



# **Building a tool to extract data from users and potential users of e-government**

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**ABSTRACT:** The demand to extract data about e-government users and potential users by the decision makers is increasing day by day. They need to know more about citizens' attitude, skills, and willingness to use e-government online services to segment citizens into different groups and build the citizens' profiles. Inspired also by the low rate of use of online government services, a tool was constructed and tested to address this gap. The tool is intended to extract the required data from the existing users and potential users of e-government. It will also determine the key factors with highest impact on e-government use and satisfaction, in order to select those elements that should be prioritized for improvement. The possible level of analysis and knowledge gained using this tool will also be shown. The tool focuses on: discovering the gap between interests in e-government (including attitudes, preferences and intentions to use) and actual use of e-government; the ability to use e-government; user satisfaction with e-government and future e-government developments (motivators and barriers for future use). The tool showed a high reliability score. Moreover, the tool is clear, easy to use and cost effective. The results of analysed data showed that the extracted data was meaningful, current, and accurate. It will help the decision makers to understand the users' abilities and requirements, and improve the online services of e-government.

**KEYWORDS:** e-government, tool, user profile, potential users, online services

## **I. INTRODUCTION**

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Extracting data about e-government users and potential users by the decision makers is increasing day by day. They need to know more about citizens' attitude, skills, and willingness to use e-government online services to segment citizens into different groups and build the citizens' profiles. Inspired also by the low rate of use of online government services, a tool was constructed and tested to address this gap. The tool is intended to extract the required data from the existing users and potential users of e-government. The tool is aimed to extract the useful data directly from the target citizens. Extracting this kind of data from the social networks or the internet usage will not help in this situation. The reason is that, most of the users registered in the social networks using fake data. In addition we cannot get a clear picture of the user's skill or willingness to use e-government.

To understand the proper role of information systems in e-government field, we have to consider e-government as many information systems integrated together. We should also realize that a good decision about releasing any e-government service required data and information to support the design of e-government information system. One can then determine how much the information systems are valuable tools to serve the citizens at different levels of their day to day activities, and how these information systems should be organized. The decision makers need information about the people whom they are serving. These information act as the nerve center for the organization, receiving the latest, most concrete, most up-to-date information and redistributing it to those who need to know more information about users. Much work needs to be done in broadening the impact of systems on government organization and



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citizens' lives. One of the important necessities for designing any information system either for e-government or any other field is to develop the user profile.

A profile is a description of specific person or thing containing the most important or interesting facts [21]. The purpose of creating user profile is to capture the needs, goals, values, expectations and habits of users into well-defined user groups. The purpose of getting user profiles is also different for the various areas that use them. In adaptive systems, the user profile is used to provide the adaptation effect, which is to behave differently for different users [2]. In intelligent tutoring systems, the user profile or student model is used to guide students in their learning process according to their knowledge and learning styles [7].

The content of a user profile varies from one application domain to another [21]. For example, if we consider an online calendar management domain, the user profile contains information about the dates and times when the user usually schedules each type of activity in which he is involved, the priorities each activity feature has for the user, the relevance of each user contact and the user's scheduling and rescheduling habits. In other domains, personal information about the user, such as name, age, job, and hobbies might be important [21]. In knowledge management systems, the skills a user or employee has, the roles he takes within an organization and his performance in these roles are used by managers or project leaders to assign him the job position that suits him best [22]. In the context of e-government, user profiling gives governmental organizations tremendous possibilities for their e-government strategies. Fully personalized portals, for example, provide citizens with specifically those services they need, thereby increasing citizen satisfaction levels [15]. In e-government domain, User profiling or audience analysis is figuring out who uses—or should use— your website, what information and services they need, which tasks they must complete, what are their abilities to use internet and what are their attitudes to access government information and service online. Any government agency should have the goal of building the right e-services for the people who need it, not for stakeholders who may have other objectives. To achieve the goal of providing excellent web services, one must learn as much as he can about citizens or users and what they do, and should be able to communicate this effectively to management. With the information gained from audience or user analysis, it is easy to develop a good and usable service. User profiling has also additional objectives; it gives those organizations offering electronic services the possibility to gain insight into the behaviour of individual users and influence them at the same time [15].

Capturing the profile of potential users of e-governments' services is important to understand the information needs of the target audience to help tailor online services for specific user groups. Not only the content of user profile differs from one domain to another, but also how the information needed is acquired. To build a user profile, the information needed can be obtained explicitly, that is provided directly by the user, or implicitly, through the observation of the user's actions [21].

There are number of research methods used to gather information about audience and their interaction needs and preferences. The investment required to implement these research activities will depend on time, resources, costs, scope, size and the risk profile of the website [8]. Each of these methods can use formal and informal approaches. However it is vital that some investigations are done into who might use a website and what they might want to do there. Table shows the user's research methodology to collect data about users and provides details of their strength, weakness and resource requirements. For the scope of present research it was decided to build a new data set that can be used for this study. In order to collect random primary data from the target population, a questionnaire tool was considered to be the most appropriate primary survey instrument for this study, because it addressed the issue of reliability of information by reducing if not eliminating differences in the way that the questions were asked [4] and facilitates the collection of data within a short period of time from the majority of respondents [9]. A questionnaire is a method (Method: this means that a questionnaire is a tool to be used rather than an end in itself or a work of modern art) for the elicitation (Elicitation: a questionnaire may bring out information from the respondent or it may start the respondent thinking or even doing some work on their own in order to supply the requested information [11]). In any case, a questionnaire is a device that starts off a process of discovery in the respondent's mind, recording, and collecting information. The questionnaire tool is inexpensive, less time consuming and has the ability to provide both quantitative scale and qualitative data from a large research sample [13]. It can also find subjective user preferences; provide countable data and high quality human response feedback [8].

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The aim of the present work is to design a tool to extract data from citizens. This data can be used for many purposes like segmentation and building the user profile of potential user of e-government, where there is no data set or other source of data available except the user himself.

Table 1 Methods of building user profile[8]

Method	Strengths	Quality of Results	Weakness	Resources Required
Usability test metrics, qualitative feedback	<ul style="list-style-type: none"> <li>Pinpoints users' misconceptions</li> <li>Comfortable for users</li> <li>finds user preferences</li> </ul>	<ul style="list-style-type: none"> <li>Medium quality human response feedback</li> <li>Medium quality technical feedback</li> </ul>	<ul style="list-style-type: none"> <li>Does not show technical problems</li> </ul>	<ul style="list-style-type: none"> <li>8-15 users per group</li> <li>2+facilitators/observers</li> </ul>
Questionnaire tool and Surveys	<ul style="list-style-type: none"> <li>Find subjective user preferences</li> <li>Provide countable data</li> </ul>	<ul style="list-style-type: none"> <li>High quality human response feedback</li> <li>Low quality technical feedback</li> </ul>	<ul style="list-style-type: none"> <li>Indirect method: low validity</li> <li>Needs good recall to be significant</li> </ul>	<ul style="list-style-type: none"> <li>No conclusive data on numbers</li> <li>2+facilitators and observers</li> </ul>
Interviews and Focus Groups	<ul style="list-style-type: none"> <li>Find subjective user preferences</li> <li>Spontaneous reactions</li> <li>Group dynamics</li> </ul>	<ul style="list-style-type: none"> <li>High quality human response feedback</li> <li>Low quality technical feedback</li> </ul>	<ul style="list-style-type: none"> <li>Hard to analyse subjective data</li> <li>Appointments can be hard to set up and participants fail to turn up</li> <li>Group dynamics</li> </ul>	<ul style="list-style-type: none"> <li>6-12 per focus group</li> <li>30+interviewees</li> <li>2+ facilitators and observers</li> </ul>
User Website Feedback	<ul style="list-style-type: none"> <li>Finds subjective user preferences</li> <li>Spontaneous reactions</li> </ul>	<ul style="list-style-type: none"> <li>Medium quality human response feedback</li> <li>Low quality technical feedback</li> </ul>	<ul style="list-style-type: none"> <li>Not a good representation of the user population</li> <li>Hard to analyse subjective data</li> </ul>	<ul style="list-style-type: none"> <li>2+ analysts</li> </ul>

In the present work initially a tool will be built which will help to:

- Establish the extent of access to computer and internet.
- Understand the web behaviour of the citizens, the internet usage and the ability to use the.
- Find out the purposes of using the internet among respondents.
- Establish the level of awareness of e-government.
- Establish the level of interest in using e-government.
- Identify the most desired e-government services.
- Identify the type of interaction with e-government.
- Discover the gap between interests in e-government (including attitudes, preferences and intentions to use) and actual use of e-government.

## II. METHODOLOGY

Approaches like [20][11][24]were adopted to develop and test the tool. The approaches can be divided into two stages: proposing the important dimensions and item generation for each dimension. Each stage has several steps as illustrated in Table 2.

Table 2 Steps in developing questionnaire tool.

Questionnaire tool development	Key issues
What will the tool measure?	Knowledge; Attitude /beliefs/intention Cognition; Emotion; Behaviour; willingness
What types of scale can be used?	Frequency, Likert type, Multiple choice
How do I generate items for my tool?	Ensure relevance of items? Wording issues Which response format is best? Which types of questions are possible? Does your measure have subscales? Questionnaire layout.
Piloting the tool: Item analysis	Spread of responses across options; Initial psychometric analysis; Clarity and relevance of items; Items deemed theoretically important; Is your measure affected by social desirably bias?
Reliability	Internal consistency; Test–retest; Inter-observer
Validity	Face or content, Concurrent or discriminate, Predictive

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The first stage was started by proposing the important dimensions of information and recommended attributes that are need to be captured during profiling. Hence four focus groups with experts from four different areas were done. The proposed dimensions to experts from e-government area, e-commerce, computer science and management were presented. The dimensions were reviewed and refined in four rounds to arrive at the final conclusion. The tool was divided into following seven dimensions: access; awareness; web behaviour; attitude towards the use of e-government; barriers of using government websites; demand of e-government services and demographic data. The dimensions and the attributes to be captured are presented in Table 3.

Table 3 Dimensions of the tool.

Dimensions	Attributes to be captured	Items
1. Access	• Access and availability of Computer and internet.	Item No. 1
2. Web behaviour	• Internet usage (time).	Item No. 2
	• Experience or skills.	Item No. 3
	• Purpose of using internet.	Item No. 4
3. Awareness	• Awareness of e-government.	Item No. 5
	• Source of awareness.	Item No. 6
4. Attitude towards e-government	• Willingness to interact with government online or using common service center.	Item No. 7
	• User expectations.	Item No. 8
5. Demand of e-government services and information	• Type of services and information required.	Item No. 9
	• Type of interaction.	Item No. 10
6. Barriers of using government websites	• Perceived and real problems in accomplishing their goals, special needs that affect users.	Item No. 11
7. Demographics	• Age	Item No. 12
	• Gender	Item No. 13
	• Occupation	Item No. 14
	• Education	Item No. 15
	• Income	Item No. 16

The second stage started by generating a pool of items relating to each dimension based on literature review, focus group, expert's opinions and brain storming. At this stage, the dimensions' items were generated and tested to assess and refine the tool. There is a range of scales and response styles that may be used when developing a tool. These produce different types or levels of data and this will influence the analysis options. Therefore, when developing a new measure, it is important to be clear which scale and response format to use. Frequency scales may be used when it is important to establish how often a target behaviour or event has occurred [19]. Generally Likert scale, multiple choices or dichotomous yes/no response options are offered. For research Likert-type or frequency scales are most commonly used. The closed format questions are used limiting individual responses to multiple choice answers. These were done by using close-ended multiple-choice questions in the tool in order to obtain a high response rate. This is intended that the respondents preferred to answer close-ended questions within the non-interactive, self-administered tools [6].

Prior to distribution of the final tool, a pilot study was conducted in order to determine the response rate and to find out whether any discrepancies are present in the questions. This was intended to know whether the format of the tool and questions are appropriate. The generation of items during tool development requires considerable pilot work to refine wording and content. To assure face or content validity, items can be generated from a number of sources including consultation with experts in the field, proposed respondents and review of associated literature [18]. In addition, a key strategy in item generation is to revisit the research questions frequently and to ensure that the items reflect these and remain relevant [1][14]. Minor changes based upon the responses were incorporated to the final design of the tool and finally tool was developed. Responses received from the pilot study were also included in the final analysis [6]. Two data sets one from Yemen (DataSet1) and the other one from India (DataSet2) using online method were extracted. The collected data sets were analysed using SPSS version 22. It is essential that the reliability of developing questionnaire tool should be demonstrated. Reliability refers to the repeatability, stability or internal consistency of a questionnaire tool [10]. The reliability of questionnaire tool is the ability of the questionnaire to give the same results when filled out by like-minded

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people under similar circumstances. Reliability is usually expressed on a numerical scale from zero (very unreliable) to one (extremely reliable). One of the most common ways to demonstrate the reliability is using Cronbach's statistic. This statistic uses inter-item correlations to determine whether constituent items are measuring the same domain [1][3][10]. If the items show good internal consistency, Cronbach's should exceed 0.70 for a developing questionnaire. Testing of the inter-item correlation and reliability of the tool was done using Cronbach's reliability test. Items with a poor Cronbach's  $\alpha$ , i.e. ( $<0.7$ ) should be considered for removal [12]. Alternatively, if respondents fail to complete an item it conveys that the item may lack clarity. Items should be retained if they are deemed to be theoretically important even if they do not meet the above criteria. The developed tool recorded a good score when Cronbach's reliability test was applied in both data sets. Table 4 shows the result of Cronbach's reliability test. The correlation between items using inter-item correlations was also measured. High inter-item correlations ( $>0.8$ ) suggest that these are indeed repetitions of each other (sometimes referred to as bloated specific) and are in essence asking the same question [5][12]. Hence all items that recorded inter-item correlations score of more than (0.8) were removed.

Table 4 Cronbach's reliability test.

Data set	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
Data set 1	.765	.795	42
Data set 2	.854	.859	42

Validity refers to whether a questionnaire tool is measuring what it purports to [3]. The validity of a questionnaire tool is the degree to which the tool is actually measuring or collecting data that you think it should be measuring or collecting data about. While this can be difficult to establish, demonstrating the validity of a developing measure is vital. There are several different types of validity [17][1][3]. Content validity (or face validity) refers to expert opinion concerning whether the scale items represent the proposed domains or concepts the tool is intended to measure. The conducted content validity was tested with five experts. Few items were replaced and two were deleted based on experts' opinion.

## III.RESULTS

The ability of the proposed tool to extract the right data that can help to establish the level of access to internet and web behaviour, the level of awareness of e-government, the level of interest in using e-government, identify the most desired e-government services and type of use is presented here. The tool focused on: identifying the gap between interests in e-government (including attitudes, preferences and intentions to use) and actual use of e-government; the ability to use e-government; user satisfaction with e-government and future e-government development (motivators and barriers for future use).

It should be remembered that this data set is based on sample, but not on the entire population. In consequence, all results are subject to sampling tolerances, which means that not all differences are statistically significant. However, the sub-group differences mentioned in this work are all statistically significant at 95% confidence level.

### 1.1. Establish the level of access to computer and internet.

To establish the level of access to computer and internet, it is necessary to know the percentage of people who have access to computer and internet at home or in the place of work among the internet users. The results are presented in Table 5. Although the target population was the internet users, it can be seen that some respondents (30.5% and 50.5% in both data sets) do not have internet facility at home or in their work place. They are accessing the internet either at the browsing centre or using friend's internet access. Moreover, we can link these results to the demographic data to know the distribution of computer and internet access among the male and female, among the age group, education level, job and level of income. By using the cross tab analysis between access to computer and demographic data, and between internet and demographic data, we can find who access more or less. Based on these results we can understand if any category of citizen needs enhancement in the level of access. The level of access to internet is not enough as we expect. These results will give the decision makers an idea as to how to improve the level of access. In such cases the decision makers have to plan a policy to provide low cost computers and internet access or provide community centres facilities where citizens can access the internet free of charge. Many solutions can be found for this problem.



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Table 5 Access to computer and internet

Factor	Data set 1	Data set 2
Having Computer at home or office	86.9%	61.4%
Having Internet at home or office	69.5%	49.5%

1.2. Understand the web behaviour of citizen( the internet usage and the ability to use internet)

Table 6 Internet usage

Value	Data set 1	Data set 2
Monthly	28.4%	38.6%
Weekly	12.1%	29.3%
Daily	59.5%	32.2%

Table 6 shows that most set 1 access the internet

of the respondents in data daily (59.5%). Most of

the respondents in Data set 2 access the internet monthly (38.6%). We can go deep in the analysis to know which category of respondent use more and which category use less by using cross tab analysis. Also we can find if there is any significant difference in use between different categories of respondents. Based on this level of analysis, we can address the category that access internet less and develop a plan to find the problem for less access and encourage them to access internet more.

Table 7 Skill to find information in internet

Value	Data set 1	Data set 2
Not bad	29.5	16.7
Good	30.0	54.3
Excellent	40.5	28.9

The finding in Table 7 shows the skill to find information in internet. Most of the respondents in Data set 1 have excellent skills. In Data set 2, most of the respondents have good skills. Still 29.5% in Data set 1 and 16.7 % in Data set 2 need improvement in skills to use internet. These results need to be linked to demographic data to explore which groups need more training to improve their skills.

The ability among the respondents to find information or services through internet is quite good if we consider this ability to be used to access e-government; this will help in empowering the society. Some citizens could see the benefits of being able to access e-government services. In a small number of cases citizens are already looking at the ways of actively promoting and increasing the usage of such services. The government agencies would provide support and guide people in finding information they need, encouraging them to do this on-line rather than having to access the services of various departments face-to-face or over the phone.

1.3. Find the purposes of using internet among respondents.

To find the interest of internet users, decision makers have to find the purpose of using the internet. The respondents use the internet for different purposes like e-mail, chat, searching for government or non-government information, and making purchase or for payment through internet. Table 8 illustrates the different purposes using internet. It is assumed that the internet users know the benefit of internet in saving time, money, and effort; then they can use it to deal with government to get information or services. In contrast, we find the low level of searching of government information among the internet users.

Table 8 Purpose of using the internet

Purpose *	Data set1 %	Data set2 %
E-mail/Entertainments(chat, music, game)	39.6	71
Searching for governmental information	26.3	34
Searching for non-governmental information	74.8	35
Make purchases or payments	15.3	17
Use for learning	36.3	65.6

\*Options are multiple choices

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## 1.4. Establish the level of awareness of e-government.

One of the important issues that decision makers should know is the awareness of e-government. It is presumed that the level of awareness of e-government among the internet users is of high order. Table 9 shows the awareness of e-government among the internet users. The level of awareness is very low in both data sets.

Table 9 Awareness of e-government

Value	Data set 1 %	Data set 2 %
I'm not aware	37.7	38.6
I'm aware but I don't use it	43.2	38.6
I'm aware and I use it	19.1	22.8

Moreover, the source of awareness comes from T.V more than any other sources. It indicates that government organization did not spend enough effort to spread the awareness among citizens using different channels.

Table 10 Source of awareness of e-government

Source of awareness*	Data set 1 %	Data set 2 %
Government	14.0	10.3
Word of mouth	16.7	8.7
News	19.3	30
TV	20.3	32.8
Studying Course	23.2	18

\*Options are multiple choices

## 1.5. Establish the level of interest in using e-government.

To explore the way as to how the respondents communicate with or contact the government, it is assumed that the internet users like to interact with government through internet rather than interacting either face to face or through common service centers. The results in Table 11 show what most of the respondents like to interact with government online rather than inline. Some of them still fear to use it by themselves online; therefore they prefer to use e-government through common service centers to reduce the risk. Only few respondents, who still like to use the legacy system, may be due to bad experience with e-government or lack of awareness about e-government.

As evident from these data, there is fairly high demand for e-government and it is especially encouraging that great majority of both the samples that is 70% and 83% believe that the Internet can make government more approachable. There is clearly overwhelming agreement concerning that having government information on the Internet would make the government more accessible.

Table 11 The willingness to use and adopt e-government online services

Method of interaction with government*	Data set 1	Data set 2
Face to face interaction	23.2%	15%
Using One-Stop (common service centre)	52%	85%
Online interaction Using Website	70.4%	83%

\*Options are multiple choices

## 1.6. Identify the most desired e-government services.

In case government wants to make its services accessible online, then which are the one that will be most likely to be used by citizen? Table illustrates several services that are likely candidates for e-government services and which of them the public is ready to accept. It gives a clear idea about what citizen need the most.

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Table 12 Online Services which Residents Most Likely to Use

Online Services Residents Most Likely to Use*	Data set 1 %	Data set 2 %
E-learning	86.1	50.8
Online enrolment in Schools and Universities	81.6	35
Payment of bills and fines	81.1	62
Health information and services.	80.0	45
Telecommunications and postal services	79.9	31.2
Search for jobs and apply for job	79.5	57.6
Booking and cancel tickets (bus - Airline)	77.3	59.2
Register Citizen (birth , death , marriage)	74.4	45
Find information to communicate with the local council and public services ( such a telephone number - E-mail)	72.1	35
Apply for passport, visa, driving license ....etc.	71.6	43
Renewal of various licenses and permits	70.4	30
Payment of taxes online	61.3	37.9
Business information and services	60.5	19
Legal services and information	59.1	23.2
Agricultural services and information	45.7	21

\*Options are multiple choices

### 1.7. Identify the type of interaction with e-government.

It is assumed that this important point will affect the perception of respondents toward e-government. This assumption is supported by the results in Table 13 where 63.2% of the respondents in Data set 1 like to have full interaction with government online compared to 39.9% in Data set 2. On the other side, 63.3% of respondents in Data set 2 like to have one way interaction more than 77.5% like only to search. Moreover, 77.5% of respondents in Data set2 prefer to search only compared to 21.2% in Data set 1.

Table 13 Type of interaction with government online

Levels	Type of interaction*	Data set 1 %	Data set 2 %
Level 1	Search,	21.2	77.5
Level 2	Download forms or applications, inquiry, complaint	56.7	63.3
Level 3	Online transaction	63.2	39.9

\*Options are multiple choices

### 1.8. Discovering the barriers of e-government from the citizens' point of view.

When it was tried to know, as to why internet users did not use the e-government to communicate with the government, then different types of answers were received although most of the respondents gave almost the same type of answers. The answers included poor infrastructure and connectivity and lack of proper security or privacy through internet as shown in Table 14.

Table 14 The barriers of e-government from the citizens' point of view

Reason*	Data set 1 %	Data set 2 %
Lack of awareness	86.7	39.5
Problem of Design and Operation	78	62
No security or privacy through the internet.	81.6	26
Poor infrastructure / Connectivity.	73.3	41.2
Internal risk (like employee resistant to change)	72.9	3.9

\*Options are multiple choices





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## IV. DISCUSSIONS

The tool helps to extract data that can help the decision makers to take the right decision. The citizen is the key element in making any technological tool to succeed. So, the citizen plays a major role to make any technology tool useful or not, through fully utilizing this technology. Since e-government is one of the most important information technology tools available in our day to day lives, it is essential that the citizen should have a full knowledge about it. Any technological tool will be useful only when it is known how to use it, in terms of goals achieved and how they are utilized. To make the citizens aware of e-government's applications and how to use and get maximum benefits provided by these applications, the following points are very important:

1. The familiarity with the technology used by the e-government, like computer and internet.
2. Development of skills required to deal with e-government.
3. Understanding and full awareness of how and when to use e-government.
- 4.

The study recommends that governments should use the best practices to adopt e-government. It also needs to reorient its delivery mechanisms to address the ICT capability and information gaps identified in this study. Along with the quality, improvement brought by information technology revolution and internet and with speeding up the delivery of services to citizens round the clock, this put governments in a race to execute and apply this vital project, which help the government to extend services to its citizens through a single window. Governments' departments also promise to extend best services and achieve best results while attempting to eliminate all aspects of corruption.

This work offers essential contribution to different stakeholders including the government agencies who require adopting e-government to improve the relationship with citizens. That is, from the results of this research the government agencies could have better understanding in a simpler and detailed manner, about the problems of low adoption. This could allow the formulation of a strategy that promotes awareness and diffusion. From the results of the study, it is clear that there is a demand to use the government services online at the same time a number of other key problems faced by citizens with regard to e-government adoption and use were identified. These can be grouped into two categories: technology related and awareness related.

In terms of technology, the most important concern was fear of technology. Citizens frequently encountered operational problems with their ICT especially when they deal with financial issues like money transactions, so they depend on others to do the job to avoid the risk. This dependency on consultants and professionals was often cited as a major problem. The other issues like the governments' websites are not usable because they are not user friendly, out of date and poor design should be considered seriously by government agencies. It is very important to build a good website to make it usable by everyone.

Turning to awareness issues, the study suggests that most of the citizens (internet users) not aware of the e-government services and also sometimes they get these services somehow through counters, but without knowing that they may be available online and he/she can do it himself; here the government can play a major role to disseminate the information about its services and how they can be used.

## V. CONCLUSION

The aim of this work was to show a comprehensive tool to measure citizens' ability to use ICT, satisfaction derived by using e-governments, transformation to e-government, and the impact of e-government on the public. The study also sought to assess, users' interest on the services offered, the obstacles and problems that prevent them from using these services, and the extent of general satisfaction derived from e-government services. The data collected using this tool show that there is an emerging need for improving the governmental strategies, policies, applications, and websites to promote the use of e- government services online.

The proposed tool can be used to extract useful data directly from e-government users or the potential users. The results showed that the tool can be very useful in two primary ways: it can capture the important feature about user profile of e-



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government website, and it is cost effective. The extracted data can help the decision makers to understand the users and plan for a better online service. The extracted data set provides flexibility and accuracy to conduct different statistical analyses. It can be used for frequency and descriptive analyses to interoperate the data. The reason for using frequencies and percentages was due to the fact that previous Information Systems (IS) researchers were employing the earlier stated analysis tools to analyse and present research findings which involved using response frequencies, percentage [23] means and standard deviations [25]. It also can be used with t-test, ANOVA test, Post Hoc Tests, and Chi-square test to find the significance and association among the factors. Cross tab can be used as a method to segment the respondents to different groups. The study recorded greater attitude towards using e-government services online.

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ISSN(Online): 2320-9801  
ISSN (Print): 2320-9798

# International Journal of Innovative Research in Computer and Communication Engineering

*(An ISO 3297: 2007 Certified Organization)*

**Vol. 3, Issue 1, January 2015**

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