Towards a Model for Monitoring Public Services Projects in Saudi Arabia

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Abstract: Information and communication technology (ICT) has been adopted by many governments around the world in the form of e-government to facilitate service delivery to the public. Saudi Arabia is an example of such a country that has adopted technology with these aims, but there is a failure in enabling the engagement of citizens with government to deliver public services projects with assured quality standards. The failings are blamed on the system's lack of support for stakeholder oversight. In light of these inadequacies, more effective monitoring of project construction and project implementation is required in order to improve public service quality 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 applied 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 lifecycle. This paper proposes a conceptual model to facilitate citizens in monitoring the quality of public services and the progress of public service projects. It is designed based on an in-depth analysis of the available systems on the market, e-participation studies and theoretical work presented in the literature. The paper also recommends technologies and features that will facilitate the implementation of the model in different contexts.

Keywords: ICT4D; Citizen science; E-participation; Web technology; Public services.

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 have 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.gov.sa, 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 (Al Dhoky, Faisal Al Zahrani 2014; AlMouasi, 2014; Government Report, 2013), such as 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). Further still, 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):

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

- Fraud by unregulated contractors.

The use of technology and the power of citizen participation may contribute positively to public service quality by providing a reliable source of feedback. This 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 services 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 that will benefit all stakeholders (Clay, n.d.; Hansen & Reinau, 2006; Villena-román & Luna-cobos, 2014). Thus, this paper suggests a model for monitoring public services and makes recommendations regarding features and technologies that will be required to implement the model, such Internet and Communication Technologies and Reporting tools (Mobile Application and Web Application, Social media website).

2. Public service project issues and management concerns

Public service has been defined as "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). 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 (World-psi.org, 2015).

Internationally, there are two different approaches that public authorities can choose from when it comes to the management of public services (European Parliament, n.d.; Ministry of Municipal and Rural Affairs, n.d.):

- ***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 using this approach. In this scenario, the public service mission and details of obligation to that effect will be 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 1). 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. The project will be posed as a public tender for construction companies registered in 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.

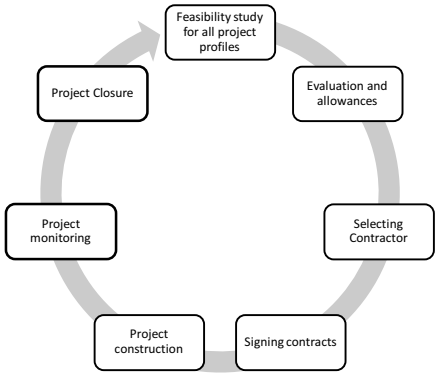

Figure 1: Overview of public services project life cycle

2.1 Issues with Saudi Arabia's Public Services:

Saudi Arabia government, like many countries, is responsible for providing public services to their citizens. However, it struggles to deliver many public services that comply with minimum quality standards.
Mohammed Sheriff, head of the Anti-Corruption Commission in Saudi Arabia, has identified significant reasons behind the frequency of project failure and low quality of service delivery (Al-Sibai, 2011). He argues that a lack of supervision during the construction phase of a project and the inefficiency of final Committee members are key problems in the public service framework as any issues or shortcomings of a project are not identified at an early enough stage for remediation measures to be taken. Thus, it is clear that the main issue lies in the final two stages of the project lifecycle (Figure 1).

3. The adoption of web technology 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 they require (Gupta et al., 2008). In addition, some independent organisations have begun to provide tools for the public services sector, such as FixMyStreet, SeeClickFix that 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 these technologies and how they could potentially accelerate national development. Most of the Gulf countries such as Saudi Arabia and the United Arab of Emirates, have adopted ICT in order to offer their citizens effective e-Government services.
However, the use of ICT should be expanded in order to further increase citizen engagement and transparency. The local government of AlMadinah AlMonorah, Saudi Arabia has established "Adaa" programme in 2014, a web application which ensures transparency in terms of budget spending and the constriction of public services (Adaa.mda.gov.sa, 2014). However, there is still a clear lack of engagement with local citizens. The next section of this paper will provide an overview of "Adaa", FixMyStreet and SeeClickFix.

3.1 Adaa system

Figure 2: Snapshot for a project summary of Adaa web application

The aim of the Adaa programme for Almadinah Almonorah[1] 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

[1] 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 an area of 151,900 km² (stats.gov.sa)

organisations. In addition, the Adaa programme, in the near future, will invite participation from the private sector (Adaa.mda.gov.sa 2014).
Adaa web application provides a series of functions and a graphical user interface that allows projects 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 restriction; 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 (2) shows a snapshot for a project summary from Adaa that include project name, starting date, end date, budgeting and spending, contractor, project location and the status of the project. The main functionalities of the 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.

While the implementation of the Adaa program may have improved the monitoring of public services in AlMadinah AlMonorah, the researcher inspection of the website finds there are still many issues associated with this system that must be addressed as follows:

- 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 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 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 tools (with some modifications) may be an effective way of resolving most of the above issues.

3.2 Summary of public services monitoring systems

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 nonemergency issues in the region. FixMyStreet and SeeClickFix are the leading web applications in this field and have the same aim of the present research study but use a different approach. FixMyStreet, for example, has been operational since 2007 in the UK (Crowley et al., 2012; The Charity MySociety, n.d.). 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 of these tools are somewhat similar in terms of how they work in reporting an issue (Berkowitz & Lasater, 2008; Sjoberg et al., 2015; The Charity MySociety, n.d.). The main steps to reporting an issue are as follows:

- 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).

The below table presents the main features and major differences between FixMyStreet and SeeClickFix. The categorisation of the comparison is based on the analysis of the aforementioned systems and the identification

of common features. Section 6 recommends a list for the main common features that can be used for the proposed model implementation.

Table 1: Comparison of FixMyStreet and SeeClickFix

	FixMyStreet	*SeeClickFix*
User interface: For Citizens	Website/Mobile App	Website/Mobile App
User interface: For Councils	Receives reports in form of Emails or a directly integrated system with council	Integrating Customer relationship management system and Mobile App
Citizen Privacy	All reports are public but you can hide your email and contact info. However, councils can still access this data.	All reports are public but you can hide your email and contact info. However, councils can still access this data.
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	Items that are broken, dirty, damaged, or dumped, or 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 regarding the health of citizens and communities
Voting on reports	No	Yes
Accessing reports/Open Data	Available to view but without a data exportation 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 closing a report; however, you have to be registered or confirm your comment using a link sent to user email	Not available, users not even required to be at the physical location of the issue when closing a report; however, you have to be registered or confirm your comment using a link sent to user email
Functionalities	- Auto detect location maps view - Upload photos, profile for registered users - Reports history for registered users--Find nearby issues close to your problem	- Auto detect location maps view - Upload photos or video, profile for registered users - Report history for registered users - Find nearby issues close to your problem - Watch areas and real-time news about your 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
Tracking 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
Duration to fix a problem	Not specified or estimated. Many problems have been open for months	Many issues have been closed; specified as either closed or open for a very long time

4. Citizen participation

Citizen participation aims to utilise community members for decision-making purposes and for influencing institutions and services related to them as it employs citizens' skills and observations to enhance community conditions and overall public service quality (Florin & Wandersman, 1990).There are a variety of ways in which

an individual may participate, such as by performing on an advisors or consultants committee, influencing municipal policies, developing local activities or instigating social movements. In effect, citizen participation provides a positive addition to government on a national, local, interpersonal and personal level. In addition, citizen participation has a significant impact on improving local conditions in the community (Wandersman, Abraham Heller et al., 1984).

The leverage of technology, Web 2.0 specifically, has empowered the means by which citizens interact with the political and administrative sphere in the form of e-participation. The term e-participation focuses on the relationship between citizens and the political sphere and advocates the need for citizens and administration to introduce a new communication channel for increased participation (Le Masson & Al-Yahya, 2014; Sæbø et al., 2008).

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 conducted research 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)

- ***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 by engaging citizens through an e-consultation system. This has been done by informing 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 citizens and 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). As it aims to enable the implementation of open-platforms based on citizen-centric and internet-enabled services in different cities to stimulate citizen engagement to be more content creators, informed and involved users.

- ***Petitioning:***

This is a formal request signed by a number of citizens about issues related to them. ICT will support petitioners in disseminating information about the issues and will 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, signing petitions. In addition, posting background information, and joining discussion forum. More details are provided in (Macintosh et al. 2002).

- ***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; Xenakis & Macintosh, 2005).

- ***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 to formulate strong arguments (Ergazakis et al., 2011).

- ***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 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).

- ***Community Building:***

Community building is achieved by formulating a group of individuals from the same regional area who share common characteristics to enhance 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).

5. E-MPSP: proposed model for e-monitoring public services projects

The E-MPSP model (e-monitoring public services projects) has been devised based on the key citizen participation concepts identified above along with the analysis of the benefits and drawbacks of existing systems in the final two stages of the Public service projects lifecycle shown in Figure 1). This model captures and inherits several of the features available in existing public services monitoring systems, such as Adaa, FixMyStreet and SeeClickFix . In addition, it combines some of the existing concepts in applied areas and forms of e-participation, which include Consultation, Deliberation, Petitioning, Voting, Spatial planning, Information Provision and Community Building. It provides an improved way for design web-based application for the procurement and delivery of public services.

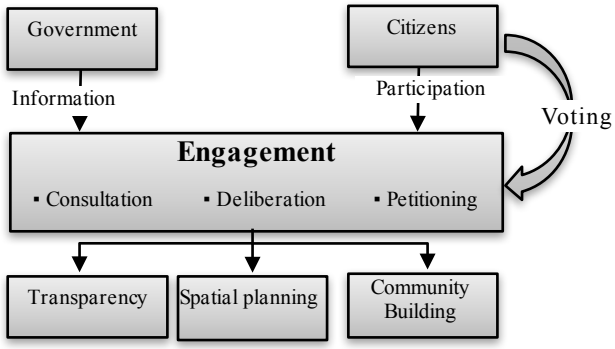

Figure 3: Illustration of the main factors of the proposed model and their relationship

Figure 3) illustrates the main factors that helped to build the proposed model. Both the Government and citizens play individual roles in achieving a high level of engagement. This model provides citizens with proper information to ensure effective participation as they are invited to express their opinions (Consultation), discuss public concerns (Deliberation), request services (Petitioning) or support any participant or request by voting. Improved engagement could improve spatial planning, community building and ensure a higher level of transparency.

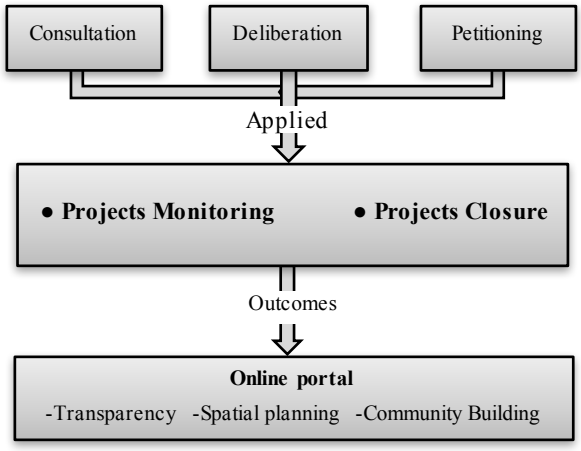

Figure 4: Relationship between e-participation forms, main issues and outcomes.

As mentioned earlier, 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 (Consultation, deliberation and petitioning) as shown in Figure 4), the outcomes achieved will result in better transparency, spatial planning and community building. Figure 5) presents a detailed model

that shows the different possible interactions between different parties involved in the engagement process for monitoring public services. The highlighted boxes indicate the important components for the main interactions and outcomes.

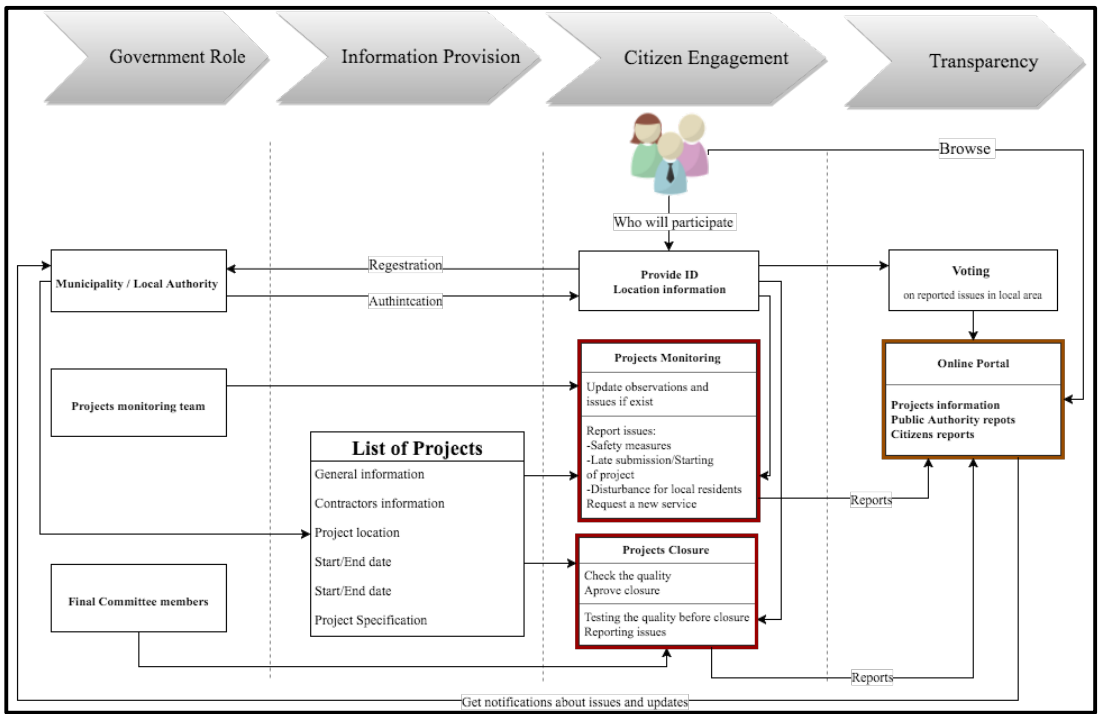

Figure 5: Conceptual Model for monitoring public services projects

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

5.1 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.

5.2 Information provision role

This will ensure that citizens are kept informed about all public services projects. This will enable citizens to have the required knowledge prior to reporting any issue with public services projects or making an official complaint/argument.

5.3 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 projects delays or setbacks; they can also request a service, take safety measurements, or report on the disturbance of 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 services projects for governments, politicians and citizens.

5.4 Transparency role:

Any citizen using electronic devices, such as Mobile phones or Tablets, can openly access all the generated content from phase two and three. 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. In addition, the high usage of mobile technology and Internet in Saudi Arabia (Ministery of Communications and Information Technology n.d.) 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. Recommended technologies for the model implementation:

Based on the analysis of the systems presented in section 2, 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 to developed web page that offers access to all content generated in relation to public services projects and submitted reports. Further still, it is advised that such data be made accessible to everyone, even non-registered users.
The features of the tool should 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 attached photos and videos while reporting issues by citizens.
- A comment posting function for supporting citizens' views via the before mentioned 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 user's location in order to navigate 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.

The result will be a tool that improves the procurement and delivery of public services by incorporating a wider set of concerns that have been reported in the literature.

7. Conclusion and future research recommendations

Information and communication technology (ICT) has been adopted by many governments for delivering public services in the form of e-government. E-government offers citizens the opportunity to communicate with the government quickly and conveniently through e-participation, which appears in a variety of forms and areas. However, the lack of monitoring quality of public services and project construction has not been addressed.
Therefore, this paper proposed a model for monitoring public services projects based on the utilisation of citizens' reports and feedback on the quality of public services projects. Some e-participation areas and applied forms were included in the model, namely petitioning, deliberation and consultation. In addition, this model advocates the use of voting as an indicator of how strongly citizens agree or disagree with various issues or proposals. If this applied and utilised effectively, the outcomes of the model may enhance transparency, spatial planning and community building, which may in turn enhance overall public services quality and help address the current problem that faces the Saudi Arabian public sector. The future work will focus on validating the model throughout acquiring experts reviews and surveying citizens in order to investigate if any further components should be included for the benefit of local municipalities or stakeholders and government agencies.

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