more authority. (…) In my opinion, when switching from conventional to electronic systems, the main problem is that of departments' authorities. In other words, signatures and stamps. A single transaction may require to be passed to more than one department in order to be completed. This may lead to the suspension of the transaction and cause delays in completion.

In addition, it can lead to an inability to make decisions in the case of delegating the decision-making power to a specific authority:

Expert Q:

Delegation of power to a particular authority (what happens in our case is that there is a sole reference, which is the Ministry) may be a problem for the ability to make decisions, which generally relies on the municipality.

This centralisation can limit opportunities to develop new services, according to the expert R.

Expert R:

We do not have full authority to develop new services. This is one of the matters hindered due to centralisation, otherwise we would have many innovative ideas.

Lack of managerial skills

This issue is related to a manager's ability to organise the processes within their department, for example, to provide clear instructions or to listen to colleagues. The following expert explains this in detail.

Expert F:

The big problem is management skill. The manager provides instructions even though he does not possess much knowledge about aspects of the work and the details. The manager is also sometimes unqualified to assume a management position to provide instructions and does not have enough experience or ability to listen to colleagues.

Lack of coordination and communication between concerned parties

This challenge is related to the need for more links between government institutions, with the help of ICT. Different departments or institutions each have their own database and work procedures, which can cause conflicts between those parties, especially, when there are transactions that must be completed by more than one party. Therefore, clear communication, coordination and services integration are required to overcome this challenge and ensure the work performance.

Expert W:

Links among governmental authorities must be established to facilitate conducting and completing transactions quickly.

Expert V:

Limitations in the process of linking government departments together, as all government departments have their own databases, which, unfortunately, are not offered any APIs ... There is also the lack of clear home addresses, which has caused in the past, and still causes, a lot of problems in reaching many people. Note that, at the moment, it has become obligatory to list the postal code for shops, and there are future plans for home addresses and other locations.

Expert Q:

The need for having a clear and consistent method for transferring services and complainants to the concerned party in the government by having a well-connected platform.

Expert R demonstrates an example of how this miscommunication can provoke a waste of public funds:

Expert R:

Coordination between different departments and public companies, such as electricity, and water supply companies. We receive requests for asphalting streets, but we cannot implement them due to the presence of water and electricity works in the same area … which would result in wasting public money in the form of building roads then having to destroy them again to complete water and electricity works.

Manpower shortage

This challenge is related to the shortage of employees with a particular skill in each department. This issue may affect the work process quality. Thus, there is a need to increase manpower to raise the work quality and efficiency, according to experts S, W, and T:

Expert S:

The number of people we have with responsibility for receiving reports is low. It's necessary to increase the manpower in order to increase effectiveness.

Expert W:

Lack in number of employees, as the number of employees working in each shift is very small, which makes the effectiveness of the operation of systems unreliable.

Expert T:

Lack in number of employees who are responsible for responding to phone calls, which extends citizens' waiting time.

Failure to reinforce the benefits of e-government

Increasing user confidence in online services is a constant challenge for the authorities. This problem is usually based on a negative previous experience with other government platforms that are neglected, according to the expert L.

Expert L:

Ensure user confidence with our e-services, as some citizens do not have confidence in using our online platforms due to bad previous experiences. Some government agencies neglect their online service, which has led to the prevalence of the idea that these platforms are ineffective.

A suggestion was made to overcome this issue by increasing people's awareness, and considering citizens' requests with greater commitment:

Expert L:

Increasing people's awareness as well as implementation…take the request seriously and respond to all citizens. This is similar to what occurred in the case of the Ministry of Commerce, which involved very strong implementation and the raising of citizens' awareness. This, in turn, increased their confidence and had real consequences, and it was not just empty propaganda.

Inefficiency of current business processes

One of the examples related to challenges in the business models is the inability to deal with multiple means used for reporting issues.

Expert M:

Providing multiple approaches for reporting issues makes it difficult for us to deal with reports quickly. We have telephones, applications, and others methods.

Lack of leadership support

Supporting employee leadership is an important step for human resources development. Lack of training can be one of the related problems:

Expert R:

Researcher: *Is there any training conducted for employees on the workflow of all request types?*

Unfortunately, no, there is no such training. It should be carried out as an initiative by the ministry. However, what we are doing is making personal efforts by training our colleagues.

Citizens' involvement

The involvement of citizens can help to increase usage and interaction. The challenge is to consider the views of end users. It important to communicate with citizens prior to launching the service, according to experts F and V.

Expert F:

Providing the opportunity for participation to citizens for interaction, and taking their views into consideration will increase usage and interaction…The needs of the actual users (in other words, citizens) are not taken into consideration when developing systems. This is considered a failure in the development of systems.

Expert V:

The process of communication with citizens prior to launching the service may be a good idea.

Vendor selection and management issues

This issue is defined as an inability to process and update the data, while working with different vendors over different periods of time, according to experts U and R.

Expert U:

Processing old data, as work is carried out through different vendors over different periods of time. When a contract expires, and is transferred to a new vendor, the problem lies in data processing, and that's because archiving is bad or that data organisation (or a big portion of it) is not based on clear specifications or standards. Also, there is no proper handover.

Expert R:

The problem of contracts with the vendor responsible for developing the mobile application. The contract has expired, and the application has not been updated or enhanced ever since. Currently, there is ongoing work on updating it internally.

Resource management

This subcategory means that there is some confusion related to the roles of some departments inside the institution. For example, expert K emphasises that it can lead to problems in the basic work process.

Expert K:

Sometimes, one of the causes of negligence is the variety of roles we carry out simultaneously. This results in confusion in our basic work. We receive customers' requests to resolve their problems. Then, at the same time, the manager comes and gives a different request. Then the programming team comes and asks us to test new pages or systems, and so on.

This confusion can result in slowing the completion of transactions, according to the expert V.

Expert V:

The problem of job rotation, which results sometimes in slowing the completion of transactions.

Lack of performance monitoring

This challenge can be described as the lack of performance indicators, and the lack of continuous monitoring. The issue was referred to four times by the experts.

Expert V:

The lack of continuous monitoring of work performance by the delegated departments or managers.

Expert R:

Lack of performance indicators to measure the implementation of responses to reported issues and requests. Developing such indicators is among our future plans and we are planning to work on implementing them in three areas: pending work, completed, non-competence.

Expert F:

Lack of a performance indicator and setting criteria for it.

Expert S:

Honestly, no, we don't perform that kind of tracking; we just make some general statistics.

Lack of transparency

This issue indicates the internal ability of the organisation to be transparent by providing information about the projects, and employee's performance.

Expert U:

Providing transparency and assessing performance, as well as indicating work achievement and number of completed tasks or operations.

Expert V:

The employees are well-informed of all the details related to municipality projects, but citizens are not.

Expert Q also mentioned the importance of announcements which should be offered to all beneficiaries so they are aware of any changes to the area in which they live or work.

Expert Q:

Prior notification and information about future projects, such as tunnels and other projects, as citizens can be unaware of roadworks plans; then in the morning they would suddenly witness them as they affected their shops, some of which had been established a short period of time earlier. Having such information in advance, they would've spent effort and money to choose another place for starting their businesses. Unfortunately, announcements are not

provided, which is considered a disaster for citizens' rights! (…) Closing roads without prior notice! The citizen is not even informed of some alternative streets to get out of his home. This may cause delays in him getting to work and his children to school.

Lack of human resource development

These issues are defined as the inability to provide a general development programme for employees, according to expert R.

Expert R:

The biggest problem lies in the lack of consistent jobs and job titles for the employee, training, and development. This affects the extent of his work compared to employees at private companies such as Aramco and others.

Furthermore, employees must receive training on a different type of job, according to experts S and M:

Expert S:

Employees must be trained on managerial work and not just on how to deal with systems.

Expert M:

Yes, training courses were conducted, however the training was mainly focused on using systems and receiving reports, but did not include internal processes needed to redirect requests to the competent departments efficiently.

Deficiency in the quality of services

This issue is related to the measurement of organisation performance, as some organisations focus on the amount of work achieved, but not on its quality. The statistics provided by expert R support this point.

Expert R:

Our products meet 95% of public service's needs. However, with comparison to quality standards, we have not reached 30% of the real digital transition.

Expert F:

The major focus for senior management is on achievement more than on quality. Projects are completed by the contractor, who in turn cares about quickness and making money without dedication to the quality of work.

Lack of financial support

Another challenge, indicated by expert V, is related to lack of funds as it can affect the work quality and performance.

Expert V:

Lack of adequate funding for information technology in terms of hardware, number of employees, experience, number of servers and lack of secondary networks.

8.8 User-related challenges

With the internet and the digital transformation of government, citizens' participation through this medium has been adopted for the purpose of facilitating and expediting procedures for applications and communications. However, there are challenges that may arise due to users' culture and behaviour, according to experts C, D and P. In this section, the findings of expert interviews related to social and cultural challenges are presented. This theme is related to the acceptance and use of electronic methods in the monitoring processes of public services and the submission of online applications to the secretariats and municipalities. Experts have mentioned during the interviews many of the problems they are facing while providing services to citizens on a daily basis, related to different social and cultural issues. These challenges were classified into five sub-challenges, as presented below.

Lack of seriousness/manipulation

A lack of seriousness of a citizen can result in the generation of malicious reports. This issue was referred to by five experts:

Expert P:

Malicious reports, which are complaints among shop owners about shop licenses.

Expert I:

Previously, we introduced a service that enables citizens to close their reported issues' tickets. However, it was not effective even upon the completion of problem resolution, due to negligence from the complainant's side.

Expert N:

Some citizens send e-mails or mobile messages, with the purpose of testing these communication methods.

Expert U:

The general orientation on Twitter is to cause outrage in public opinion, as if a person is having a problem he will try expose it publicly, to make others interact with it. In such cases, municipalities act much faster. Society's support concerning a particular problem increases its value and makes it important, even if it is actually not.

Expert E:

Citizens don't provide comments or reports about defects on our online services, except in rare cases.

Lack of awareness

This issue can be defined as the citizens' ignorance about authorities' work. Some citizens can put on constant pressure through frequent calls. Experts J, C, and G referred to this issue.

Expert J:

There is constant pressure through frequent calls to fulfil personal requests by some citizens. Even though prior requests must be finished in order of precedence.

Expert C:

Citizens' ignorance about our job, as we receive many calls reporting on things that are outside the scope of our work, such as traffic signals. While some other citizens use us as a tool to release their anger about social problems, such as rising prices!

Expert G:

Repeated calls by citizens to our centre, in which case we become the centre of attention, despite having transferred their request to the competent authority.

Lack of awareness can be a consequence of lack of knowledge, as experts D and H explain:

Expert D:

Lack of citizens' knowledge about our centre's role in receiving reports; our role is to receive reports from citizens, rephrase them, complete their information, then transfer them to competent authorities.

Expert H:

Citizens have no patience when it comes to resolving their reported problems, which results in their repeated communication with us to enquire about the status of their requests and any recent changes that have occurred. This results in a waste of our time in responding to these enquiries.

In addition, citizens have different expectations about the work of the authorities:

Expert L:

The belief held by some people is that once a report is delivered, we will resolve the problem right away; this is not accurate, and it's beyond our area of competence; we are only redirecting requests to the relevant authorities.

Lack of knowledge

Some of the quotes below were used in the subcategory: Inaccuracy in the problem description (Section 1.3). However, it is also appropriate to include them in this subcategory due to their mutual relevance to this challenge. In this regard, the citizens' lack of knowledge or skills can affect the use of the offered services, describing their problems and needs. According to experts J and C:

Expert J:

One of the challenges we face is citizens' lack of knowledge on using our electronic systems in their transactions with us. Also, we found that elderly people have some difficulty of use and lack of knowledge about using technology. Although, current system designs are good and easy to use, they can be further

improved. For instance, some existing systems, such as the mobile application, are easier to use than the web browser's version.

Expert C:

A small percentage of people don't know how to use our applications; therefore, they contact us for enquiries.

Furthermore, there is the issue of citizens being unable to describe their problems:

Expert G:

Some citizens' struggle in describing their problems and needs.

Expert M:

Some citizens don't have the knowledge to choose the report category while filling in the report information.

Lack of courage

Courage in this context is mainly in reference to the use of technologies by citizens. Also, some people can be afraid of dealing with an official agency, and they hide their numbers and personal information.

Expert P:

Lack of information provided by the reporters, due to the fear of dealing with official government agencies. For example, some citizens try to hide their name, and call using a number other than their personal number.

Expert M:

There is a number of citizens who don't have confidence in the use of technology. They feel more comfortable and trusting in making a phone call.

Another issue discussed by expert U is a culture of "non-reporting". This challenge was also found during the during exploratory phase conducted in this research, discussed in Chapter 4.

Expert U:

When there is a problem, report it, and it will be resolved. But in the prevalent culture, non-reporting is the choice, which is due to citizens' inherent experiences,

which are characterised by the idea that reports are met with no response or interaction.

On the other hand, people are used to trusting the phone as a method of communication due to established beliefs:

Expert R:

The persistence of the idea that the phone is the main method of communication, as in the case of contacting the police or firefighters.

Expectation and trust

Expectation and trust can give rise to a challenge when groups of people have their own expectations of activities, hence the level of trust can differ from one group to another. The challenge for building citizens' trust is common, as it was referred to by six experts:

Expert D:

Some citizens think that we will receive their reports and take action regarding them, which puts us in constant clashes with them.

Elderly people have less trust in e-systems. There are people who believe only in using papers as documents, according to experts O and S:

Expert O:

Elderly people are the main group that visit our centres. The reasons for this are that they want to acquire information as soon as possible, as well as their lack of trust in e-systems due to their belief that delays will occur in completing work electronically.

Expert S:

We have a culture and background that remain constant in our society. For example, the case of e-government transformation; there are opposers who only believe in using paperwork. There is a certain segment of people who only believe in heading to municipalities for completing their procedures.

On the other hand, the experts mentioned that citizens should consider authorities' working time and the existence of other requests. It requires them to be more patient, since certain procedures must be followed, according to experts W, N, and K:

Expert W:

Citizens should consider municipalities' working time. When submitting a report on Thursday, a citizen should expect that he/she may not receive a response until roughly Sunday. Therefore, performance should not be evaluated on that basis, as this issue should be taken into consideration.

Expert N:

A citizen wants his request to be completed quickly without taking into consideration the existence of other requests belonging to other citizens.

Expert K:

The biggest problem is that a citizen reports an incident today and wants everything to be completed on the same day. This is unreasonable, since each problem requires certain procedures to be processed. Sometimes this requires days or even months.

8.9 The proposed model-related challenges

The preceding sections provided an overview of the challenges facing the current online platforms and applications presented by the eastern region municipalities. This section focuses on the challenges that may confront the proposed model, as there might be some differences between the functionality and the purpose of use between the proposed model's main components and the current platforms and applications. Thus, the last part of the expert interviews was designed to focus on this area and so identify these challenges.

The emphasis during the data analysis was to identify the barriers that each component might be confront with. The identification of challenges can contribute to the success of the process of implementing the model and it may reduce the occurrence of problems during the development of online platforms and applications, or even after the completion of service development and delivery to the public.

The analysis focused on the following components: Government, Citizens, Petitioning, Voting, Consultation, Deliberation, Emergency, Transparency, Information Provision, Spatial planning and Community Building. The findings identified challenges in the following sub-themes: petitioning and reporting issues-related challenges, deliberation-related challenges, voting-related challenges, government-related challenges, citizens-

related challenges, consultation-related challenges, information provision-related challenges, and transparency-related challenges.

Petitioning and reporting issues-related challenges

This issue is related to citizens who are sometimes not transparent in their dealings with e-systems, as some hide their name or even submit malicious reports. Thus, it is important to work on acquiring the reporter's personal information to eliminate this problem:

> **Expert P:**
>
> *Malicious reports are a common issue in online platforms. Thus, ensuring acquisition of the reporter's information improves and reduces this problem.*
>
> **Expert C:**
>
> *Hiding complainants' names may be a solution for privacy but may also be exploited by some through the lack of seriousness, and lying. Also, there is a problem related to submitting irrelevant reports.*

Deliberation-related challenges

Challenges related to the Deliberation component can appear because of the availability of deliberation methods on social media if, at the same time, the municipality does not take notice of it:

> **Expert E:**
>
> *From my experience, the deliberation component might be inadequate because of its availability through social media. However, when introducing a specific subject for voting and discussion, then it can be considered excellent. In both cases, if this component is implemented and the municipality doesn't give preference to the view held by the majority then it implements its own view, even though it goes against citizens' wishes, then there will be a huge problem. (…) Another challenge is that offering a discussion forum might be taken advantage of by some people for destructive purposes or to cause chaos, especially if there are no regulations over it. Even if the topic is not evaluated or discussed, parties addressing it might be incompetent with regards to experience and so on.*

Expert E also emphasises the importance of organising the e-deliberation process to overcome any issue:

In general, I do not reject the idea of offering discussion forums, but the main problems are the regulations, the type of people using forums, and their effectiveness?! This should be considered broadly when discussion forums are implemented. The reason for this is the sensitivity of the subject, as well as that discussion forums might be ineffective if they are not regulated.

Expert I mentioned that offering online discussion forums under the umbrella of the Deliberation component may result in creating conflicts of interest among the participants, but this can be regulated during the registration process.

Expert I

It is natural that conflicts of interest may occur if information and transparency are available. There may be debates and conflicts of ideas. This is normal, but these problems can be avoided during the registration process in the service by limiting the choice of words, through guidelines, and other means which govern the exchange of knowledge and benefit from it, rather than creating a wide debate. Also, it must be clarified that any person is subject to legal accountability.

On the other hand, experts Q and U mentioned that clear restrictions should be put in place, and there should be an effective consultation related to participation:

Expert Q:

It may not provide a great value unless clear restrictions are put in place, to enhance transparency and motivation for use.

Expert U:

If the component is included, it is important to not marginalise citizens' opinions and to listen to them; there should be effective consultation and real participation. The biggest example of this is making hashtags, and the participation of many people in it because they were striving for it, because it is a big issue supported by the citizens first and then by the government. In the first place, we should listen to citizens' opinions from the beginning.

Voting-related challenges

Voting-related challenges happen when citizens force officials to meet their needs with the support of others while their requests are not realistic and genuine:

Expert Q:

We see some tweets on Twitter making achievements and changes in systems in a short time, which members of the municipal council could not attain in months…The citizen's voice, with support from other citizens, pushes and drives officials towards meeting citizens' needs and resolving problems, and that's because they are realistic and genuine.

Government-related challenges

The government-related challenges are that public departments can provoke the biggest obstacles, especially in implementing new systems. One of the reasons is that some public sector employees feel that their jobs are secure, and as result they believe that there is no need to strive towards further improvement.

Expert S:

In public sector departments, there is a noticeable slowness in the accomplishment of administrative works, and this may be one of the biggest obstacles when implementing a new system; the government employee does his work slowly because he feels his job secure, and he will never be dismissed under any condition of accomplishment; the human factor is difficult. (…) Our staff representatives who receive reports are few. This issue must be tackled in order to increase the effectiveness. Employees must be trained not only on how the system works but also to understand managerial aspects. In addition, because of this small number, it will be difficult for the employee to determine the type of report, its importance, and if it is an emergency case or not.

Corporate culture and human resource management are important aspects to ensure the efficiency of a work process, as indicated by experts K and U.

Expert K:

Distributing tasks to departments and defining the basic tasks of each employee is an essential step.

Expert U:

Staff culture and level of knowledge are important elements for enhancing work performance and customer confidence. Also, dealing with the public requires certain skills; thus, the employees must be chosen carefully.

Citizens-related challenges

The citizens-related challenges are those human factors that can affect the work of the authorities. For example, people can be afraid of declaring some important information.

Expert C:

There are some citizens who fear to declare their personal information... they even fear the idea of recording the call while reporting issues by phone...or even fear to make a complaint, which in turn will cause less interaction.

Even if governments are transparent in their conduct, some citizens may not be transparent. Therefore, people's awareness should be increased, according to expert S.

Expert S:

If a citizen submits a report in unfriendly way, it may create sensitivity and tensions between the citizen and the staff representative. (...) Even when transparency is provided by the municipalities, the citizen may not be transparent in dealing with us. This does not solve the problem. Thus, citizens' awareness must be increased. (...) Some complainant tries to exaggerate the size of his problem to increase its importance and have the resolution completed faster; on the other hand, if the complainant does not know the description of his problem, it may be given less importance.

Consultation-related challenges

The main challenge related to the Consultation component is that some government officials consider that only their opinions are correct.

Expert T:

We have a problem with the government employee or the government official because he considers that his opinion is always true... Also, according to his personal thinking or misconceptions, the participation of citizens in decision-making (consultation and deliberation) may threaten his position and reduce the value of his job.

Differences in opinion can provoke problems in the implementation of consultation and the citizens' engagement process, according to expert S.

Expert S:

I see it as beautiful, and effective to increase human value. But we must make the effort to make people its aim and purpose. However, there might be some difficulty in implementing the consultation component because of differences in opinion, but it is possible to use voting alongside consultation as a step towards solving the problem.

Information provision-related challenges

The information provision-related challenges are about providing comprehensive information, and clear rules to raise people's awareness. Experts U and B suggested offering theoretical and visual documentation for all the new services.

Expert U:

Full information, clear rules, and clear steps should be provided for any procedure, as well as its services and processes, to raise the awareness of citizens in order to avoid many problems. (…) Guiding people to return and read the service information when they have a question in order to ensure the element of learning and to save time for future queries.

Expert B:

Theoretical and visual documentation for all of the new e-services must be offered to the users.

Expert E indicated that the lack of information access can affect citizens' decisions.

Expert E:

Any decision must be based on a specific and clear basis… The citizen may make a decision that is not based on evidence due to the lack of information access.

Transparency-related challenges

Transparency about the work process is an important step to make the beneficiary feel reassured. Expert U mentioned that the reported issues or the work process for any transaction should include information related to the number of processes, the transaction status, and a conception of operations.

Expert U:

Clarification of the time period and the steps of the work process in order for the citizen to have a conception of the operations and his transaction status. Also, indicating the number of processes they are working on, waiting time to executing caller requests, so that the beneficiary acquires knowledge and feels reassured.

8.10 Discussion and summary

This chapter began with a review of the literature concerning the e-government initiatives in Saudi Arabia to build an in-depth understanding of the barriers affecting successful e-government transformation. However, only a few studies have considered this topic in the Saudi context. Four main challenge categories were identified from the literature (Table 20), which are technical-related challenges, user-related challenges, organisational-related challenges and financial-related challenges. Within these four main challenges, 20 subcategories were identified.

In addition, within the identified literature there was no focus on the challenges facing the Saudi municipalities' online services. Therefore, it was important to conduct an in-depth case study to identify the challenges affecting municipalities' online services. This can help in answering part of the second research question, which is RQ2.1.

In relation to the experts' interviews, six main themes were identified in relation to the challenges of municipalities' online platforms and applications, and one main theme related the proposed model challenges. The seven identified themes are e-service-related challenges, ICT infrastructure-related challenges, user-related challenges, organisational-related challenges, operational-related challenges, reporting-related challenges, and the proposed model-related challenges. A total of 57 sub-challenges were identified within these themes. Thus, in comparison with the challenges drawn from the literature, four more new themes have been revealed. These new themes are e-service-related challenges, operational-related challenges, reporting-related challenges, and the proposed model-related challenges.

Similarities can be seen between the experts' interview findings and the challenges identified in the literature in three themes: ICT infrastructure-related challenges, user-related challenges and organisational-related challenges. However, on inspection, it has been noted that the challenge subcategories included under each theme are different to

some extent, as there are many subcategories have not been explored or mentioned in the literature. For example, the subcategories under ICT infrastructure-related challenges that have not been addressed in the literature include data quality standards, technical issues and functional issues, while the rest were addressed. Even with similarities between the names of the subcategories, the purpose and the definition may be different due to the focus of the identified literature on e-government in general, while this study focused mainly on the e-services challenges related to municipalities. The six main themes describing the challenges facing the current e-systems in Saudi municipalities that were revealed in the experts' interviews are outlined in detail in Table 22, along with the sub-challenges.

Table 22: Summary of the identified challenges in existing Saudi municipalities' online platforms and mobile applications.

#	*Category*	*Challenges*	*Experts count*	*Challenges*	*Experts count*
1	***E-service-related challenges***	User experience	5	Information security, safety and privacy	3
		Technical support and availability	2	Service marketing	7
		Service responsiveness	3	Service planning, design and delivery	7
		Service quality	7	Service testing and evaluating	3
		Lack of user manuals and information provision	3	Transparency	4
2	***ICT infrastructure-related challenges***	Security and privacy aspects	5	Lack of powerful computing	4
		Lack of efficient data storage management and design	4	Improper networks and connectivity	1
		Data quality standards	2	Technical issues	4
		Functional issues	3	Lack of IT skills	1
3	***User-related challenges***	Lack of seriousness/manipulation	5	Lack of awareness	6
		Lack of knowledge	4	Expectation and trust	6

#	*Category*	*Challenges*	*Experts count*	*Challenges*	*Experts count*
		Lack of courage	4		
4	*Organisational-related challenges*	Unclear organisational structure	2	Deficiency of policies and procedures	1
		Authority delegation	3	Lack of managerial skills	1
		Lack of coordination and communication between concerned parties	4	Manpower shortage	3
		Failure to reinforce the benefits of e-government	2	Inefficiency of business processes	1
		Citizens' involvement	2	Vendor selection and management issues	2
		Resource management	2	Lack of performance monitoring	4
		Lack of transparency	3	Lack of human resource development	3
		Deficiency in the quality of services	2	Lack of leadership support	1
		Lack of financial support	1		
5	*Operational-related challenges*	Employees experience	8	Resistance to change	1
		Service delay	1		
6	*Reporting-related challenges*	Description of the issues	3	Malicious user or reports	4
		Contacting several times	1	Location accuracy	6
		Usability and efficiency of the reporting tool	2	Reported issues classification	2

On review of the findings, it was found that there were significant variations in the frequency with which some of the challenges were mentioned during the expert interviews. The number of experts mentioning a particular challenge varied between one and eight. This may indicate the significance of these challenges; therefore, the frequency count has

been included in Table 22. To elaborate, in the e-service-related challenge theme, the service marketing challenge, service planning, design and delivery, and service quality have all been identified by seven experts and by reviewing their areas of expertise, it can be seen that there is a common area of experience between the majority of these experts. This might be due to the frequency with which they have confronted those particular challenges in their experience with e-services. On the other hand, in the organisational-related challenges section, it can be noted that the deficiency of policies and procedures, lack of managerial skills, inefficiency of business processes, leadership support, and financial support challenges have been mentioned by one expert. The reason behind that can be related to the number of experts involved in the study with different background experiences than the majority of the participants, and that they have encountered this problem during their work repeatedly or individually. The number of participants in this study was very limited, thus, it is possible that with a greater number of participants with relevant background experience then these challenges could have been mentioned by more experts. Therefore, all of these challenges were presented in general due to the small sample size involved in the study, with an emphasis given to the frequency count for each of the challenges included in the table.

Having identified the challenges facing existing e-systems, it is possible to build a fundamental foundation to be considered during the implementation of new systems in the future. This, in turn, can create a perception of the nature of the challenges that may be faced when implementing the model proposed in this research.

Table 23, presents the different types of communication channels currently available in the Saudi municipalities compared with the extent to which the model components are applied, in order to approximate the nature of the challenges that may be in common. As a result, a similarity to each component was observed by at least one communication channel. This may reveal a perception of similarity, which in turn may result in the occurrence of some of the aforementioned challenges to the proposed model. The research sub-question RQ2.2 is considered to be answered.

Table 23: Comparison between the proposed model components and the extent of the implementation in the current online platforms in Saudi Arabia

	Communication channels						
Components	Phone & IVR	'Balagati 940'	E-mail	WhatsApp	Twitter	Balady	Instagram/ Snapchat
Petitioning	√	√	√	√	√		
Deliberation						√	
Consultation					Partial		
Government	√	√	√	√	√	√	√
Emergency	√						
Citizens	√	√	√	√	√	√	√
Information provision						√	√
Transparency					√		
Voting						√	
Community building					√	√	√
Spatial planning		√					

Therefore, the focus was to continue the interviews with the experts to study the challenges may affect the proposed model implementation more accurately. During the interviews, each component was discussed in-depth and the experts mentioned several challenges for each component, which can be summarised in Table 24.

Table 24: Summary of the proposed model-related challenges.

#	***Category***	***Challenges***	
1	***Petitioning and reporting issues-related challenges***	Malicious reports	Hiding complainants' names
2	***Deliberation-related challenges***	Can be used for destructive purposes	Lack of clear regulations
		User behaviour	Conflicts of interest

#	*Category*	*Challenges*	
		Considering citizens opinions	
3	***Consultation-related challenges***	Government officials may consider that only their opinions are true	Differences in opinion can provoke problems in the implementation of consultation
4	***Voting-related challenges***	Citizens can push the officials to fulfil their requests even if it is not important.	
5	***Government-related challenges***	Continuous service improvement	The government employee
		Human factor	Human resource management
6	***Citizens-related challenges***	Fear to declare their personal information	Transparent, for people's awareness
7	***Information provision-related challenges***	The lack of information access	
8	***Transparency-related challenges***	Lack of performance indicators	Lack of transparency

The main challenges facing the proposed model are identified as: petitioning and reporting issues-related challenges, deliberation-related challenges, consultation-related challenges, voting-related challenges, government-related challenges, citizens-related challenges, information provision-related challenges and transparency-related challenges.

With these findings, RQ2.3 is answered and awareness of the nature of the challenges that could be faced during the implementation of the proposed model in the Saudi environment can be increased. Furthermore, this may help to reduce or overcome these challenges in the implementation phase. As a result, the second research question RQ2 was answered by highlighting the challenges in existing systems and the challenges that might face the proposed model and the degree of convergence between them.

Chapter 9 Conclusion and future work

This chapter provides an overview of this research and a conclusion of the research results. In addition, it presents the research contributions from the different case studies conducted. Lastly, it outlines the guidelines and suggestions for future work related to this study.

9.1 Conclusion

With the rapid advancement in technology, governments have realised the benefits of technology adoption to provide their services with the help of Information and Communication Technology (ICT). The Saudi initiatives towards e-government transformation through the "Yesser" programme were considered a significant step to facilitating new approaches for servicing and engaging the citizens. However, the engagement process is still lacking for the purpose of monitoring public services projects, as indicated in Chapter 2. It is clear that the quality of public services projects is considered to be significantly poor in consideration of the annually allocated funds. The reasons behind that are the method of project assignment to subcontractors, the apparent weakness in project supervision, and also the weakness in the efficiency of the members of the primary and final delivery committees of projects, as the chairman of the National Anti-Corruption Commission in Saudi Arabia indicated[19]. Therefore, this research was conducted to investigate the possible approaches for engaging citizens with government to assist in the monitoring of public services for the purpose of enhancing the quality of public service projects.

A conceptual model to engage citizens with governments has been proposed. In addition, this research addresses the challenges that may arise during the model's implementation. Therefore, two main research questions and five sub-questions were considered in order to provide guidance for the direction of this research. The answers to these questions were distributed in different chapters of this thesis. Table 25 provides a comprehensive summary of this thesis as it includes the aims and objectives, the outcomes and the research question answered in each chapter.

[19] Government projects failure in Saudi Arabia: Causes and Solutions http://www.aleqt.com/2011/05/11/article_537223.html

Chapter 9

Table 25: Chapter summary

Chapter	*Aims and objectives*	*Deliverable*	*RQ*
Chapter 1	Overview of the research problem, questions and objectives	Research problem, questions, objectives' definitions	Defining
Chapter 2	Building background knowledge about the research problem	Background knowledge and literature review	Exploring
Chapter 3	Research methodology plan to assist answering the research problem	Research plan, research methods used, data collection process, and ethical approval	RQ1 and RQ2
Chapter 4	Exploratory study to understand the research problem from the Saudi citizens' perspective	Data analysis of citizens' questionnaire responses	RQ1
Chapter 5	Conducting case studies to help build the proposed model	In-depth analysis of Twitter Government and third-party online platforms analysis Southampton people's panel project	RQ1.2, RQ1.3 and RQ2.1
Chapter 6	Overview of the proposed model in depth	Conceptual model for monitoring public services projects through citizen engagement Recommended technologies for model implementations	RQ1
Chapter 7	Model evaluation and confirmation	Experts' interview analysis for the model evaluation Experts' questionnaire analysis for the model confirmation	RQ1
Chapter 8	Identifying the challenges facing the current online platforms used in Saudi municipalities and the proposed model during the implementation phase	Presenting the challenges for e-government initiatives Experts' interviews findings for the challenges in Saudi municipalities' online platforms Presenting challenges that may be encountered during the proposed model implementation	RQ2
Chapter 9	Research summary and future work	Research overview, contribution, and future work	-

Chapter 1 demonstrated the research problem in Saudi public services, research aims and objectives, research questions, research publications and the research organisation.

Next, Chapter 2 focused on building background knowledge about the problem, as well as reviewing the gaps in the literature. An introduction and background about public services

in general and the problems related to it were provided. Also, the main issues behind the low quality of public services were identified in the last two phases of the public services project life cycle. In addition, it discussed the various essential subjects related to RQ1 and RQ1.1, which are the role of the ICT in delivering government services, the concept of e-participation, and its applied areas and forms. Consequently, this research has considered and reviewed the recent publications conducted in different contexts. The literature review findings provided different approaches to study and offered solutions to help mitigate the problem, such as using government and third-party mobile applications as well as social media platforms like Twitter for reporting issues. However, there was still a lack in offering a model to overcome this problem. As result, RQ1.1 has been answered:

RQ1.1 What are the existing systems used for monitoring projects?

Chapter 3 focused on planning the research methodology. It provided the research philosophy, strategy, research methods, and the data sampling, collection and analysis process. The research methodology was divided into three phases. The first phase was an exploratory study where a survey was conducted using an online questionnaire tool to collect Saudi citizens' opinions regarding their needs, public services issues, and the available communication channels. In addition, three case studies were conducted to discover the possible approaches for communication and to assist in designing the proposed model. The first case study was concerned with the adoption of Twitter as a potential method for monitoring public services, whereas the second case study was about the Southampton peoples' project that the researcher joined to gain knowledge and understand the approach used in Southampton, UK, to engage citizens. Lastly, the third case study focused on conducting in-depth analysis on five different e-systems used for monitoring public services offered by governments and third-party companies.

The second phase of the research methodology concerned evaluating and confirming the proposed model through experts' interviews and questionnaires. Finally, the aim of the third phase was to explain the methods used for identifying the challenges facing the online platforms used by Saudi municipalities as well as the challenges they may encounter for the proposed model implementation. Beforehand, ethical approval for each phase was obtained by the researcher from the ethical committee of the School of Electronic and Computer Science at the University of Southampton.

The initial exploratory study aimed to support the understanding of the research problem from the citizens' perspective, and to confirm the research problem. Therefore, Chapter 4

presented the findings from an online questionnaire that was distributed to Saudi citizens. The participants were from different age categories, different fields of work and had different levels of education, but the focus was on the younger generation as they are the majority in Saudi Arabia. The results of the questionnaire indicated that citizens experienced difficulties in communicating with the competent authority to report or request services. In addition, it was found that modern technology, such as mobile apps, was preferred as a method of submitting requests to local municipalities. Moreover, the majority indicated public services projects are completed and delivered late and 57% mentioned that they do not reach quality standards. The analysis also found 60% had had an unsuccessful experience, and that complicated procedures had to be followed to report an issue. As result, there is a clear indication that citizens face issues with public service projects, as well as the available communication channels. Therefore, it is important to further investigate the research problem by analysing the available tools for communication in order to determine strengths and limitations, and to recommend a new approach for citizens to communicate with local municipalities for the purpose of monitoring public service projects.

Thus, Chapter 5 continued exploring the available approaches by conducting three case studies as a part of the exploratory study to answer RQ1.2 and RQ1.3.

RQ1.2 What are the limitations of the existing systems?

The first case study was concerned with the adoption of Twitter as a potential method for monitoring public services. However, it was found that there were two main challenges in adopting it, which led the researcher to continue investigating different methods. Consequently, the second case study conducted was about a Southampton peoples' project that the researcher joined to gain knowledge and understand the approaches used in Southampton City Council to engage citizens. However, the researcher found that the scope and direction of the project was different to the goal of this research, therefore he started searching for different possible solutions. Lastly, the third case study focused on conducting in-depth analysis on the existing e-systems for monitoring public services offered by governments and third-party companies. However, most of the existing systems focused on public service issues, such as graffiti, dog fouling, potholes and street lights, while the Adaa system is the only one to focus on the issue of public service projects, yet it has not achieved its goal due to the lack of engagement, as it is mainly operated and updated through government departments and contractors.

Using the results of the aforementioned case studies, Table 13 was constructed to show the potential components that can be used to build a model for engaging citizens with government for monitoring public services projects. Therefore, the third research sub-question was answered:

> *1.1RQ1.3)* What are the components that can assist building a model for monitoring public service projects in Saudi Arabia?

After having the first three research sub-questioned answered, Chapter 6 and Chapter 7 focused on answering the first research question:

> *RQ1 What is the appropriate model that would enable two-way communication between citizens and the Saudi government for monitoring public service projects?*

Chapter 6 presented the proposed model, which was developed based on the analysis of the existing systems, literature reviews, and the e-participation applied areas and forms. The model components are Government, Citizens, Petitioning, Deliberation, Consultation, Voting, Information Provision, Transparency, Community Building, and Spatial Planning. Furthermore, it recommends the features and technology needed for the model implementation.

Chapter 7 focused on evaluating and confirming the proposed model components. The mixed methods approach was used for this step. Semi-structured interviews with 14 experts in Saudi Arabia were used to evaluate the model's components and to identify any new component not included. The analysis found that the experts suggested Emergency as a new component. Thus, the evaluated model contains 11 components. Subsequently, a comprehensive questionnaire was applied widely and distributed over Saudi municipality experts to confirm the proposed model components. A total of 87 responses were collected and analysed. Results show that experts have confirmed the proposed model components. At this stage, the research has answered the first main research question.

Thereafter, Chapter 8 aimed to answer the second research question, RQ2. To do this, the sub-questions RQ2.1, RQ2.2, and RQ2.3 must be answered first. Therefore, the chapter started by reviewing the literature concerning the e-government transformations challenges in Saudi Arabia. However, just few publications had highlighted this matter. Table 20 summarised the challenges identified from the literature. Four main themes were identified and these guided the research to understand the nature of the challenges found in the literature. For more precision, 23 experts working in Saudi municipalities were interviewed for two main reasons. The first is to assist answering

RQ2.1: What are the challenges facing the current online system?

The analysis of the experts' interviews identified six main themes related to the challenges facing the existing online platforms. Each theme had a range of sub-challenges that were frequently mentioned by the experts (Table 22). As result RQ2.1 was answered. The second reason was to identify the challenges that may be encountered during the proposed model implementation. The experts determined challenges that might affect eight components of the proposed model, which are Petitioning, Deliberation, Consultation, Voting, Government, Citizens, Information Provision, and Transparency. Therefore, RQ.2.3 was answered.

RQ.2.3: What are the challenges that might be encountered during the proposed model implementations?

Finally, to answer RQ2.2, Table 23 was designed to compare the proposed model components with the current online services provided by the Saudi municipalities. The goal of this comparison was to determine the extent of usage of the model components in the available Saudi municipalities' e-services. This helped to approximate the nature of the common challenges. The comparison results showed that each e-service or communication channel adopts at least three elements of the proposed model. These results can assist in anticipating the challenges that may be encountered in implementing the proposed model. The result of RQ2.1 identified 49 different sub-challenges facing the current systems, while RQ2.3 identified 19 sub-challenges that might face the proposed model. According to the comparison results in Table 20, all of the aforementioned challenges could be encountered when implementing the proposed model. Therefore, all the sub-questions of RQ2 are answered and the discussion was presented in Section 8.10:

RQ2: What challenges would result from implementing the proposed monitoring model in Saudi society?

It can be concluded that the research questions set for this thesis have been answered since a model for engaging the Saudi government with citizens was proposed in Chapter 6. The proposed model then was evaluated and confirmed with the help of the experts' interviews and questionnaires as presented in Chapter 7. Thus, RQ1 was answered and a validated model was gained. In addition, RQ2, which focuses on identifying the challenges that could be encountered during the model implementation, was answered. As a result, seven main themes of challenges have been identified successfully through experts' interviews in Chapter 8.

9.2 Research contributions

The research direction of this thesis focused on the topics related to e-government, citizen participation methods with governments, the adoption of ICT to activate the role of citizens in monitoring government projects, and the difficulties facing digital transformation. Therefore, the contributions of this research are to these fields. Citizens can play an important role during the development of public services projects through monitoring and reporting issues. It is accordingly feasible to provide tools that facilitate communication and participation of citizens with governments. This research has been carried out in order to investigate this research gap. Through the analysis of the results of the questionnaire distributed to the Saudi citizens, it was found that a large proportion of citizens refrain from participating, and reporting issues and complaints to official authorities. On the other hand, governments are seeking to provide a wide range of communication methods, but there are many weaknesses in these methods. Thus, this research contributed to this matter from different angles.

The difficulties faced by citizens in relation to public services have been reviewed and identified by designing and circulating an online questionnaire. This assisted in guiding this research and confirming the research problem as the appropriate approach to develop a method of communication between citizens and government. Also, this research can provide a benefit by presenting these results to the competent authorities. In turn, this can help them review their existing operations to improve their ability to meet the needs of beneficiaries, as well as contribute to citizen participation through community building.

One of the main contributions of this research is the development of a theoretical model that has been evaluated and validated through experts' interviews and a questionnaire instrument. The validated model aims to improve the quality of public services projects through citizens' participation with governments through monitoring public services projects. Fourteen experts were interviewed during the model evaluation stage, while 87 experts' responses were collected through the questionnaire instrument that was developed to measure the extent of agreement about the model components. The experts involved in the model evaluation held a variety of roles, including senior government positions such as Mayor, General Manager, Under Secretary, and other positions. This range of roles has had a positive impact on the quality of the findings. As result, 11 components were considered for designing and developing the model. These components are: Government, Citizens, Petitioning, Deliberation, Consultation, Voting, Information Provision, Transparency,

Community Building, Spatial Planning and Emergency. In addition, this research has offered recommendations for the technologies and features that might assist the development of integrated e-systems through online platforms or mobile applications based on the proposed model. Furthermore, the developed instrument can assist future research to collect data for measuring the extent of change about the model components presented in this research.

Also, because of the limited availability of literature focused on the challenges that can guide the digital transformation of governments, and specifically the public services sector in Saudi Arabia, an in-depth study was carried out with senior experts in the field to consider this aspect by conducting interviews with experts. The focus was to study the challenges facing current systems used by Saudi municipalities. Six categories of challenges have been identified and each theme includes related sub-challenges, which could provide a clear vision for future research on the types of challenges faced by digital transformation in Saudi Arabia and elsewhere. In addition, there was also a focus on the challenges that could face any party intending to implement the proposed model in order to reduce the challenges that might be faced and to contribute to efficient application of the model.

9.3 Research limitations

In general, all research is conducted under a number of conditions that determine the direction and scope of the research. Therefore, there were some difficulties that may have affected the results of this research, although this research has successfully achieved the aims and objectives that were set initially. This research was conducted at the University of Southampton in Southampton but the case studies used were established in Saudi Arabia.

Therefore, mobility and obtaining official approval from the concerned authorities were among the main constraints. Saudi Arabia is considered one of the largest countries in the Middle East in terms of population, area, diversity of co-existing cultures and the number of municipalities scattered in different places. Thus, the focus was on collecting data through expert interviews mainly in the eastern part of the Kingdom, specifically in the Eastern Province Municipality and Al Ahsa Municipality.

Consequently, it is possible that if a larger segment of participants from more cities were included, a slight change in results may occur. Similarly, a larger budget to support the research would in turn contribute to attracting a larger segment of the participants in a wider range through intensive visits to more cities

The limited time of this study is another factor. Accordingly, the research was conducted using a theoretical approach through conducting questionnaires, interviews and laboratory studies. The availability of more time would contribute to the process of implementing the proposed model to study realistic data. This would have been done by developing a communication channel, searching for a supportive site to adopt it and studying the data collected during the period of operation of the system, which in turn would give more realistic results than the theoretical results that this research has presented.

9.4 Future work direction

As this research has made some contributions in the field of e-government, the quality of Saudi public services and methods of monitoring of public services, it is possible that this research has opened more opportunities for future studies in the aforementioned fields. As mentioned in the research limitations section, it is important for future studies in this field to focus on conducting similar studies in different contexts, which in turn might help to build models for communication on the basis of the environment and challenges that are relevant for each region or country.

Another suggestion for future research is an individual focus on each component of the model in depth, as this research has built the basic model of communication in the Saudi environment, but it is possible to study the development of a model under different factors or environments. It is also important to study the model components to determine the successful factors for each component.

In addition, this research has been conducted theoretically, but it is also important for it to be conducted in a practical manner that might provide more accurate results. The technologies recommended by this research may not be valid for all times and places. Therefore, the focus on technologies that help the implementation of communication means to enhance engagement between citizens and governments is a critical field due to the rapid development of the technologies, which require constant understanding and evaluation of their importance and their relevance to each sector.

Appendix A **Citizen questionnaire**

Below are the survey questions that used for collected data from the Saudi citizens:

The level of efficiency and quality of public services
كفاءة ومستوى جودة الخدمات العامة

Research Information Sheet

Title of Study: Using ICT: Proposed model for reducing the gap between citizens and governments toward enhancing public services: Case of Saudi Arabia

Principal Investigator (PI): Khalied Al Barrak
Web and Internet science, ECS, University of Southampton

Purpose:

You are being asked to be in a research study that is being conducted at University of Southampton. This study about the quality of public services in Saudi Arabia in order to highlight the main barriers and the prefered ways to facilitate the e-communication between the citizen and the government for the purpose of enhancing the public services.
The results of the survey will help to explore the citizens opinion and needs about the public services provided from the government of Saudi Arabia on your local area. Furthermore, it will help to shape the communication framework that is being developed

Please read this form and ask any questions you may have before agreeing to be in the study.

Study Procedures:

If you agree to take part in this research study, you will be asked to complete an online survey related to this study.
This study is entirely voluntary, so you may withdraw at any time. Your responses will be kept confidential. There is no compensation for your participation. 10-15 minutes are needed to complete the survey.
The survey will ask you to provide some basic demographic information. Also, it seeks your opinion about the public services in general and the communication methods for reporting issues if exist.
The survey must be completed in one sitting; it cannot be saved and continued in later time.

Questions:
If you have any questions about this study now or in the future, you may contact me at the following email kmab1g14@soton.ac.uk.

We seek the accuracy in your feedback as it will affect the results of this study

Your participation is highly appreciated

* Required

كفاءة ومستوى جودة الخدمات العامة

عنوان البحث:

دراسة امكانية تعزيز التواصل مابين المواطنين و حكومة المملكة العربية السعودية لرفع مستوى الخدمات العامة بأستخدام تكنولوجيا المعلومات والاتصالات.

الباحث :
خالد البراك
علوم الويب والانترنت، كلية علوم الحاسب والالكترونيات، جامعة ساوثهمبتون

الهدف من الدراسة:

يهدف هذا الاستقتاء لدراسة مستوى تقديم الخدمات العامه للمواطنين في المملكة العربية السعودية، وتحديد ابرز العوائق العامه والتحديات في تطوير الخدمات العامة لرفع مستوى الخدمات المقدمة للمواطنين وتسهيل اجراءات التواصل مع الجهات المختصه بهذا الخصوص.
نتائج هذا الاستقتاء سوف تسهم في معرفة آراء المواطنين وحاجاتهم في الخدمات العامه التي تقدمها الحكومه، وذلك لغرض تطوير طرق حديثه

للتواصل والتبليغ عن مشاكل الخدمات العامه الموجودة في مكان اقامتك.

يرجى قراءة هذه المعلومات وطرح أي أسئلة قد تكون لديكم قبل الموافقة على المشاركة في الدراسة

إجراءات البحث:

في حال موافقتكم على المشاركة في هذه الدراسه ، يرجي اكمال الاستبيان الالكتروني التالي.
مشاركتك في البحث تطوعية، ويمكنك الانسحاب من الدراسة في أي وقت تشاء.
البيانات المشارك بها سوف يتم حفظها وحفظ خصوصية صاحبها.
هذا البحث يتطلب منك 10-15 دقيقة.

المشاركة:

إكمالك لهذا الاستبيان يعبر عن موافقتك للمشاركة في هذه الدراسة.
جميع المشاركات سوف تأثر في نتائج البحث، فلذلك نرجوا الدقه وتوفير وقت كافي لاجابة جميع الاسئلة الموجودة في الاستبيان

للاستفسار:
اذا كان لديكم اي تساؤل عن هذه الدراسة في الوقت الحالي او المستقبلي، ارجوا التواصل معي من خلال البريد الالكتروني التالي:
kmab1g14@soton.ac.uk

ولكم جزيل الشكر والتقدير

1. **Would you like to participate in this survey?** *

هل تود المشاركة في هذا الاستفتاء؟

Mark only one oval.

- ◯ Yes نعم — *Skip to question 2.*
- ◯ No لا — *Stop filling out this form.*

Section 1: Demographic Information

2. **What kind of the following devices do you use (For phone calls, Internet, etc.)?** *

أي من الاجهزة التالية تقوم باستخدمها (في استخدام الانترنت، المكالمات الهاتفيه، وغيرها)غالبا؟

Check all that apply.

- ☐ Smartphone هاتف ذكي
- ☐ Tablet جهاز لوحي
- ☐ Laptop كمبيوتر محمول
- ☐ Desktop كمبيوتر مكتبي
- ☐ None لاشيء

3. **Which of the following social media website\Applications do you use for communicating with others?** *

اي من مواقع التواصل الاجتماعي/التطبيقات التالية تستخدم ؟

Check all that apply.

- ☐ Twitter تويتر
- ☐ Facebook فيسبوك
- ☐ Google+ قوقل
- ☐ Youtube يوتيوب
- ☐ Linkdin لينكدن
- ☐ Instagram أنستقرام

القسم الاول : معلومات أساسية

4. **What is your age category** *

الفئة العمرية

Mark only one oval.

- 18 - 24
- 25 - 34
- 35 - 44
- 45 - 54
- 55+

5. **What is your gender?** *

هل أنت:

Mark only one oval.

- Male ذكر
- Female أنثى

6. **Do you have any disabilities ?** *

هل تعاني من اي اعاقة ؟

Mark only one oval.

- Yes نعم
- No لا

7. **Do you live in** *

هل تسكن في

Mark only one oval.

- The Capital city العاصمة
- One of the Main cities أحدى المدن الكبرى
- Provence محافظة
- Village قرية

8. **Where is your place of residency?** *

أين هو مكان إقامتك؟

Mark only one oval.

- Central Region المنطقة الوسطى
- Eastern region المنطقة الشرقية
- Western region المنطقة الغربية
- Northern region المنطقة الشمالية
- Southern region المنطقة الجنوبية

9. **What is your occupation** *

ماهي مهنتك

Mark only one oval.

- Student طالب
- Public sector employee موظف حكومي
- Private sector employee موظف قطاع خاص
- Unemployed عاطل عن العمل
- Retired متقاعد

10. **What is your field of work or interest** *

ماهو مجال العمل او الاهتمام؟

Mark only one oval.

- Health الصحة
- Education التربية والتعليم
- Economics الاقتصاد
- Politics السياسة
- Technology التقنية
- Engineering الهندسة
- Construction and Contracting المقاولات والبناء
- Administration الاعمال الادارية
- Agriculture الزراعة
- Industry الصناعة
- Other: .....

Section 2 : Public services

القسم ٢ : القسم الثاني : الخدمات العامة

11. **What are the availability of public services around your area of living (Within 3 miles from your house)** *

ما مدى توفر الخدمات العامة في منطقة الاقامة (في محيط ٣ كيلومترات من منزلك) ؟

Mark only one oval per row.

	Available متوفرة	Partially available متوفرة نوعا ما	Not available غير متوفرة
Schools المدارس			
Hospitals المستشفيات			
Streets الطرق المعبدة			
Public parks الحدائق العامة			
Water disposal system الصرف الصحي وتصريف الامطار			
Water supply system توصيل المياه			
Electricity supply system توصيل الكهرباء			

12. **Public services projects** *

مشاريع الخدمات العامة

Mark only one oval per row.

	Strongly agree أوافق بشدة	agree أ وافق	Neutral محايد	Disagree لا أوافق	Strongly Disagree لاأوافق بشدة
During the implementation of projects, in your area or the nearby areas, detailed information about the project is set at the project location أثناء تنفيذ المشاريع، في منطقتك او المناطق القريبه منك، يتم وضع معلومات واضحة ومفصلة عن المشروع					
A notice will be sent to nearby residents before the construction starts يتم تنبيهك بالمشروع الذي سوف يتم تنفيذه قبل البدء به					
Project delivered on the specified time يتم إنجاز المشروع في الوقت المحدد					
Implemented projects delivered with high standard and excellent quality المشاريع المنفذه تظهر بمواصفات عالية وبجودة ممتازة					
Health and safety plan is taken into account during construction work خلال تنفيذ المشاريع يتم الاخذ بقواعد الامن والسلامة					
The development of projects takes longer time to be delivered in compared with the final project quality تتطلب المشاريع وقتا أطول للتنفيذ بالمقارنة مع الجودة النهائيه للمشروع					
Procedures to request new service to be added in your area of living is easy من السهل طلب انشاء خدمات عامة في منطقتك عند القيام بتقديم طلب					
Do you think your request will be taken into consideration when apply to add new public service in your area بأعتقادك سوف يتم تلبية طلبك عند التقدم بطلب انشاء خدمة عامة في منطقتك					

13. **Public services maintenance** *

صيانة الخدمات العامة

Mark only one oval per row.

	Strongly agree أوافق بشدة	agree أوافق	Neutral محايد	Disagree لا أوافق	Strongly Disagree لاأوافق بشدة
Your area of living is constantly cleaned اعمال النظافة لمكان الاقامة تتم بشكل مستمر	◯	◯	◯	◯	◯
Road maintenance is done on an ongoing basis and perfectly يتم صيانة الطرق باتقان وبصورة مستمرة	◯	◯	◯	◯	◯
Road maintenance works don't cause any traffic jams أعمال صيانة الطرق لاتسبب أزمة مرورية	◯	◯	◯	◯	◯
Safety procedures are taking into the consideration during maintenance work يتم مراعاة إجراءات السلامه خلال أعمال الصيانة	◯	◯	◯	◯	◯
When you make a report to the competent authority, they respond to your request for maintenance in a reasonable amount of time (24 to 72 hours) (عند تقديم بلاغ لأحدى الجهات المختصه يتم تنفيذ طلب الصيانة بشكل سريع (٢٤ الى ٧٢ ساعه	◯	◯	◯	◯	◯
Maintenance work for General Services on a regular basis done across the regions اعمال الصيانه للخدمات العامه تتم بشكل دوري في جميع انحاء المناطق	◯	◯	◯	◯	◯
Streets shall be remain as they used to be after the completion of the development work by public utilitiy companies such as electricity and water الشوارع تكون كما كانت علية بعد الانتهاء من اعمال التطوير من قبل الشركات الخدمية مثل الكهرباء والماء	◯	◯	◯	◯	◯

Section 3: Public services issues reporting

القسم الثالث : البلاغات عن المشاكل في الخدمات العامة

14. **Have you ever reported an issue related to public services or requested to add a new services near your area of living?** *

هل سبق بان تقدمت بشكوى لاحد الجهات المختصه في صيانة الخدمات العامة او طلب توفير خدمة غير موجودة في منطقتك؟

Mark only one oval.

- ◯ Yes نعم
- ◯ No لا

15. **Reasons behind the ignorance of reporting public services issues by citizen** *

أسباب امتناع المواطنين عن الإبلاغ بمشاكل الخدمات العامة

Mark only one oval per row.

	Agree موافق	Neutral محايد	Disagree لست موافق
عدم معرفة قنوات التواصل مع الجهات المختصه Lack of knowledge of communication channels with the competent authority			
Unwillingness to get involved into governmental procedures and carry responsibility عدم الرغبة في خوض الاجراءات الحكومية وتحمل المسؤلية			
Unsuccessful previous experience تجارب سابقة لم تعطي تفاعل من الجهات المختصه			
Reporting an issue requires complicated procedures تعقيدات الإجراءات للتقدم بشكوى			
Giving less attention for individual request compared to frequent requests by individuals for the same issue اعطاء اهمية اقل لبلاغ فرد بالمقارنة مع البلاغات المتكرره من قبل افراد لنفس المشكلة			
I don't prefer sharing my personal information عدم الرغبة في مشاركة معلوماتي الشخصية اثناء تقديم البلاغ			

16. **Which of the following communication channels it deems appropriate and convenient** *

بار أيك اي من قنوات الاتصال التالية تراها مناسبة وتسهل عملية البلاغات

Mark only one oval per row.

	Effective فعالة	Ineffective غير فعالة
Approaching the concerned authority الذهاب للجهه المعنية		
Phone الاتصال الهاتفي		
email البريد الالكتروني		
SMS الرسائل النصية		
Social media websites مواقع التواصل الاجتماعية		
Smart phones application تطبيقات الهواتف المحمولة		

17. **When you report a non-emergency issue** *

عند تقديم بلاغ غير طارئ

Mark only one oval per row.

	Strongly agree أوافق بشدة	Agree أوافق	Neutral محايد	Disagree لا أوافق	Strongly disagree لا أوافق بشدة
Generally, local government will consider a citizen service requests بشكل عام، تعطى اهمية للبلاغات التي تقدم من قبل المواطن					
The participation of other citizens will support a request to add a new service to be accepted عند تقديم عدد من المواطنين بطلب اضافة خدمة جديدة سيسهم في تنفيذ الطلب					
Competent authority will give higher priority to a reported issue if they received frequent complaints from many citizens تعطي الجهة المختصة اهمية أكبر عند تكرار الشكوى من اكثر من فرد					
Local authorities call center will respond to your reported issue instantly يتم التجاوب مع البلاغ من قبل مستقبلي البلاغات بشكل سريع					
Reported issues will be fixed during short amount of time يتم حل المشكلة التي تم التبليغ عنها في وقت قصير					
Staff are professional and cooperative يوجد تعاون ومهنية من قبل موظفين استقبال البلاغات					
No one answer your call while you are trying to report an issue لايوجد رد على اتصالك الهاتفي اثناء قيامك بالتقدم ببلاغ					

18. **Recently, there is a significant adoption for e-government services** *

في الفترة الحالية يوجد اهتمام كبير من الجهات الحكومية لتوظيف الخدمات الالكترونية

Mark only one oval per row.

	Yes نعم	No لا	I don't know لا أعرف
Have you ever browsed the government websites هل سبق ان قمت بتصفح المواقع الالكترونية الحكومية			
Have you ever used one of the government mobile apps هل سبق ان قمت باستخدام تطبيقات الجوال الحكومية			
Do you know the available services in the government mobile application هل لديك معرفة بالخدمات المتوفرة في تطبيقات الجوال الحكومية			
Do you support the adoption of mobile apps as the method of communication and dispense the old communication methods هل تؤيد اعتماد تطبيقات الجوال كوسيلة للاتصال والاستغناء عن وسائل الاتصال القديمة			

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Appendix B “Potholes” Twitter hashtag analysis report

Summary	
Keyword	حفريات
Total audience	71667950
Contributors	5380
Total tweets	6001
Total potential impressions	100.459.253
Measured data from	2015-03-31 10:11
Measured data to	2015-09-12 18:07
Tweets per contributor	1,12
Impressions / Audience	1,40
Measured time in seconds	14284538
Measured time in minutes	238076
Measured time in hours	3968
Measured time in days	165
Tweets per second	0.000420105
Tweets per minute	0.025206275
Tweets per hour	1.512376529
Tweets per day	36.2970367

Geolocation:

Place (as appears on Bio)	Keyword Repetitions	Latitude	Longitude
Riyadh	96	24.68773	46.72185
Riyadh, Kingdom of Saudi Arabia	47	24.68773	46.72185
Saudi Arabia	34	24.68773	46.72185
Egypt	22	30.06263	31.24967
Riyadh,Jeddah /Saudi Arabia	21	24.68773	46.72185
Riyadh	20	24.68773	46.72185
Cairo, Egypt	18	30.06263	31.24967
Riyadh, Saudi Arabia	17	24.68773	46.72185
Jeddah	14	21.54238	39.19797
Jeddah, Makkah Al Mukarrama	13	21.4413315	39.5232047
jeddah	12	21.54238	39.19797
Cairo	11	30.06263	31.24967
Kuwait	8	29.36972	47.97833
Qatar	8	25.27932	51.52245
Egypt	8	30.06263	31.24967
Buraydah, Qassim	8		

Appendix B

Place (as appears on Bio)	Keyword Repetitions	Latitude	Longitude
Saudi Arabia - Riyadh	8	24.68773	46.72185
riyadh	8	24.68773	46.72185
cairo	7	30.06263	31.24967
EGYPT	7	30.06263	31.24967
Lebanon	6	33.88894	35.49442
jakarta	5	-6.21462	106.84513
egypt	5	30.06263	31.24967
لبنان	5	33.88894	35.49442
Amman	4	31.95522	35.94503
kuwait	4	29.36972	47.97833
Iraq	4	33.34058	44.40088
Dubai, United Arab Emirates	4	25.25817	55.30472
Alexandria, Egypt	4	31.21564	29.95527
London	4	51.50853	-0.12574
saudi arabia	4	24.68773	46.72185
Makkah Al Mukarrama, Kingdom of Saudi Arabia	4		
Saudi Arabia, Jeddah	3	24.68773	46.72185
bethlehem,Palestine	3	-28.23078	28.30707
NajraN .	3	17.4924	44.12766
Jordan	3	31.95522	35.94503
Gaza, Palestine	3	31.5	34.46667
Dammam	3	26.43442	50.10326
Riyadh, KSA	3	24.68773	46.72185
RIYADH	3	24.68773	46.72185
JEDDAH	3	21.54238	39.19797
Jeddah	3	21.54238	39.19797
Saudi Arabia Riyadh	3	24.68773	46.72185
Paterson, New Jersey	3	40.91677	74.17180999999999
Najran	3	17.4924	44.12766
Washington DC	2	47.50012	-120.50147
Jerusalem - القدس	2	31.76904	35.21633
New York, USA	2	53.958	-1.083
KSA - Riyadh	2	24.68773	46.72185
Saudi Arabia , Qassim	2	24.68773	46.72185
Germany	2	52.52437	13.41053
Ahsa, Eastern	2	25.31270786	49.56283194
Riyadh,Saudi Arabia	2	24.68773	46.72185
Saudi Arabia, Dhahran	2	24.68773	46.72185
Saudi Arabia / Riyadh	2	24.68773	46.72185
Seattle, WA	2	47.60621	-122.33207
Ramallah	2	31.89964	35.20422
Jubail Industrial City, Eastern	2		
Israel	2		
Saudi Arabia.	2	24.68773	46.72185

Place (as appears on Bio)	Keyword Repetitions	Latitude	Longitude
Bahrain	2	26.21536	50.5832
Dubai, UAE	2	25.25817	55.30472
jeddah	2	21.54238	39.19797
Saudi Arabia.jeddah	2	24.68773	46.72185
Doha, Qatar	2		
Riyadh.	2	24.68773	46.72185
Paris, Ile-de-France	2	48.85341	2.3488
Sharjah, United Arab Emirates	2	25.29854298	55.52526098
London, England	2	51.509	-0.126
Gaza	2	31.5	34.46667
jeddah	2	21.54238	39.19797
لبنان	2	33.88894	35.49442
Dammam, Eastern	2	26.43442	50.10326
Eastern, Kingdom of Saudi Arabia	2		
syria	2	33.5102	36.29128
Gaza-ps	2	31.5	34.46667
Jeddah	2	21.54238	39.19797
Saudi Arabia.	2	24.68773	46.72185
Turayf, Northern	2	31.6729131	38.6870828
Dhahran, Eastern	2	26.28864	50.11396
Riyadh	2	24.68773	46.72185
ABHA	2	18.21639	42.50528
Saudi Arabia - Hafralbatin	2	24.68773	46.72185
Alexandria	2	31.21564	29.95527
QATAR- DOHA	2	25.27932	51.52245
Saudi arabia	2	24.68773	46.72185
Melbourne	2	-37.814	144.96332
Riyadh, SA	2	24.68773	46.72185
Saudi Arab -ARAR	2	24.68773	46.72185
Tétouan - Morocco	1	35.57845	-5.36837
mansoura	1	34.86158	-1.33935
France	1	48.85341	2.3488
london	1	51.509	-0.126
Riyadh/Skaka/Dubai	1	24.68773	46.72185
K S A _ AR Riyadh	1	24.68773	46.72185
Jordan'ZaRqa	1	31.95522	35.94503
Riyadh..P.S.M.M.C	1	24.68773	46.72185
Ramallah, Palestine	1	31.89964	35.20422
Oman	1	23.61387	58.5922
IRAQ	1	33.34058	44.40088

Appendix B

Country list:

Country	Keyword Repetitions	Latitude	Longitude
Saudi Arabia	539	26.43442	50.10326
Egypt	103	30.06263	31.24967
United States	25	34.14778	-118.14452
Kuwait	23	29.36972	47.97833
Jordan	21	31.95522	35.94503
Lebanon	20	33.88894	35.49442
Qatar	18	25.27932	51.52245
United Kingdom	16	51.88921	0.90421
Palestinian Territories	13	31.89964	35.20422
United Arab Emirates	12	25.25817	55.30472
Australia	7	-37.814	144.96332
Oman	6	23.61387	58.5922
Iraq	6	33.34058	44.40088
Germany	5	52.52437	13.41053
Sudan	5	15.55177	32.53241
Israel	5		
Indonesia	5	-6.21462	106.84513
Syria	4	33.5102	36.29128
Morocco	4	34.01325	-6.83255
Spain	4	40.416	-3.703
Bahrain	4	26.21536	50.5832
South Africa	4	-26.26781	27.85849
Italy	4	41.89474	12.4839
Algeria	3	34.86158	-1.33935
Canada	3	49.24966	-123.11934
Pakistan	3	25.81308	68.42273
Yemen	3	15.35472	44.20667
France	3	48.85341	2.3488
Chile	2	-33.45694	-70.64827
Russia	1	55.75222	37.61556
Japan	1	35.6895	139.69171
Ireland	1	53.33306	-6.24889
Libya	1	32.87519	13.18746
Turkey	1	39.91987	32.85427
Mexico	1	25.8569	-99.61855
Benin	1	8.03424	2.4866
Brazil	1	-22.8375	-51.97306
Tunisia	1	36.81897	10.16579
Singapore	1	1.28967	103.85007
Congo - Kinshasa	1	0.49113	29.47306
Argentina	1	25.41273899	49.553809
Austria	1	47.80850381	13.04790922

Country	Keyword Repetitions	Latitude	Longitude
Switzerland	1	46.20222	6.14569

Appendix C Interview questions for the model evaluation

Below are the interview questions (IQ) used to guide the researcher through the conducted interviews:

IQ 1) How do public services projects monitored during the construction phase? Who is the organizations/teams responsible for monitoring public service projects during construction phase?

IQ 2) What methods are used for monitoring public services projects (E-tools, Websites, etc.)?

IQ 3) Does your municipality use technology for delivering its services? If yes, how?

IQ 4) What are the purposes for using social media by your municipality uses social media for?

IQ 5) What are the available communication channels between the local municipalities in Saudi Arabia and citizens?

IQ 6) How can citizens or residents report an issue in one of the public services projects? And what factors affect the speed of the response?

IQ 7) Do you think citizens could be helpful in monitoring public services projects? How?

IQ 8) What kind of information would local municipalities be able to share with citizens? A. The projects B. Reported issues

IQ 9) Please choose which of the following proposed components are important or not for the proposed model monitoring public services citizens and government of Saudi Arabia with help of ICT. The model is attached for clarifications.

Main Components of the proposed model		
Model components	Importance	Why
Government (Support and control procedures)	YES | NO	
Citizens (Support monitoring by report observations)	YES | NO	
Consultation (On citizens needs and new projects ideas and location)	YES | NO	
Deliberation (Future plans, budget spending, etc.)	YES | NO	
Petitioning (request new services and needs)	YES | NO	
Information provision (Make all information available for citizens such as project details, contractors, etc.)	YES | NO	
Transparency (provide future plans, budget, reported issues related to public services)	YES | NO	
Voting (Voting on reported issues, petition to support the request, or support thought)	YES | NO	

Appendix C

Proposed model May help to enhance the following components	
Transparency (all reported issues and decision available for anyone – This help citizens to understand why some projects are stalled or not started, etc.)	YES | NO
Spatial Planning (Better planning and utilizing in providing public services in most needed cities accurately (GPS support))	YES | NO
Community building (participants will have the ability to be grouped into different communities for the propose of enhancing public services project.)	YES | NO

IQ 10) Do you suggest to remove or add any new components form the proposed model?

Appendix D **Experts questionnaire for model confirmation**

Below are the survey questions distributed over experts working in Saudi municipality in Arabic version. While the English version is presented after.

دراسة إمكانية تعزيز التواصل ما بين المواطنين وحكومة المملكة العربية السعودية لرفع مستوى الخدمات العامة باستخدام تكنولوجيا المعلومات والاتصالات.

الباحث:

خالد بن محمد البراك
علوم الويب والانترنت، كلية علوم الحاسب والإلكترونيات، جامعة ساوثهامبتون.

الهدف من الدراسة:

يهدف هذا الاستفتاء لدراسة فاعلية نموذج مقترح من قبل الباحث، حيث يهدف هذا النموذج لمراقبة جودة الخدمات العامة في المملكة العربية السعودية وتسهيل التواصل الإلكتروني بين الأمانات والمواطنين.

يتكون النموذج المقترح من ١١ عنصر أساسي وهي كالتالي:

- الحكومة
- مشاركة المواطنين
- التصويت
- إتاحة المعلومات
- الاستشارات
- الساحات النقاشية
- البلاغات والمطالبات
- الطوارئ
- التخطيط المكاني،
- الشفافية
- بناء المجتمع.

إتاحة هذه العناصر وتقديمها في نموذج واحد سوف يسهم في تصميم أداة إلكترونية تهدف لتوظيف المواطنين وإشراكهم في العملية الرقابية للمساهمة في تحسين جودة الخدمات العامة.
الجهات والأفراد المعنيين في هذا النموذج المقترح هم الحكومة والمواطنين، حيث يتعين على الحكومة دعم المشاركة عبر الإنترنت من خلال توفير قنوات تواصل الكترونية رسمية ومعتمدة للمواطنين الى جانب تقديم معلومات عامة عن المشاريع الخدمية مثال ذلك (اسم المشروع، الموقع، الشركة المنفذة، تاريخ الانتهاء.. الخ) لتدعيم مبدأ الشفافية والذي يسهم بدوره في تحسين جودة مشاركة المواطنين في قنوات التواصل الالكترونية المعتمدة.
دور المواطنين في قنوات التواصل الالكترونية المعتمدة يتم تلخيصه في أربع نقاط رئيسية:

1. تقديم البلاغات والمطالبات.
2. المشاركة في الاستشارات.
3. المشاركة في الساحات النقاشية.
4. تقديم طلبات حالات الطوارئ.

وبالإضافة إلى ذلك، إتاحة خاصية التصويت للمواطنين، وذلك على البلاغات والمطالبات العامة أو الأفكار والمقترحات المقدمة من قبل مواطنين آخرين للمساهمة في تحديد الأولويات في إنشاء وتقديم الخدمات العامة.
وبالتالي، فإن نتيجة هذا النموذج سوف تسهم في تحسين التخطيط العمراني المستقبلي بناء على احتياجات المواطنين الفعلية الى جانب بناء المجتمع من خلال زيادة وعي المواطنين وخلق مجتمعات مصغرة مهتمة في مجالات متعددة ذات صلة بتطوير الخدمات العامة واخيرا، زيادة مستوى الشفافية لدى الأمانة من خلال إطلاع المواطنين على البلاغات المقدمة ومؤشرات الأداء الى جانب المشاريع المنجزة والمتعثرة.

نتائج هذا الاستفتاء سوف تساعد في معرفة آراء الخبراء والتي سوف تسهم بدورها في تأكيد عناصر النموذج المقترح.

** للاستفسارات ارجوا التواصل من خلال البريد الالكتروني : kmab1g14@soton.ac.uk

مطلوب*

1. **أوافق على المشاركة في هذا الاستبيان** *
   حدد دائرة واحدة فقط.
   - نعم *التخطي إلى السؤال 2*

معلومات عامة

2. **الفئة العمرية؟** *
   حدد دائرة واحدة فقط.
   - ١٨ ـ ٢٥
   - ٢٦ ـ ٣٥
   - ٣٦ ـ ٤٥
   - ٤٦ ـ ٥٥
   - ٥٦ وأكثر

3. **في أي قسم إداري تعمل؟** *

4. **المسمى الوظيفي ؟** *

5. عدد سنوات الخبرة؟ *

حدد دائرة واحدة فقط.

- ١ - ٣ سنوات
- ٤ - ٥ سنوات
- ٦ - ١٠ سنوات
- ١١ - ١٥ سنة
- ١٦ سنة وأكثر

إلى أي مدى توافق على النقاط المذكورة أدناه:

القسم الأول : الحكومات أو الأمانات

6. ١- سعي الحكومات لتوفير قنوات تواصل الكترونية معتمدة بينها وبين المواطنين. *

حدد دائرة واحدة فقط.

	1	2	3	4	5	
لا أوافق بشدة	◯	◯	◯	◯	◯	أوافق بشدة

7. ٢- سعي الحكومات لإتاحة المعلومات العامة عن المشاريع الخدمية للمواطنين إلى جانب الخطط المستقبلية والميزانية العامة *

حدد دائرة واحدة فقط.

	1	2	3	4	5	
لا أوافق بشدة	◯	◯	◯	◯	◯	أوافق بشدة

إلى أي مدى توافق على النقاط المذكورة أدناه:

القسم الثاني: مشاركة المواطنين

8. ١- إتاحة قنوات التواصل الالكترونية المعتمدة للمواطنين، للمشاركة فيها وتفعيل دورهم في العملية الرقابية *

حدد دائرة واحدة فقط.

	1	2	3	4	5	
لا أوافق بشدة	◯	◯	◯	◯	◯	أوافق بشدة

9. ٢- استخدام الحكومات لقنوات التواصل الالكترونية المعتمدة من أجل طرح المشاريع الخدمية للمواطنين قبل اعتمادها وبدء العمل على تطبيقها، لتفعيل مبدأ الاستشارات، من خلال المشورة في الطريقة المثلى لتطبيقها بما يلائم تطلعاتهم وتضمنها لكافة احتياجاتهم، مثال (قبل البدء في إنشاء حديقة عامة يتم طرح استبيان للمواطنين للأخذ بآرائهم في العناصر الأساسية لإنشائها كمعرفة الموقع الأنسب وماهي الخدمات الإضافية المقترح إنشاؤها مثال ذلك ساحة لألعاب الأطفال والمقاهي.. الخ) *

حدد دائرة واحدة فقط.

	1	2	3	4	5	
لا أوافق بشدة	◯	◯	◯	◯	◯	أوافق بشدة

10. ٣- إتاحة الساحات النقاشية الإلكترونية للمواطنين من خلال قنوات التواصل المعتمدة لطرح أفكارهم ومقترحاتهم ومناقشة الأفكار المستقبلية *

حدد دائرة واحدة فقط.

	1	2	3	4	5	
لا أوافق بشدة	◯	◯	◯	◯	◯	أوافق بشدة

11. ٤- إتاحة تقديم البلاغات والمطالبات العامة من خلال قنوات التواصل الإلكترونية المعتمدة بناءاً على آلية واضحة ومعتمدة من قبل الأمانة *

حدد دائرة واحدة فقط.

	1	2	3	4	5	
لا أوافق بشدة	◯	◯	◯	◯	◯	أوافق بشدة

٥- إتاحة تقديم البلاغات الطارئة للمواطنين والتي تهدف للحصول على أولوية في التفاعل مع المشكلة خلال وقت قياسي *

د دا ة وا ة .

٦- إتاحة خاصية التصويت للمواطنين على البلاغات والمطالبات العامة أو الأفكار والمقترحات المقدمة من قبل مواطنين آخرين *

د دا ة وا ة .

إلى أي مدى توافق على النقاط المذكورة أدناه:

القسم الثالث: نتائج تطبيق عناصر النموذج الالكتروني

١- تطبيق النموذج المقترح قد يسهم في تحسين التخطيط العمراني المستقبلي بناء على احتياجات المواطنين الفعلية *

د دا ة وا ة .

٣- تطبيق عناصر النموذج المقترح قد يسهم في خلق مجتمعات مصغرة مهتمة في مجالات متعددة ذات صلة بتطوير الخدمات العامة *

د دا ة وا ة .

٤ -تطبيق النموذج المقترح سوف يسهم في زيادة مستوى الشفافية لدى الأمانة من خلال اطلاع المواطنين على البلاغات المقدمة ومؤشرات الأداء إلى جانب المشاريع المنجزة والمتعثرة *

د دا ة وا ة .

Google Forms

Appendix D

Questionnaire English version:

Research Information Sheet

Title of study: Using ICT: A proposed model for reducing the gap between citizens and governments toward enhancing public services: Case of Saudi Arabia

Principal Investigator (PI): **Khalied Al Barrak**

Web and Internet science, ECS, University of Southampton

Purpose:

You are being asked to be in a research study that is being conducted at University of Southampton. This study about confirming a proposed model for monitoring the quality of public services in Saudi Arabia in order to facilitate the e-communication between the citizen and the government for the purpose of enhancing public services.

The results of the survey will help to explore the experts' opinion to confirm the proposed monitoring model components.

The proposed model mainly consists of 11 components which are Government, Citizens participation, Voting, Information provision, Consultation, Deliberation, Petitioning, Emergency, Spatial planning, Transparency and Community Building.

Involving those components may provide an improved way for design an online tool for the purpose of citizens engagement to enhance public service quality and the delivery of public services in more convenient approach.

The main stakeholders in the proposed model are the government and citizens, where the government is required to support online participation by offering official communication channels for citizens (beside allowing transparency) and providing general information about public services projects. The citizens role is by participating in online petitioning, deliberation, consultation, or submit an emergency request. In addition, citizens will have

the ability to vote on others' reported issues, ideas and submitted suggestions. Thus, result of this model may enhance the spatial planning and community building which may result in enhancing the overall quality of public services projects

Please read this form and ask any questions you may have before agreeing to be in the study.

Study procedures:

If you agree to take part in this research study, you will be asked to complete an online survey related to this study.

This study is entirely voluntary, so you may withdraw at any time. Your responses will be kept confidential. There is no compensation for your participation. 10-15 minutes are needed to complete the survey. The survey will ask you to provide some basic demographic information. Also, it seeks your opinion about the proposed model components. The survey must be completed in one sitting; it cannot be saved and continued in later time.

Questions:

If you have any questions about this study now or in the future, you may contact me at the following email kmab1g14@soton.ac.uk .

***We seek the accuracy in your feedback as it will affect the results of this study**

Your participation is highly appreciated

Section 1: Demographic Information						
1	***Age category***	18 to 25	25 to 35	35 to 45	45 - 55	55 and more
2	***Department***					
3	***Job Title***					
4	***Experience***	1 year - 3 years	3 years - 5 years	5 years- 10 years	10 years - 15 years	15 and more

Appendix D

Section 2: Proposed Model							
Component		***To what extent do you agree with the following?***	***Strongly agree***	***Agree***	***Natural***	***Disagree***	***Strongly disagree***
1	***Government***	Governments support to provide an official communication channels between municipalities and citizens					
2	***Citizens***	Involvement of citizens to activate their role during the monitoring process to improve the quality of public services through the official communication channels.					
3	***Consultation***	Using the official communication channels to list public services projects for citizens prior to launching and start working on these projects to activate the concept of consultation to know the best way to apply and build these projects based on their needs and requirements.					
4	***Deliberation***	Provide official forums for citizens through the official communication channels to present their ideas, suggestions and discuss future ideas.					
5	***Petitioning***	Allowing citizens, the ability to submit their needs or issues through the official communication channels which may facilitate the process of communication and interaction.					
6	***Emergency***	Beside the petitioning, provide a special case of requests called "Emergency" to gain a high level of priority and having an immediate response based on the submitted request.					
7	***Information provision***	Provide general information about public services projects to citizens (i.e. Project name, project location, contractor name, project's delivery date ... etc.) in order to increase the transparency level to have effective participation and interaction in consultation, Petitioning and deliberation by citizens.					

8	***Transparency***	Achieving the transparency by making the future plans, budget and reported issues available for effective involvement of citizens during the monitoring process.					
9	***Voting***	Allowing citizens voting on the reported issues, proposed ideas or submitted suggestions may help to prioritized the before mentioned points.					
10	***Spatial planning***	Help municipalities to improve future spatial planning based on the actual needs of citizens.					
11	***Community Building***	Increase the awareness of citizens and create miniature communities which interested in multiple related areas of public services development.					

Appendix D

Appendix E Experts interview questions for defining the challenges

Below are the interview questions used to guide the researcher through the conducted interviews:

- IQ1: Describe your current position, years of experience, and responsibilities?
- IQ2: What department you are working in?
- IQ3: What are the online tools available in your municipality used to communicate with citizens? i.e. Mobile app, website, phone, etc.?
- IQ4: What are the main activities a citizen may perform through the provided tools? Report issues, provide ideas, submit a suggestion?
- IQ5: What are the challenges raised by using these communication channels?
- IQ6: What are the challenges facing the Municipality during the planning and implementation of the new system?
- IQ7: Do you think the proposed model from this research can contribute overcoming the existing challenges of the current solutions?
- IQ8: What are the challenges that might raise if the proposed model will be implemented?

Appendix E

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