



University of Bahrain
College of Information Technology

Customer Satisfaction Index Survey (CSI) Project
(Wave 7)

Final Report

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Prepared for:

eGovernment Authority, Kingdom of Bahrain

Submitted by:

e-Government Research Team

College of IT, University of Bahrain

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Document Sign Off

We eGovernment authority hereby confirm that we have read this document (final project deliverable) that describes the outcome of the Customer Satisfaction Survey project conducted by University of Bahrain team and accept it and hence we agree to close the project.

Name	Designation	Signature

Executive Summary

To be completed, after final feedback from eGA.

Acknowledgement

The e-Government Research Team at college of IT, University of Bahrain would like to extend their sincere thanks to e-Government Authority's CEO, Mr. Mohamed AlQaed, who always supports the academic sector and believes in its roles and contributions to eGovernment sector.

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We would also like to extend our thanks to Mr. Ali Darwish (title) from Marketing department, who was a great support to us with his inspiring thoughts and guidance throughout the project life cycle. Furthermore, Mr. Rashed Khalifa (title) Amin, who has been our eGA's single point of contact and played an important role in the project's life cycle. We believe, without both Mr. Ali and Mr. Rashed's full support, this project would not be able to meet its desired objectives and timely deadlines.

We would also like to thank all the eGA staff from all concerned departments who were engaged and interacted directly and indirectly with project; Quality Assurance, Service delivery, Projects, Marketing, Legal, Finance and HR.

1 Introduction

1.1 Purpose of the document

The purpose of this document is to provide the final deliverable of the Customer Satisfaction Index (CSI) project conducted by researchers from Department of Information Systems at University of Bahrain (UOB). This document summarizes the findings that resulted from measuring the customer satisfaction of the three stakeholders; Individuals, Government's employees and Businesses.

1.2 Background and Comments on Wave 6 study

Based on extensive review of the previous reports, it was noted that there were vital efforts done toward developing such well-organized reports in measuring very critical parameters for the CSI. This can be noticed from the huge amount of data collected and the variety of descriptive analysis of different aspects of the eGovernment functions including different services, channels and stakeholders.

However, as eGovernment services around the world mature, triggered by the fast ICT developments, the citizen's knowledge and usage pattern matures, it is essential that CSI practices and approaches improve with them to get more detailed results and tackle new areas. Based on the initial benchmarking and market study conducted by the UOB team, the following points of improvements were suggested, which could improve the CSI survey considerably:

- The Customer Satisfaction Index needs to be based on a recognized international standard such as the American Customer Satisfaction Index (ACSI), Customer Satisfaction Index for Singapore (CSISG), Hong Kong Customer Satisfaction Index (HKCSI) and Swedish Customer Satisfaction Index (SCSI).
- For the better generalization of the results, the sample selection will be based on the scientific formula of computing the sample size. In addition, the sampling methods have been selected to ensure the participation of the users and non-users of eGovernment services.
- Design a more integrated questionnaire that reflects the purpose of the research and provide an inclusive view among the three stakeholders.

- A comparison analysis between the users and non-users in terms of awareness, usage trends and impact of demographic data.
- Provide detailed analysis of G2C, G2B and G2G per e-service.
- More integrative and comprehensive analysis were conducted to provide more significant and representative results.

1.3 Project Scope and Goals

This project has developed a recognized model on measuring the customer satisfaction and awareness towards eGovernment Services in the Kingdom of Bahrain. Toward this objective, the project has covered the same scope of the previous studies in which different range of stakeholders were covered: residents (G2C), businesses (G2B), government (G2G), as well as measuring the awareness and usage of the stakeholders using different service channels including kiosk, national portal, mobile portal, National Contact Center, e-Service Centers (ESC). Furthermore, this project has extended the previous waves of the studies and adopted a systematic model on conducting the customer satisfaction survey based on international recognized standards. Figure 1 summarizes the scope of the project.

In summary the project had two main goals:

1. To develop a recognized model on measuring the customer satisfaction towards eGovernment Services in Kingdom of Bahrain. This model would set a baseline for the future survey to build upon and benchmark against.
2. To measure the awareness, usage and experiences, social and economic eGovernment impact and future development from the point of view of residents (G2C), businesses (G2B), government (G2G) through using different services' channels including kiosk, national portal, mobile portal, toll free, e-Services Center (ESC).

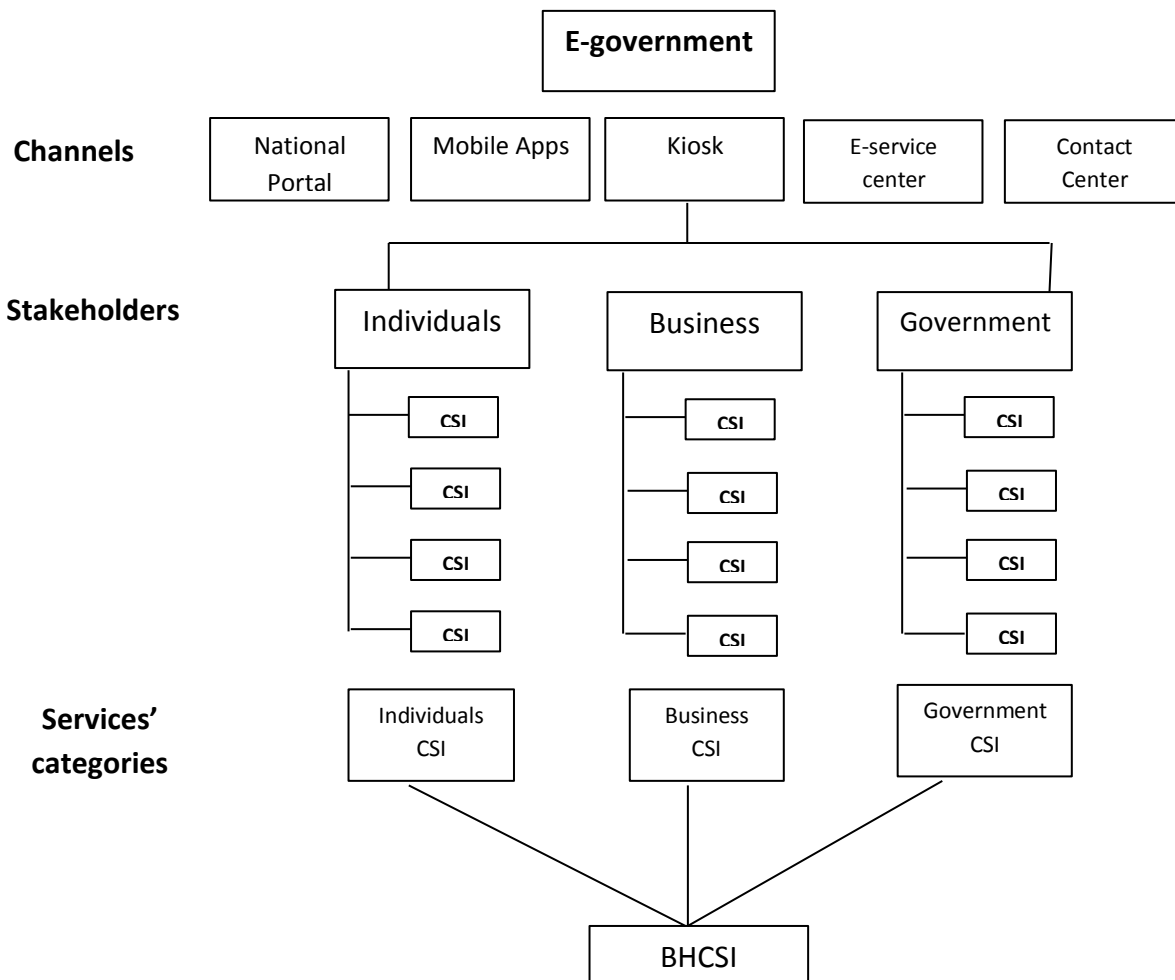


Figure 1: Scope of the project

1.4 Report Structure

In the coming sections the report will reveal the outcomes of the this survey. Specifically the areas of measurements cover Awareness, Usage and Experience, Impacts of electronic public services and factors of future developments for electronic public services. Following are the detailed coverage of the study:

- **Demographic Analysis:** covering the usual aspects such as gender, ages, education and nationality.
- **Descriptive Analysis of Results:** This part covers aspects such as Awareness, Interaction with government, Awareness of e-service, Awareness through Media, Awareness of E-Government Channels and Awareness of Mobile Applications.
- **Usage of e-Government Services:** This part covers aspects such as Usage of e-Government Services, Usage of non e-government channels, Usage of e-Government channels, Usage of e-Government Services through e-Government channels, Usage of e-Government Services for support, Usage of e-Government Services and demographics, Usage of e-Government Services and e-Government channels' ranking, Usage of e-Government Services and non-e-Government channels, Usage of e-Government Services, awareness and education, Interaction, e-Government awareness and e-Government Services Usage.
- **General Satisfaction:** This part covers aspects such as Satisfaction of e-government channels, Satisfaction of e-government channels and ranking and Satisfaction of e-government services.
- **e-government Impacts:** This part covers aspects such as Individual Impacts, Social Impacts and Economic Impacts
- **Future Development:** Services that e-Government Authority needs to develop based on the customer's feedback.
- **Model Based Results:** Describes how the project developed Bahrain CSI and what was the outcome of I; as overall Bahrain CSI (BHCSI), CSI for each sector and CSI for each service category.

2 Methodology and data collection

2.1 Project Lifecycle Approach

This project has followed a research based approach. Thus, toward achieving the project's main goal, phases depicted in Figure 2 has been followed. As such the project scope has been identified in the initiation phase as a result of interviews with concerned EGA teams, including discussions about previous study limitations and initial review of existing CSI standards. In the research phase, a development of a revised model of CSI was designed in order to improve the current survey. These modifications were then reviewed and approved by EGA team before implementation. Data collection and analysis were handled in the third phase. Finally, the project was closed by presenting the final results of the project to EGA management to sign it off.

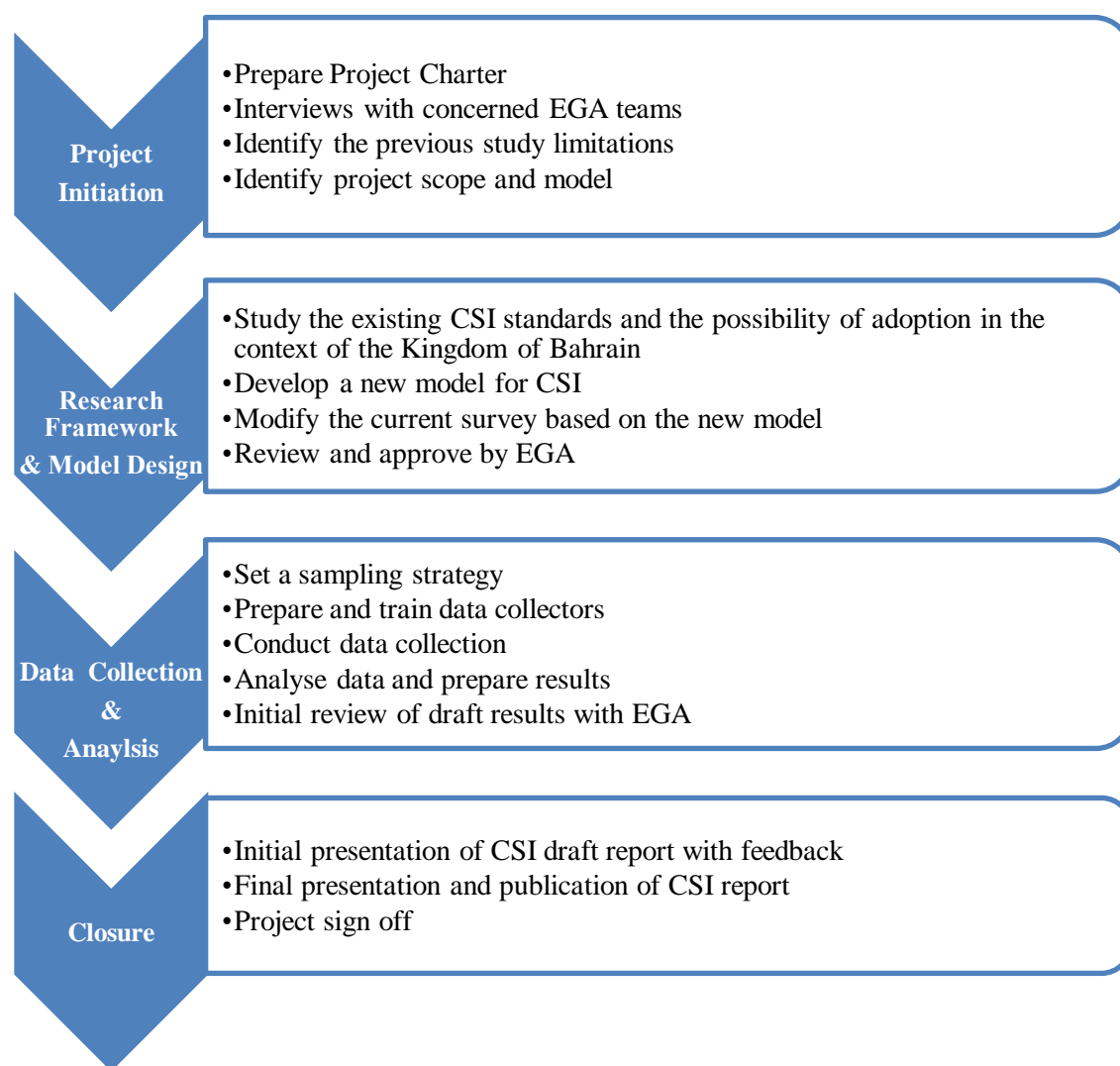


Figure 2: Detailed project phases

2.2 Customer Satisfaction Model (BHCSI)

The Current study has applied a new way for measuring CSI thereby adopting a systematic model based on a well-recognized international standard CSI model. Hence, an initial review was conducted for the existing international studies on CSI. The studies revealed that to measure the CSI, it must be impeded in a system of cause and effect relationship, making the CSI the center piece in a chain of relationships. These relationships running from the antecedents of CSI – customer expectation, perceived quality and perceived value to the consequences – complains and loyalty. Most of the famous and applied CSI standards based on the causality relations such as the American Customer Satisfaction Index (ACSI), Customer Satisfaction Index for Singapore (CSISG), Hong Kong Customer Satisfaction Index (HKCSI) and Swedish Customer Satisfaction Index (SCSI) see Figure and Figure. Some organizations have even established their own CSIs, such as Best Buy CSI, PChome Online e-CSI, and New York City Government CSI. For more information on these models see Appendix. It can be noticed that each model has used different manifest variables depend on the local context of the e-services, type of e-services provided and whether they are targeting public or private sector.

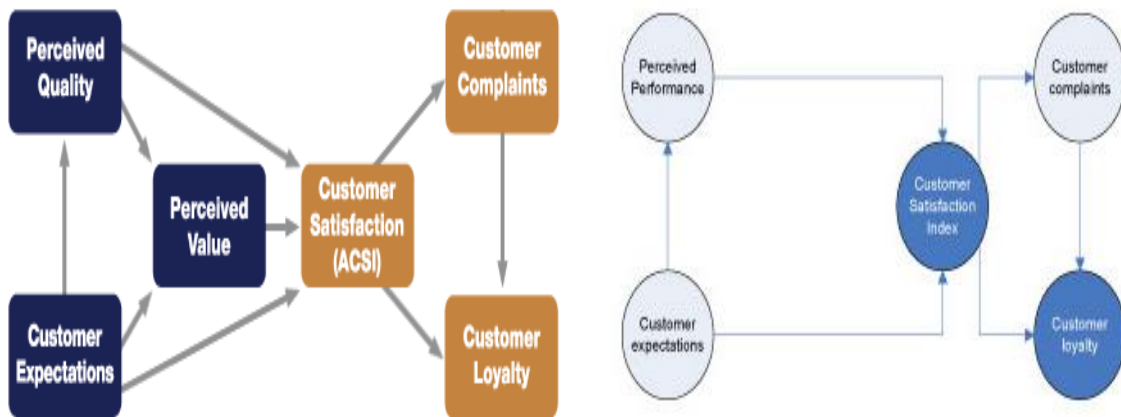


Figure 3: Detailed project phases

Among the available CSI models is the ACSI as it is the most adopted standard world-wide see Figure. The ACSI methodology identifies key drivers of satisfaction and quantifies their relationships to overall customer satisfaction. Going further, this cause-and-effect methodology predicts how customers will behave in the future and demonstrates the impact of e-services

enhancements on customer satisfaction, customer behavior and ultimately, the bottom line. Based on the ACSI, many countries have developed their own CSI such as Japan (JCSI), Customer Satisfaction Index for Singapore (CSISG) and United Kingdom (UKCSI). Therefore, based on ACSI, the current study has developed the first public CSI model in the Arabic region which call Kingdom of Bahrain Customer Satisfaction Index – BHCSI as shown in Figure .

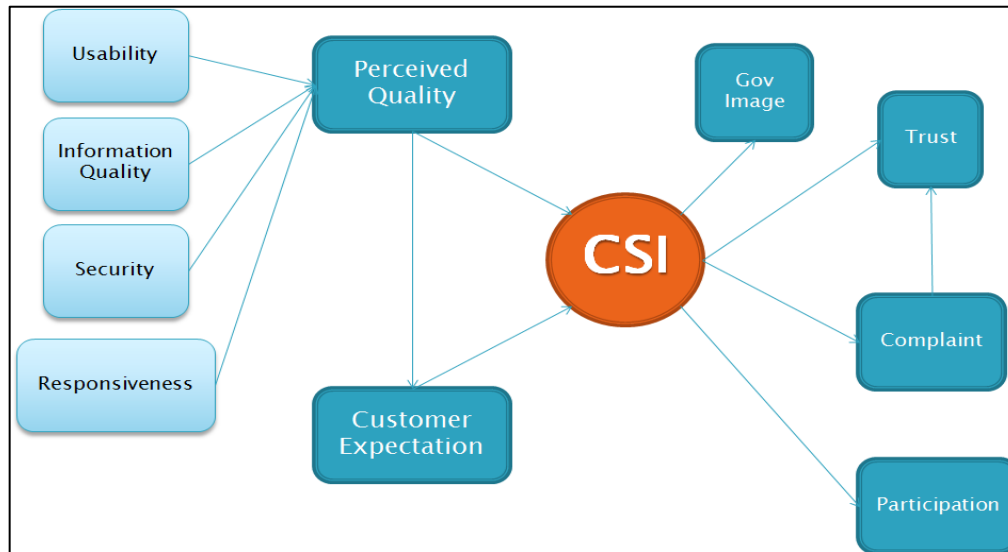


Figure 4: BHCSI Model

The BHCSI model, in Figure 4, was developed to measure the customer (citizen) satisfaction of a public not private sector; hence ACSI model for public sector was adopted. Therefore, perceived value and customer loyalty are irrelevant variables in the current model. Instead government image, public participation, and trust were measured as major consequences for the CSI. It is important to note that the developed BHCSI has the following features:

- It measures the quality of services as experienced by customers who consume them.
- It does not only account for the usage experience, but also it provides a forward-looking view as it is embedded in a cause and effect relationships.
- It is a multi-items scales represents a different aspects of customer attitudes: perceived quality, expectation, trust, complaints, participations and Government-image
- It provides two types of evaluation: transaction-specific satisfaction and cumulative satisfaction (customer overall experiences with the e-services)

- It can be compared internationally.
- It provides baseline for determining whether the citizens becoming more or less satisfied with the provided e-services.
- Tracking the overall BHSCI over certain period can yield interesting insights for national performance improvement.
- It can be also compared cross-sectional within a given period. Hence, BHSCI can be used to determine how particular e-service category or ministry is doing relative to the best ministry (e-service category).

2.3 Sample Method and Size

A scientific approach was followed to calculate the best sample size that represents the entire population as follows for each of the following stakeholders:

Individual: A probabilistic random sampling method was employed as each member of the population has a known non-zero probability of being selected.

Business and Government: A probabilistic stratified sampling method was followed in which the business population is divided into smaller business sectors. Then, a representative sample size is calculated using the sampling size equation from each sector to represent the sector.

2.3.1 Individual Sampling

According to the World Bank (2013), the population of Kingdom of Bahrain is 1.332 million. Sample size formula has been used with the following parameters: Confidence level = 95% and Confidence interval = ± 2 . Accordingly, the sample size is 2397.

2.3.2 Business Sectors Sampling

From the Ministry of Industry and Commerce (2014), a report on the commercial activities in Kingdom of Bahrain was provided which includes the total number of business activities under each business sector (see Appendix A). Sample size formula has been used with the following parameters: Confidence level = 95% and Confidence interval = ± 2 . Accordingly, the sample size is 2368. Furthermore, the weight of each business sector in terms of its number of activities was calculated. Then, stratified sampling has been applied on the generated sample size to identify the sample size in each business sector depend on an appropriate 10% to provide an affordable and representative sample size. Accordingly, the total actual number of the sample size reached 240.

2.3.3 Government Sector Sampling

From the Civil Service Bureau (2014), a report on the Kingdom of Bahrain government entities/authorities was provided which includes the total number of employees in each

government entity/authority (see Appendix B). Sample size formula has been used with the following parameters: Confidence level = 95% and Confidence interval = ± 2 . Accordingly, the sample size is 2294. Furthermore, the weight of each government entity/authority in terms of its number of employees was calculated. Then, stratified sampling has been applied on the generated sample size to identify the sample size in each government entity/authority depend on an appropriate 10% to provide an affordable and representative sample size. Accordingly, the total actual number of the sample size reached 229.

2.4 Data Analysis Methods

To analyze the collected data, three software were used including Excel, SPSS (Statistical Package for the Social Sciences) , and PLS (Partial Least Squares). Thus, SPSS was used to provide descriptive analysis of the main measurements including interaction, awareness, usage, impacts of eGovernment Services and future developments. In addition, SPSS was used to provide more sophisticated level of analysis including the correlations of the aforementioned measurements and the significance of these relations. On the other hand, PLS was used to identify the path analysis (the impact between the factors of the BHCSI model). In addition, PLS was used to calculate many other variables such as internal out weight which used to calculate the BHCSI.

2.4.1 BHCSI formula

The formula to measure the BHCSI was adopted from Anderson and Fornell (2000) who are the originator of the formula. This formula is used to calculate the CSI regardless the nation of the Index. For example, the same formula has been applied to calculate the ACSI, SCSi and ECSi. Figure 5 presents in detail the equations used to calculate the CSI. Both PLS and Excel were used to calculate the results of the given equations.

The general form of the ACSI is as follows:

$$ACSI = \frac{E[\xi] - \min[\xi]}{\max[\xi] - \min[\xi]} \times 100$$

where ξ is the latent variable for customer satisfaction (ACSI), and $E[.]$, $\min[.]$ and $\max[.]$ denote the expected, the minimum and the maximum value of the variable, respectively.

The minimum and the maximum values are determined by those of the corresponding manifest variables

$$\min[\xi] = \sum_{i=1}^n w_i \min[x_i]$$

and

$$\max[\xi] = \sum_{i=1}^n w_i \max[x_i]$$

where x_i s are the measurement variables of the latent customer satisfaction, w_i s are the weights, and n is the number of measurement variables. In calculating the ACSI, unstandardized weights must be used if unstandardized measurement variables are used.

In the ACSI, there are three indicators for customer satisfaction that range from 1 to 10. Then the calculation is simplified to:

$$ACSI = \frac{\sum_{i=1}^3 w_i \bar{x}_i - \sum_{i=1}^3 w_i}{9 \sum_{i=1}^3 w_i} \times 100$$

where w_i s are the unstandardized weights.

Figure 5: formula of BHCI

2.5 Quality Assurance

The UOB team assured the validity of the collected data through a high level of quality assurance process. The following are the data collection validity check processes followed by the team members:

- **Two training sessions were held to train the data collectors about the proper way of collecting the right data.** In the training sessions, the surveys had been discussed the surveys question by question to ensure that all the data collectors understanding what does the questions mean and how to answer it.
- **The data collectors have been split it into three groups.** Each group assigned to a specific governorate, the assigned governorate was chosen by the data collector themselves to be their comfortable zone to collect the data from. Also, this process of forming the three groups can eliminate data duplication.
- **A leader has been assigned to each group of data collectors.** Three leaders had been chosen by the group members to handle the coordination, controlling and management of the data collection process. These leaders are have been selected by the project team

based on their team leadership skills, ethics, reputation and relationship with other data collectors. Leaders know that they will be paid extra for their work.

- Further to the group leader, **each group assigned a mentor** from the e-Research group. The main aim of the group mentor is to keep in contact with the group leader for survey collection, submission and managing the group data collection by tracking the group performance on daily basis.
- Group mentors are responsible to contact the leaders frequently, update the excel sheet to **monitor the balance of data collection over the governorate, and track the surveys collection, submissions and verification.**
- An Excel data sheet had been designed to ease the work of monitoring the data collection process. Each mentor has a sheet for monitoring and tracking the group accordingly. Then the research project manager (Dr Ali Alsoufi) manages the master sheet to ensure the overall tracking of the three groups' performance and balance the sample distribution among the governorate, businesses and government entities.
- Group leaders are responsible to clarify issues to their group members. Therefore, group mentors were meeting frequently with the leaders to check after the group progress and frequently asked questions. Additionally a random spot check by mentors have been carried out to verify the process of collection by data collection.

3 Data analysis and results

3.1 Respondent's profile

The following tables demonstrate the demographics according to the three stakeholders.

Table 1: Sex

	Male	Female
Individual	47.4%	37.1%
Business	77.5%	20.6%
Government	63.9%	36.1%

Table 1 demonstrates that 63% from the respondents are male and 31% of the respondents are female. The number of respondents is nearly equal in the individual sector, while male are more than female in both business and government sectors.

Table 2: Age

	<=18	19-25	26-35	36-45	46-55	>55
Individual	6.4%	29.4%	32.6%	24%	5.7%	1.1%
Business	0%	0%	41.6%	33.6%	18.6%	6.2%
Government	0%	7.7%	38.1%	42.8%	8.2%	0.5%

Table 2 demonstrates the distribution of respondents by age groups covered in Wave 7. The surveyed age groups reflect a fair representation of Bahrain's population. Most of the respondents age between 26 to 45 years old which represent the youth point of view.

Table 3: Education

	Illiterate	Intermediary or less	Secondary	Bachelor Degree	Master Degree	PhD
Individual	2.3%	10.8%	40.8%	36.8%	7%	1%
Business	0%	2.7%	16.1%	64.3%	13.4%	3.6%
Government	0%	4.1%	11.3%	59.3%	16%	6.7%

Table 3 demonstrates the distribution of respondents by educational levels. Illiterate group represents the respondents with no school certificate. The respondents reflect a fair representation of Bahrain's population where most of them holding secondary or bachelor degrees.

Table 4: Occupation

	Self employed	Employed	Student	Housewife	Unemployed
Individual	6.9%	50.9%	29.2%	7.3%	4.2%
Business	25%	73.2%	-	-	-
Government	1%	95.9%	0.5%	0.5%	0.5%

Table 4 demonstrates the distribution of respondents by occupation covered in Wave 7. The highest percentage represents the employed sector with a mean of 73.3% for all the three stakeholders.

Table 5: Nationality

	Bahraini	Other Arab	Asian	Western
Individual	48.3%	16.1%	32.9%	1.8%
Business	51.8%	21.4%	23.3%	3.6%
Government	75.3%	10.3%	11.3%	0.5%

Table 5 demonstrates the percentage distribution of respondents of Bahrainis and non-Bahrainis in Wave 7. The sample was representing the Bahraini population which consists of mostly Bahrainis, Arabs and Asians. However, the sample contains only 2% of Western respondents which they are the minority in the kingdom of Bahrain.

Table 6: Governorate

	Capital	Northern	Southern	Muharraq
Individual	23.6%	28%	25.9%	21.9%
Business	23.7%	29.9%	35.1%	11.3%
Government	18.6%	38.7%	23.2%	18%

In wave 7, the survey spread across all the four governorates in the Kingdom of Bahrain. Table 6 illustrates the percentages of the entire distribution throughout the four governorates. The results represent a fair balanced distribution over the governorate, however Muharraq responses was the least.

3.2 The current situation of e-Government services

The current situation of the e-government services was investigated from different aspects starting by the physical interaction with government entities and authorities, overall awareness towards e-government services, usage of e-government services, ending by overall satisfaction of e-government channels and services. The following sections will discuss and demonstrate the results of the aforementioned aspects.

3.2.1 Interaction with government entities and authorities

The interaction with various government entities and services were investigated to establish the need for using various government services as well to understand the general interaction among the three stakeholders regarding the Government entities. Table 7 shows the data analyzed for all the three stakeholders interaction percentages with the government entities.

Table 7: Interaction with Government

	Individual	Business	Government	Average
Interaction	84.4%	88.7%	91.2%	88.10%

The results show that there is a high interaction level with the government entities among the three stakeholders with an average of 88.1%. This high physical interaction with the government entities can give an indication for a high awareness and usage with the e-government services which will be discussed later in the report.

3.2.2 Awareness towards e-government services

To measure the awareness towards e-government services, different components of awareness need to be explored. Thus, the awareness need to be measured on the level of e-government channels, media of awareness, mobile apps and e-service. However, e-government services were implicitly measured through the awareness of e-government channels.

3.2.2.1 Overall awareness

The overall awareness of the three stakeholders was measured as a first step (see Table 8). The results demonstrate that the overall awareness of the three stakeholders is 89.1%. These percentages represent a high level of awareness among individuals, business and government sectors.

Table 8: Overall awareness

	Individual	Business	Government	Average
Awareness	86.1%	90%	91.2%	89.1%

It has been mentioned earlier in the report that interaction is a main predictor for awareness. Therefore, the relationship between interaction and awareness is examined using descriptive and correlation analysis method. Table 9 illustrates the relationships between interaction with government entities and awareness of e-government services. The results show that whenever

there is no interaction, the awareness is very low, however the awareness become very high when there is an interaction with the government entities. This have been confirmed by the correlation test (see Table 10), which show a significant relationship (R = 0.358).

Table 9: Interaction & Awareness

	Not aware	Aware
No interact	6%	9%
Interact	6%	80%

Table 10: Interaction and Awareness Correlation

		GOVI	GOVA
GOVI	Pearson Correlation	1	.358**
	Sig. (2-tailed)		.000

** . Correlation is significant at the 0.01 level (2-tailed).

3.2.2.2 Awareness through media

To understand the main contributed source of awareness, respondents were asked to identify the main source for their awareness towards e-government services. Table 11 demonstrates the percentage of awareness through media. The results show that the most significant media contributed in enhancing the awareness is the word of mouth (WOM) via Neighbors, Friends and relative (54.2%) followed by the use of Social media (38.2%) and Newspaper (28.6%).

Table 11: Awareness through media

	Percentage
Neighbors, Friends, Relative	54.20%
Social Media	38.20%
News paper	28.60%
Television	23.90%
Lam post	18.50%
Magazine	18.40%
SMS Broadcast	15.90%
Bill Board	14.90%
Radio	7.20%
Web Banner	6%
Malls	6%
Government Office	4.80%
Road Shows	2.90%
The service provider told me to use it	1.20%

3.2.2.3 Awareness of e-government channels

Table 12 demonstrates the awareness of e-government channels. The results show that the majority of respondents (74%) are aware of the national portal followed by the national contact center (54%) and Kiosks (42%). However, results reflected a very weak awareness on Mobile Apps and Electronic Service Centre (ESC).

Table 12: Awareness of e-Government channels

	Individual	Business	Government
The National Portal	69.2%	76.2%	75.8%
The National Contact Centre	53.1%	56.7%	51.0%
Kiosks	34.6%	55.8%	35.1%
Mobile Apps	28.8%	25.1%	35.6%
Electronic Service Centre	31.0%	28.6%	21.7%

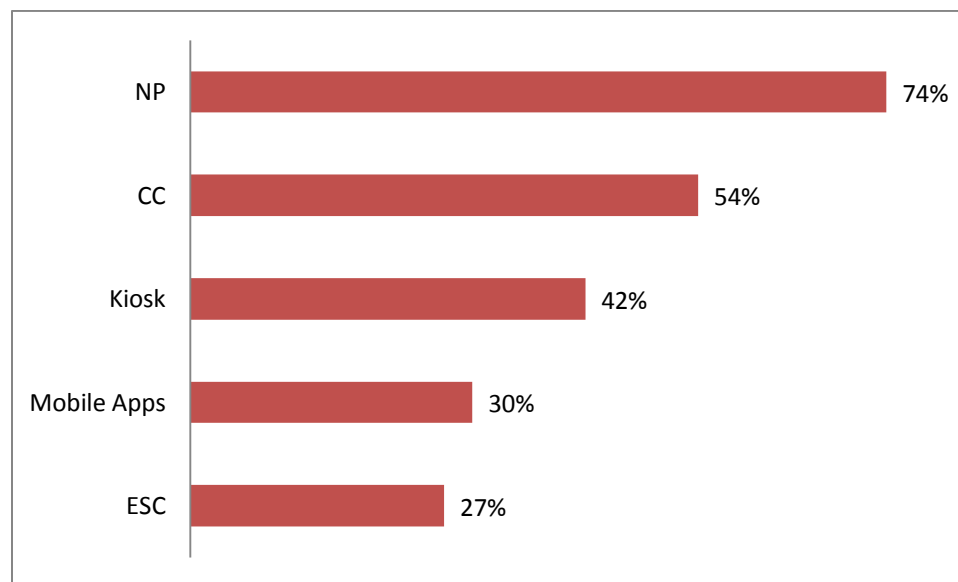


Figure 6: Awareness of E-Government Channels

3.2.2.4 Awareness of Mobile Apps

Table 13 presents the level of awareness of Mobile Apps among the respondents. The results show that Bahrain Today (12.4%), Student Exams Results (11.5%), Electricity and Water Bill Payment (11.1%), Traffic Service (9.8%) and Flight Information (8.6%) are the top five mobile apps that the respondents are aware of. However, respondents have a very low awareness on Mobile Apps such as Fix2Go, Bahrain International e-Government Forum, UN Public Service Forum Day and Award Academy and Members Guide- Bahrain Shura Council Guide. These mobile apps need to be focused on to enhance their awareness.

Table 13: Awareness of Mobile Apps

	Percentage
Bahrain Today	12.40%
Student Exams Results	11.50%
Electricity and Water Bill Payment	11.10%
Traffic Service	9.80%
Flight Information	8.60%
Islamiyat	6.60%
Postal services	5.80%
eGov SMS Services	5.50%
Civil Service Bureau	5.40%
eGuide Bahrain	5.30%
Ministry of foreign affairs	5.00%
Health locator	4.90%
NGO Directory	4.90%
Gasoline Octane Inquiry	3.70%
eKiosk and eService Center Locator	3.70%
Profile manager	2.40%
Fix2Go	1.50%
Bahrain International eGovernment Forum	1.30%
UN Public Service Forum Day and Award Academy	1.10%
Members Guide- Bahrain Shura Council Guide	1.00%

3.2.2.5 Demographics impacts on awareness

In order to understand the need of our campaigns and take proper decisions, there is a need to study the impact of demographics such as Sex, Age, Nationality and Governorate on awareness. The following section will identify the impact of the aforementioned demographics on awareness.

Table 14: Sex & Awareness

	Male	Female
Not Aware	5%	7%
Aware	40%	48%

Table 15: Age & Awareness

	<=18	19-25	26-35	36-45	46-55	>55
Not Aware	1%	3%	4%	2%	1%	0%
Aware	4%	24%	30%	24%	6%	1%

Table 16: Nationality & Awareness

	Bahraini	Other Arab	Asian	Western
Not Aware	6%	2%	3%	0%
Aware	45%	14%	28%	1%

Table 17: Governorate & Awareness

	Capital	Northern	Southern	Muharraq
Not Aware	2%	3%	5%	2%
Aware	21%	26%	22%	19%

The overall demographics impact on awareness shown in Table 14, Table 15, Table 16 and Table 17 demonstrate that sex and governorate have no significant impact on awareness while the impact of age and nationality is obvious from the results. Thus, youth respondents (19-45 years old) are more aware of e-government services than other age groups. Therefore, awareness needs to be enhanced for the elderly and teenagers. On the other hand, Bahrainis have the highest awareness among the other nationalities so awareness needs to be enhanced for the expatriate.

3.2.3 Usage

The usage of any e-service is usually measured from different aspects to provide a comprehensive picture of stakeholders usage on the e-government services. E-government Authority has offered different channels for providing e-services, different e-services to different stakeholders, variety of media for communication with e-government authority. Therefore, the following sections will provide results regarding the e-government usage for the aforementioned aspects.

3.2.3.1 Overall usage

The previous results about the awareness revealed a high awareness level on the e-government. These results predict a high usage among the different stakeholders which have been confirmed by the results on Table 18.

Table 18 demonstrates that the overall usage of the three stakeholders was 82.3%. These percentages represent a high level of usage among individuals, business and government sectors.

Table 18: Overall usage

	Individual	Business	Government	Average
Usage	78%	86%	83%	82.3%

The previous section results show that there is a strong relationship between government interaction and awareness of e-services. Further investigation has been conducted to predict if

there is a relationship with the e-service usage. The relationship between interaction, awareness and usage is examined using descriptive and correlation analysis method. Table 19 illustrates the relationships between interaction with government entities, awareness of e-government services and usage of e-government services. The results show that whenever there is no interaction, the awareness is very low, however the awareness become very high when there is an interaction with the government entities. This have been confirmed by the correlation test (see Table 20), which show a significant relationship ($R = 0.265$).

Table 19: Interaction, Awareness & Usage

	Awareness	Not using	Using
No interact	Not aware	4%	2%
	aware	2%	6%
Interact	Not aware	3%	3%
	aware	8%	72%

Table 20: Interaction, Awareness and Usage Correlation

GOVI	Pearson Correlation	GOVI 1	GOVA .358**	GOVU .265**
	Sig. (2-tailed)			.000

** . Correlation is significant at the 0.01 level (2-tailed).

3.2.3.2 Channels usage

Table 21 and Figure 7 represent the distributed usage across all the e-government channels. The result show that the National portal and Mobile Apps have the highest percentages of usage while National Call Center and Electronic Service Center (ESC) have an average usage compared to the low usage of Kiosk.

Table 21: e-government channels usage

	National Portal	Kiosk	Mobile Apps	Call Centre	Electronic Service Centre
Individual	73%	23%	38%	44%	81%
Business	66%	31%	15%	46%	46%
Government	72%	45%	74%	71%	55%

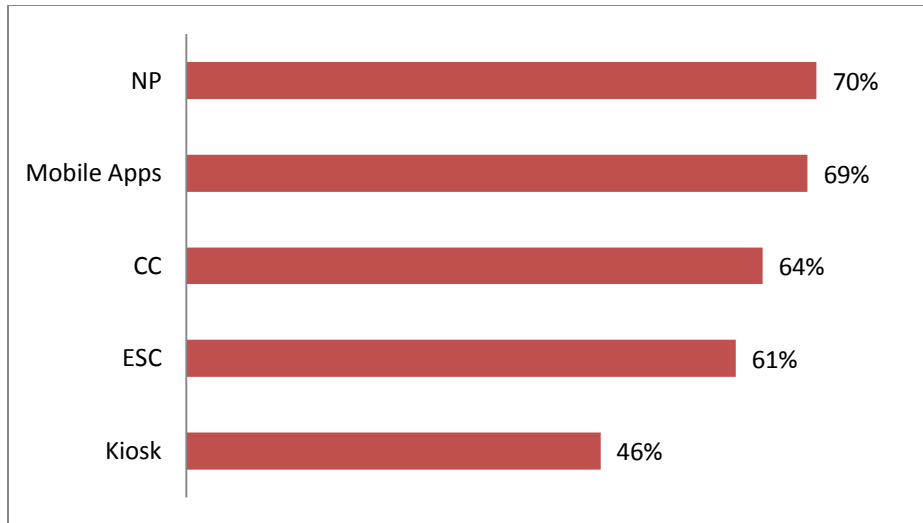


Figure 7: Overall usage of e-government channels

Though the e-government providing e-services through different channels, some governments are still proving their services through non e-government channels such as: websites, counters respective, post office and online banking. Therefore, the usage of the e-government channels are measured in addition to the usage of non e-government channels. This will provide an indicator to what extent are these channels present a competitors for the e-government channels.

Figure 8 illustrates the overall usage of the non e-government channels across the three stakeholders. Results show that the websites (63%) has the highest usage.

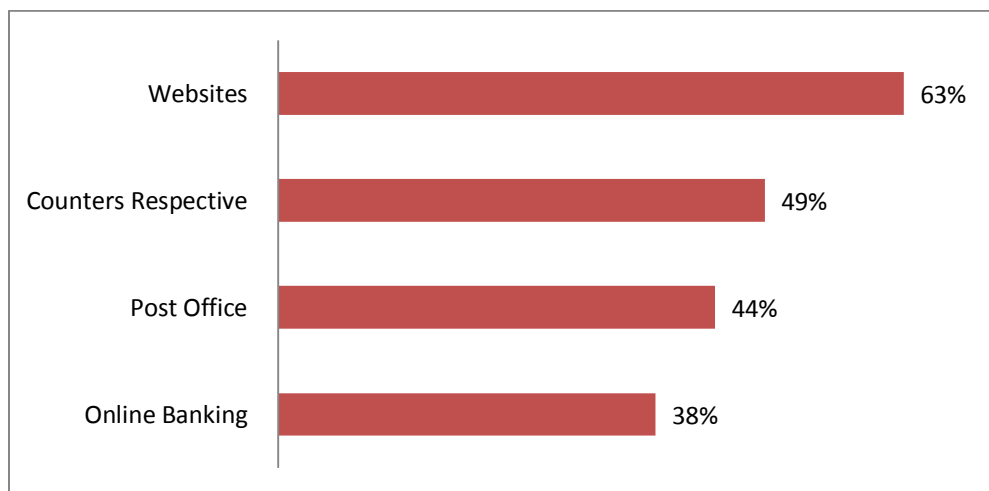


Figure 8: Overall usage of non e-government channels

Figure 9 illustrates that websites and online banking are considered as a main competitors for the e-government channels of National Portal and Mobile Apps. However, Post office and counters respective are considered as a main competitors for the e-government channels of Electronic Service Centers (ESC).

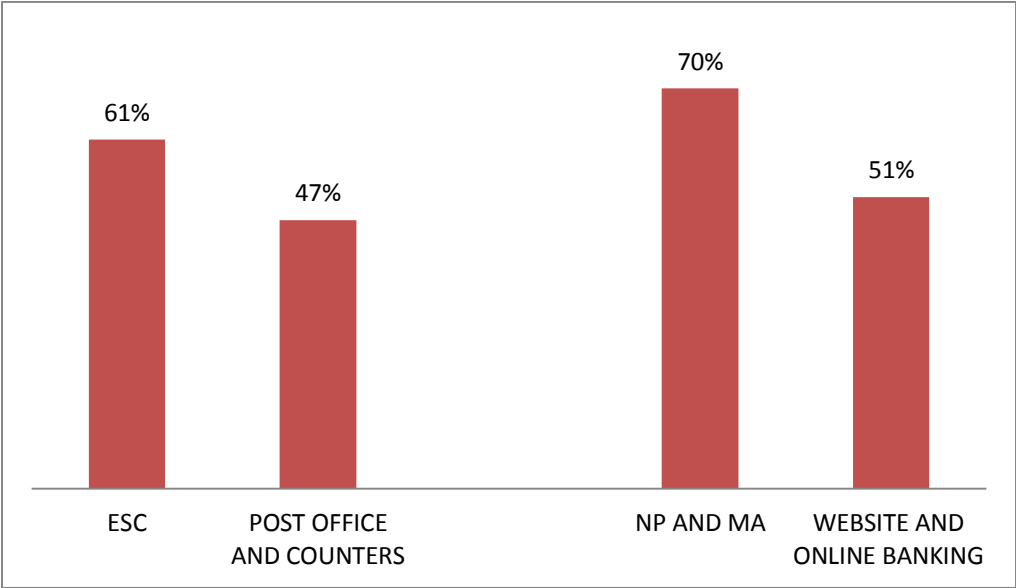


Figure 9: Benchmarking e-Government with non-e-Government channels' usage

Further analysis has been conducted to explore the usage behavior of the stakeholders in terms of using single or multiple channels, government and non e-government channels and digital and non-digital channels. Figure 10 shows that users prefer to use multiple channels either from non e-government or e-government channels. Moreover, Figure 10 and Figure 11 show that 66% of the respondents are depending on both non e-government and e-government channels in conducting their services activities.

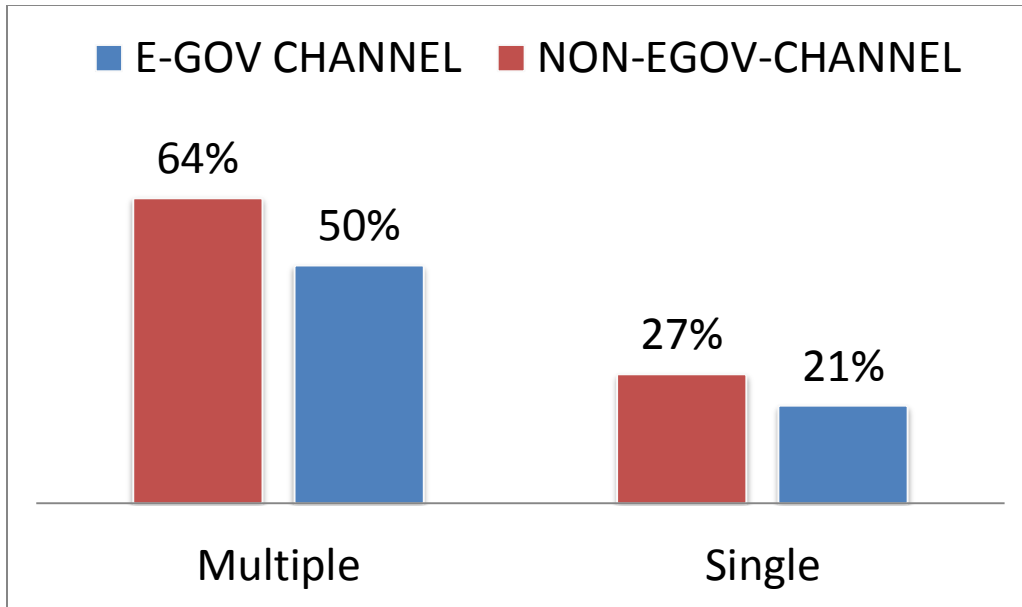


Figure 10: Single and Multiple channels' usage

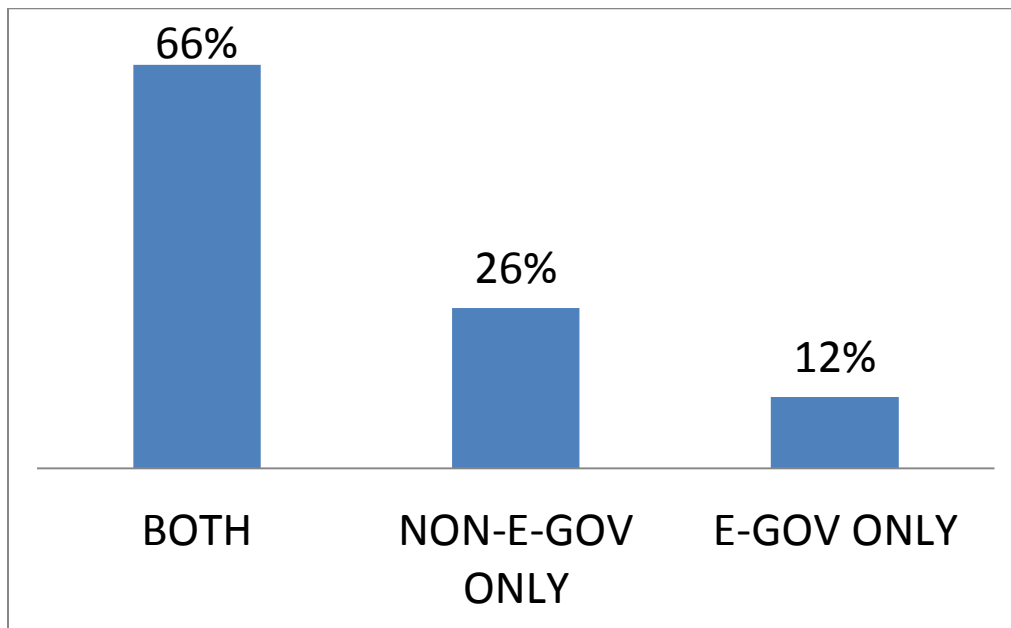


Figure 11: Channels Usage

Further investigation shows that 90% of the respondents are using digital channels in addition to other channels from both e-government and non e-government channels to conduct their e-services. However, only 11% of them are relying on digital channels from both e-government and non e-government channels. However, the results show that the reliance on the e-government digital channels is 26%, while 11% of the respondents are relying on non e-

government digital channels. These results reflect the e-government authority efforts towards the digital transformation of the society.

Since not all the stakeholders are using the e-government channels (82.3%) there is a need to investigate the reasons for not using e-government services.

Table 22 represents that mostly people are not using e-government channels because they do not know how to log into the portal and that they were not aware that the services they are using are covered by e-government services.

Table 22: Reasons for not using e-government services

	Individual	Business	Government
Was not aware that the services I use are covered by e-Government Services	2.1%	5.6%	3.1%
Lack of computer skills	0.9%	1.3%	1.0%
Tried making a transaction and it wasn't successful, and never tried again	1.2%	0%	1.0%
The services I use are not covered under the initiative	1.7%	1.3%	1.5%
Do not have credit card	1.6%	2.2%	1.5%
Prefer direct interaction	0.5%	0.4%	0%
Do not know how to log into a portal	2.2%	4.3%	5.7%
Do not trust the online payment	0.6%	0%	0.5%
Do not have internet	0.2%	0%	1.0%

Another issue raised from the usage percentage of Electronic Service Center (ESC) and Kiosk is regarding their location convenience. Therefore, respondents asked to rate their convenience toward the location of the Electronic Service Center and Kiosks. Overall results (see Table 23) shows that most of the stakeholders are satisfied with the location of the ESCs and Kiosks (61%) except the individual (48.7%).

Table 23: Convenience of the location

	Individual	Business	Government	Average
Percentage	48.7%	68%	65.5%	61%

As not all the stakeholders are fully satisfied by the locations, they have been asked to rate the suggested new locations for these channels. Results show that malls and residential locations are the most preferred locations for ESC and Kiosks.

Table 24: Suggested locations for ESC and Kiosk

	Municipalities	University	Resident Locations	Malls	Bahrain Investor Centre
ESC	7%	12.5%	13.1%	14.6%	6.2%
Kiosk	8.5%	9.1%	13.4%	13.5%	7.7%

Based on the usage of the e-government channels, respondents have been asked to rank the channels based on their usage. Table 25 demonstrates the respondents ranking of the e-government channels. The overall results show that the National Portal is the highest ranked among the channels, while Kiosk has the least ranking. These results are not surprising as it reflects the usage percentages of the e-government channels as shown in Figure 8.

Table 25: Ranking of e-government channels

	Individual	Business	Government	Overall
National Portal	1	2	1	1
Call Centre	2	1	2	2
Mobile Apps	3	3	5	3
Electronic Services Centre	4	4	4	4
Kiosk	5	5	3	5

3.2.3.3 Purpose of Using e-Government channels

E-government channels are used for many purposes ranging from posting a general queries to transaction activity while sometime the channels can be used for an entertainment purpose (mostly by using BIPA applications for social and learning entertainment by gaming; e.g. “Trah Tegdar”, “Traffic Game”, “Smartest”). Therefore, the purpose of using e-government channels has been measured (see Table 26). Mainly, people are using the e-government channels for transaction activities and general queries.

Table 26: Purpose of Using e-Government channels

	Individual	Business	Government
General Queries	83%	59%	56%
Register a Complaint	67%	37%	27%
Transaction Activity	74%	65%	69%
Entertainment	52%	24%	28%

3.2.3.4 E-services usage

The usage of e-government services has been investigated from two different aspects include: the usage of e-Government services through e-Government channels and the usage of the top e-services by the three stakeholders.

Table 27 presents results on the usage of e-Government services through e-government channels. The results show that most of the channels used for e-service are National Portal (84%) and ESC (82%). While Smart Card Appointment (91%), Pay Electricity and Water Bills (87%) and University of Bahrain Course Payment (83%) are the most e-services used by the stakeholders.

Table 27: Usage of e-Government services through e-Government channels

	NP	Mobile Apps	CC	Kiosk	ESC	Average
Civil Service Bureau	88%	52%	72%	-	63%	69%
Pay Electricity and Water Bill	90%	80%	69%	100%	95%	87%
Payment of Traffic Contraventions	81%	97%	51%	74%	82%	77%
Smart Card Appointment	90%	-	83%	-	99%	91%
Student Exam Results	85%	92%	70%	-	66%	78%
Driving License Renewal	69%	70%	64%	60%	100%	73%
Vehicle Registration Renewal	70%	84%	60%	56%	83%	71%
University of Bahrain Course Payment	100%	-	-	-	65%	83%
Average	84%	79%	67%	73%	82%	

The e-government is providing customized e-services for each stakeholders. Each year the e-government authority provides the top e-service used by each stakeholders. These top services were used to further investigate the usage of them among the respondents of the current study.

Table 28 results show that 70% of the respondents are using 13 of the top e-services. However, most of the used e-service by individuals are transaction based. Table 29 results show that 50% of the respondents are using only 7 of the top e-services. Table 30 results show that 60% of the respondents are using 15 of the top e-services, which means they are using most of the provided e-services.

Table 28: Top services usage by individual

	Percentage
VIVA Services	88
Payment of Electricity and Water Bills	87
Smart Card Appointment	84
Zain services	84
Electricity and Water e-Billing (enquiry)	81
Payment of Traffic Contraventions	77
University of Bahrain Course Payment	75
Student Exam Results	74
Driving License Renewal	72
Tracking of Postal Packages	72
Appointment for Driving Training Class	71
Vehicle Registration Renewal	70
Pre-Employment Health Check-up Appointment	70
Endorsement of Certificates	69
Court Case Enquiry	69
Request for Birth Certificate	69
Civil Service Bureau Employee Services	64
Issuance of Insurance policies for King Fahad Causeway	64

Table 29: Top services usage by business

Top service	Percentage
Commercial Registration Enquiry	81
Issue of Advertisement Permits	69
Pre-Employment Health Check-up Appointment	66
Tracking of Postal Packages	55
Official Gazette	52
Legality of Foreign Worker	51
Zain Services	50
Customs Clearing Services	49
Employers Services	47
Unemployed Job Search	43
VIVA Services	42
Kingdom of Bahrain State Budget	42
Endorsement, Accreditation and Validation of Academic Qualifications	39
Shipping Cost	35
Submit Meter Reading	33
Payment and Enquiry of Court Execution Ruling	31

Table 30: Top services usage by government

	Percentage
Kingdom of Bahrain State Budget	84
Online eTendering	82
Traffic Diversion Request	72
Bahrain Embassies Abroad	71
Accreditation and Validation of Academic Qualifications	68
Sanitary Connections	67
Bahrain Laws	65
Qualifications and Quality Assurance Authority Services	64
Official Gazette	64
Legality of Foreign Worker	62
Check Status of eVisa	62
Accredited Missions in the Kingdom of Bahrain	61
Purchase Survey and Land Registration Bureau Maps	61
Endorsement of Certificates	60
Tracking of Postal Packages	60
Registration Service for Bahraini Students Abroad	58
Apply for an eVisa	52
National Enterprise Architecture Framework	34

3.2.3.5 E-government communication media

The e-government authority is continuously expanding their channels and e-services. Therefore, there is a need to enhance their communication with the stakeholders in order to get their feedback, opinions, complain, etc. This in turn will help to enhance the e-government services.

Respondents requested to rate their preferred way of communication with the e-government authority. Table 31 demonstrates that the National Contact Center, ESC, Tawasul and Email are the main communication media preferred to communicate with the e-government.

Table 31: e-Government Communication Channel

	Social Media	Tawasul	CC	email	Live Chat	ESC	Blogs	Personal visit to eGA
Individual	48%	81%	83%	73%	74%	64%	70%	64%
Business	46%	66%	82%	69%	56%	71%	56%	64%
Government	25%	60%	72%	62%	54%	79%	58%	63%
Average	40%	69%	79%	68%	61%	71%	61%	64%

3.2.3.6 Demographics impacts on usage

In order to develop and improve the available e-services, there is a need to study the impact of demographics such as Sex, Age, Nationality and governorate on usage. The following section will identify the impact of the aforementioned demographics on usage.

Table 32: Sex & Usage

	Male	Female
No Usage	8%	9%
Usage	37%	46%

Table 33: Age & Usage

	<=18	19-25	26-35	36-45	46-55	>55
No Usage	2%	4%	5%	4%	1%	2%
Usage	4%	22%	27%	21%	5%	4%

Table 34: Nationality & Usage

	Bahraini	Other Arab	Asian	Western
No Usage	7%	3%	6%	1%
Usage	43%	13%	25%	1%

Table 35: Governorate & Usage

	Capital	Northern	Southern	Muharraq
No Usage	3%	5%	6%	4%
Usage	20%	24%	20%	18%

The overall demographics impact on usage shown in Table 32, Table 33, Table 34 and Table 35 demonstrate that sex and governorate have no significant impact on usage while the impact of age and nationality is obvious from the results. The results is reflecting the demographics impact on awareness. Therefore, the e-government authorities need to target the youth in their e-services and make more e-services for the expatriate.

3.2.4 Satisfaction

The satisfaction is the extent to which an e-service helps the user create value for the organization's internal or external customers. Usually, satisfaction of any e-service is measured by adopting available satisfaction models such as DeLone and McLean Model of IS Success (2003). This will help to identify not only the satisfaction but also identify the factors impacting the satisfaction. In fact, the developed model of customer satisfaction index (BHCSI) will

measure the user satisfaction, the factors influence the satisfaction and the impact of satisfaction on the e-services categorize as it will be discussed later in the report; in addition to measure the customer satisfaction index. However, there is still a need to measure the user satisfaction level on the e-government existing channels and the top e-services. This information on satisfaction will help the e-government authority in improving their services and enhancing their channels. The satisfaction in this section was measured descriptively and not by adopting any model. In addition, it measured in terms of e-government channels and e-government top services across the three stakeholders.

3.2.4.1 Satisfaction with e-government channels

The satisfaction on the e-government channels was measured by adopting a descriptive method based on certain criteria reflecting the nature of the channels. For the digital channels such as National Portal, Mobile Apps and Kiosk the following criteria will be used: availability, accessibility, safety and security of interface, appearances, range of services offered, comprehension of usage guideline, time taken to execute the services compared to on location, information accuracy, information Organization, recently of information and readability. On the other hand, the satisfaction towards Electronic Common Service (ECS) and Call Center were measured in terms of staff adequacy, listening to your issues, timeliness of providing information, subject knowledge, quality of information, consistency of response, detailed clarification, provide you with solution(s)/ guidance, guidance and instruction (call of action), parking space, cleanliness, ambience, waiting area, facilities for the disables and public amenities.

This type of analysis will measure the stakeholders' satisfaction percentages towards e-government channels. Table 36 shows clearly that the National Portal on average got the highest satisfaction percentage while Mobile Apps got the lowest level.

Table 36: Percentage of satisfaction of e-government channels

Sector	National Portal NP	Mobile Apps MA	Kiosk K
Individual	61%	50.3%	54.2%
Business	68.6%	54.8%	70%
Government	65.5%	58.3%	56.6%
Average	65%	54%	60%

Table 37 reveals that the Call Center on average got higher satisfaction percentage than Electronic Service Centre (ESC). However, the satisfaction percentages for both are still low compared with the other channels, which requires further consideration by the e-government authority for more development and improvement.

Table 37: Percentage of satisfaction of e-government channels (ESC & CC)

	Electronic Service Centre (ESC)	Call centre (CC)
Individual	49.1%	52.2%
Business	43.1%	61.6%
Government	46.7%	55.6%
Average	46.3%	56.4%

By measuring the channels satisfaction, it would be useful to identify to what extent it is reflecting the awareness and usage of the e-government channels. Figure 12 shows that National portal got the highest percentage of satisfaction which reflects its highest awareness and usage. However, Call Centre and Mobile Apps have a moderate satisfaction percentages which reflect the low awareness. On the other hand, the ESC has the lowest satisfaction percentage reflecting the lower percentage of awareness and usage. However, Kiosk has higher satisfaction than ESC, with a lower awareness and usage than ESC. Therefore, it cannot be concluded that the awareness and usage are the main factors effecting satisfaction where there are other factors which need to be investigated.

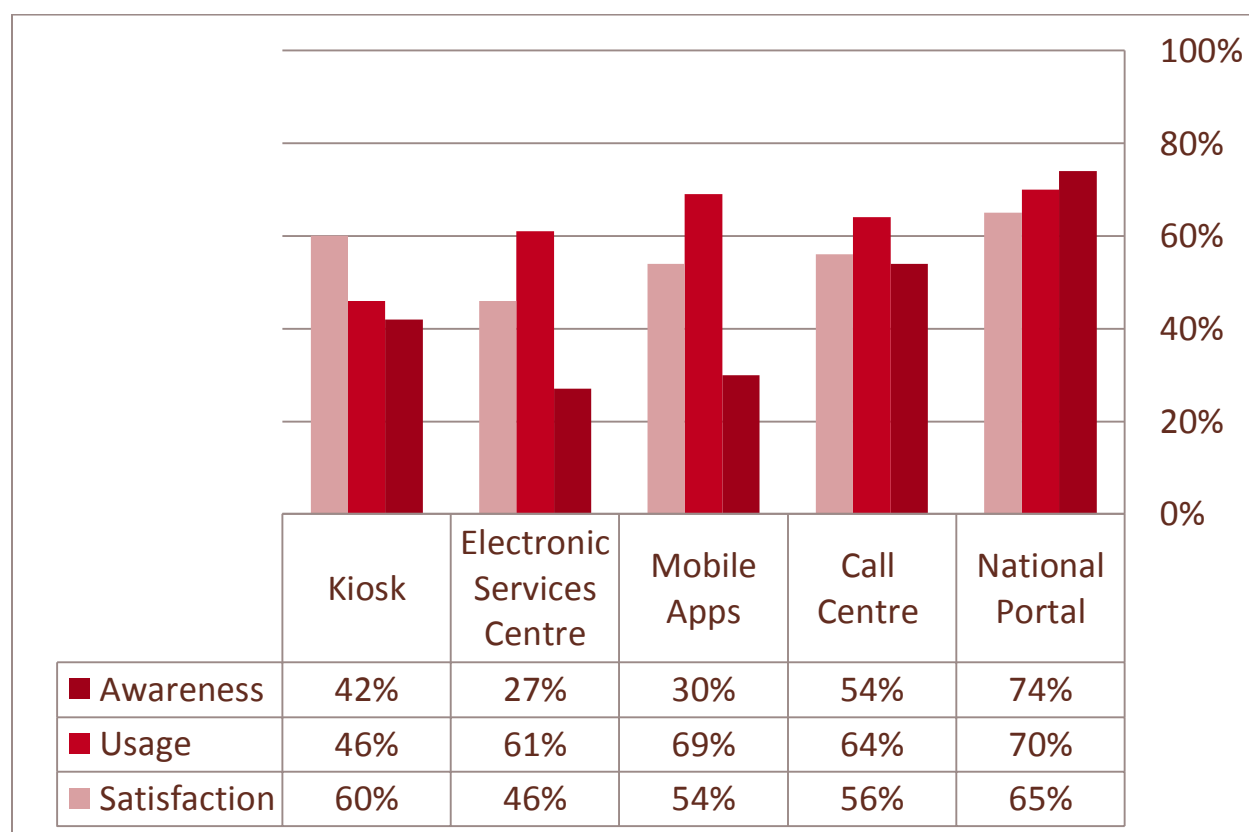


Figure 12: Satisfaction, Awareness and Usage of the e-Government Channels

3.2.4.2 Satisfaction with the e-government top e-services

The satisfaction on the e-government top e-services was also measured by adopting a descriptive method based on the following criteria: clarity of instructions to use the e-service, ease of accessing the e-service, time taken to complete the transaction, and confirmation/proof of completion of e-service. Moreover, the satisfaction of the different three stakeholders was measured on their customized top e-services. Satisfaction results shown in Figure 13, Figure 14 and Figure 15 show that the individual top e-services got the highest satisfaction percentages among the stakeholders as 14 of them got higher than 70%. However, only 4 of the government top e-services got satisfaction percentage higher than 70%. While the business top e-services got one e-service with a satisfaction higher than 70%. On the other hand, Tracking of postal packages and endorsement of certificates are two common e-services among the three stakeholders. These two e-services have got different satisfaction percentages for the different stakeholders which raised inconsistent view of the e-service. One reason for this result is the e-services categorization by the e-government authority which based on the stakeholder not on the governmental entity which provide this service.

For the individual as shown in Figure 13, Pay Electricity and Water Bill e-service got the highest level of satisfaction (89%) while Insurance policies for King Fahad Causeway e-service got the lowest level (66%). However, the top e-services for the business sectors got the lowest satisfaction percentages. Figure 14 shows that Commercial Registration Enquiry e-service got the highest level of satisfaction (81%) while Payment and Enquiry of Court Execution Ruling service got the lowest level (31%). For the government sector, Kingdom of Bahrain State Budget service got the highest level of satisfaction (84%) while National Enterprise Architecture Framework got the lowest satisfaction level (34%) as shown in Figure 15.

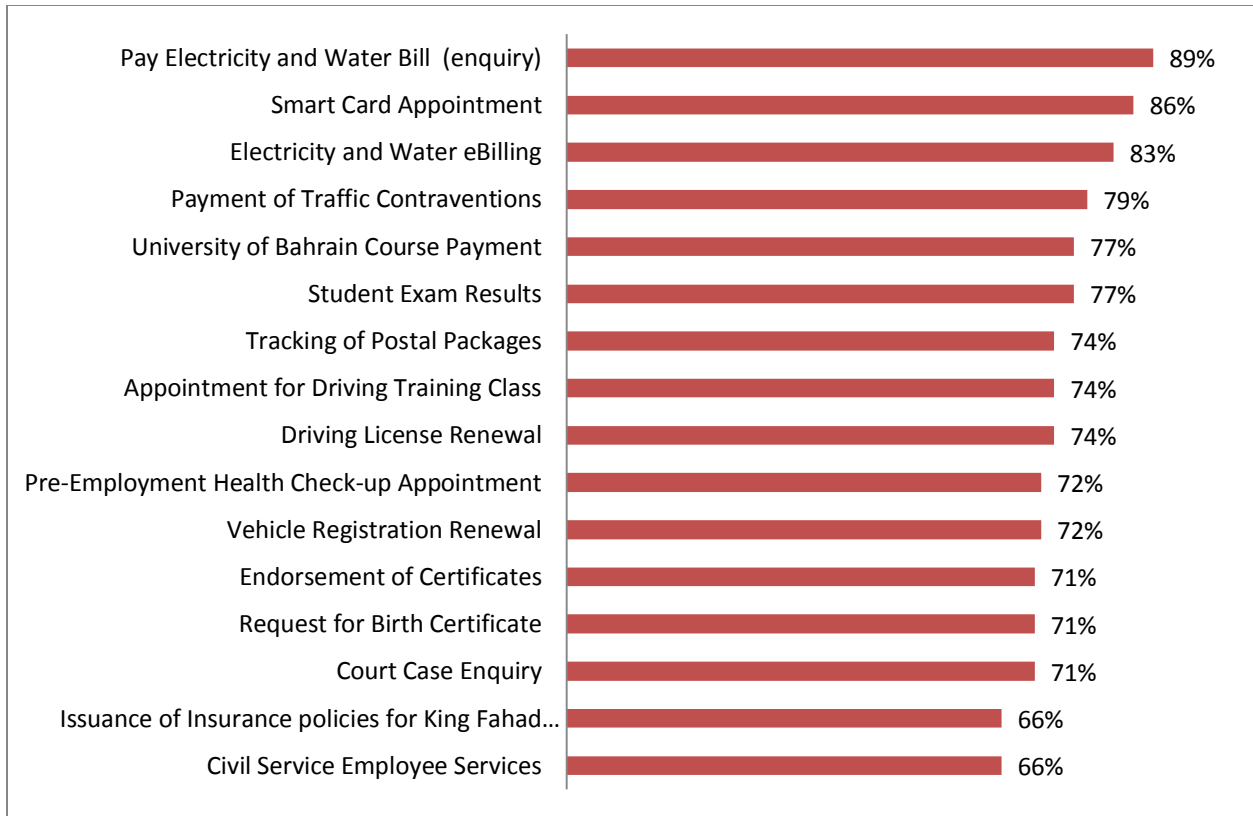


Figure 13: Satisfaction of Top Services for Individual

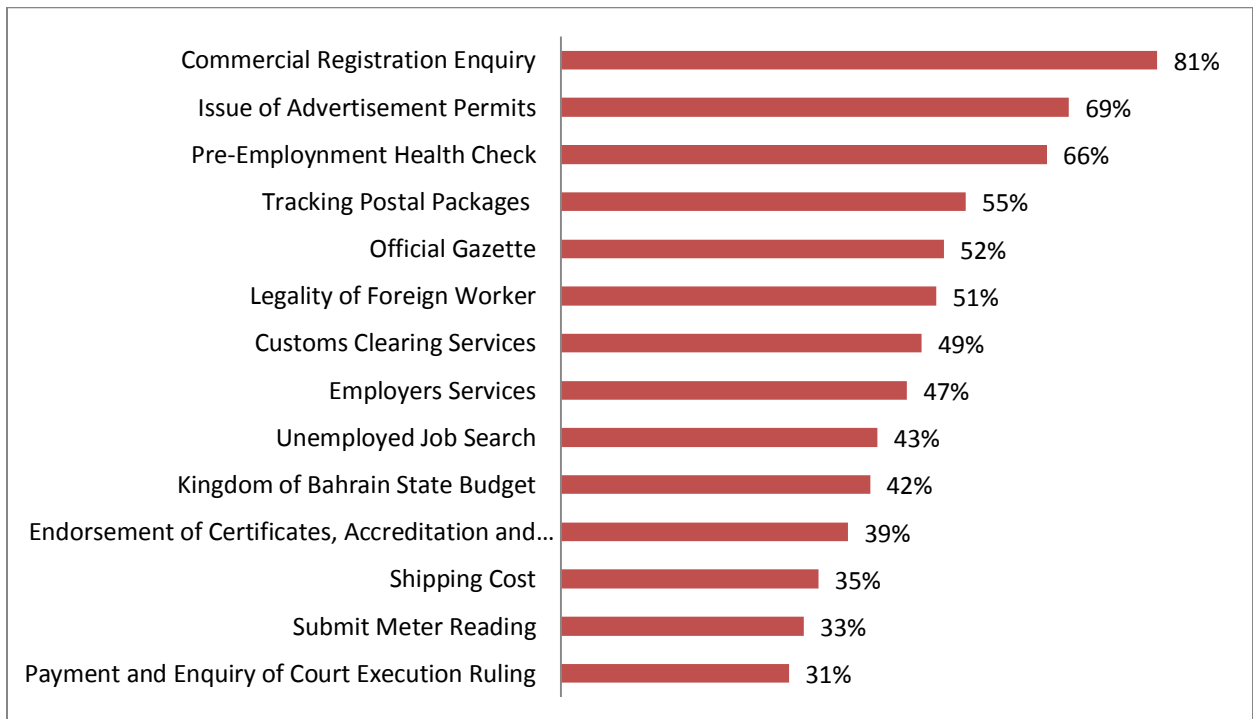


Figure 14: Satisfaction of Top Services for Business

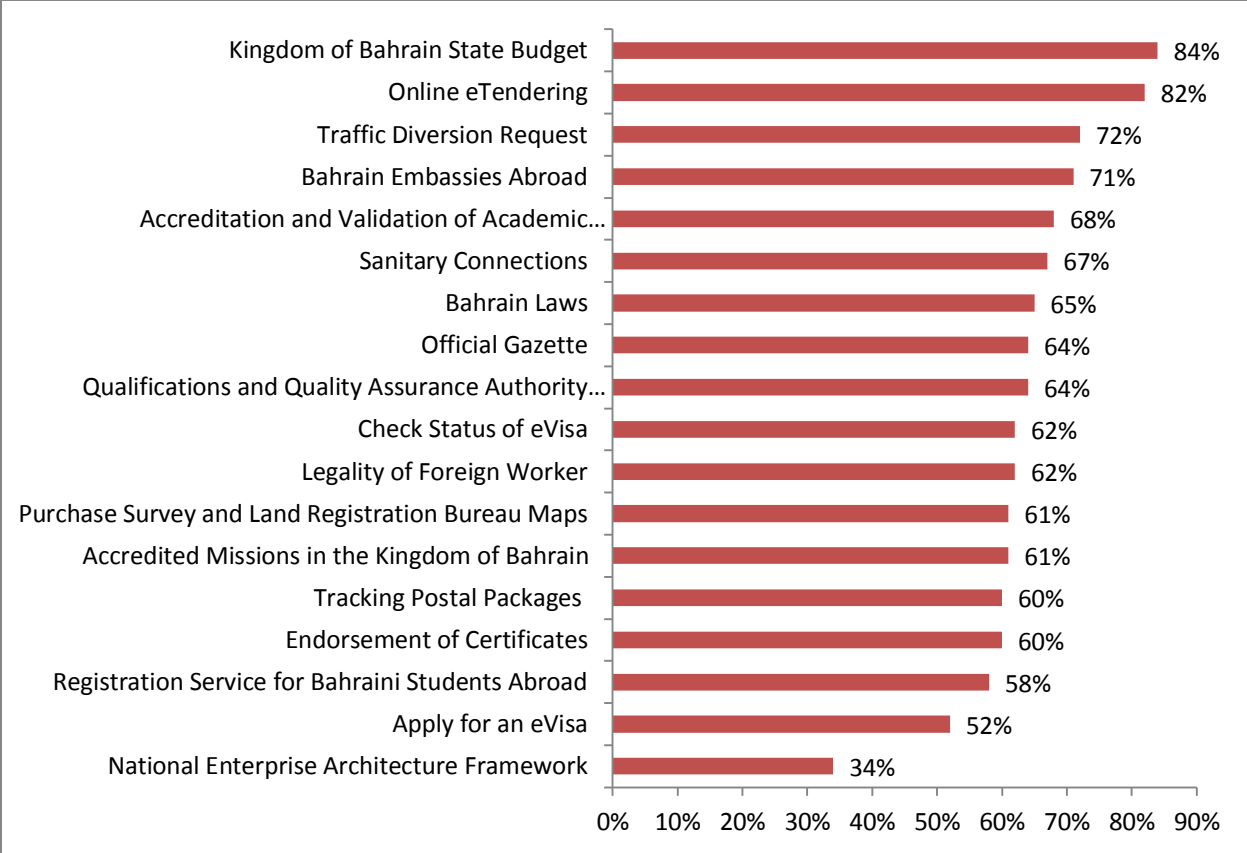


Figure 15: Satisfaction of Top Services for Government

3.2.5 Individual, social and economic impacts of e-government services

e-government is an important factor to promote and develop the country use and provision of e-services. Therefore, it is essential to investigate the impact of e-government on the individual, society and the economy. However, there is a shortage knowledge about the impact of those e-government e-services, this section will investigate the impact on the different individual, social and economic aspects.

Results presented in Figure 16, Figure 17 and Figure 18 demonstrate that there is a high impact of e-government on the individual, social and economic level. For the individual impacts, Figure 16 shows that e-government services has a high impacts on saving costs, reducing time and doing transactions anytime from anywhere. For the social e-government impacts, Figure 17 shows that e-government services has a high impacts on transferring Bahrain to a digital society, empowering special communities like special needs people and enforce greener and sustainable environments. For the economic impacts, Figure 18 shows that e-government services has a high impacts on enhancing the ministries/authorities reputation and image as well as providing an efficient and effective service delivery.

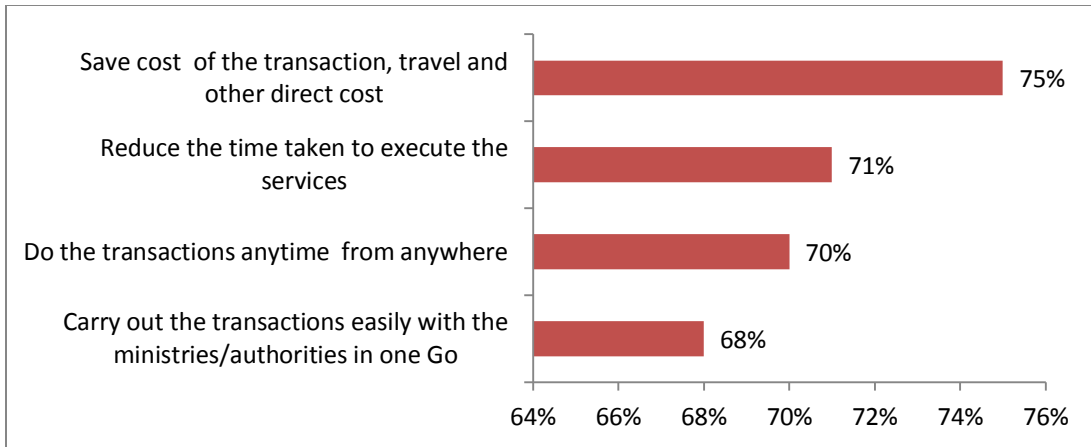


Figure 16: e-Government Individual Impacts

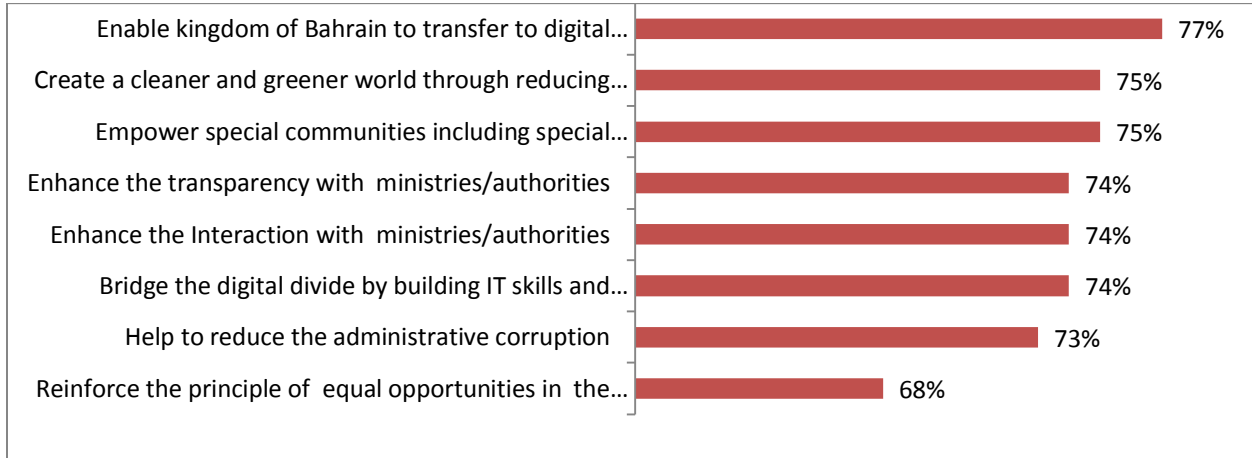


Figure 17: e-Government Social Impacts

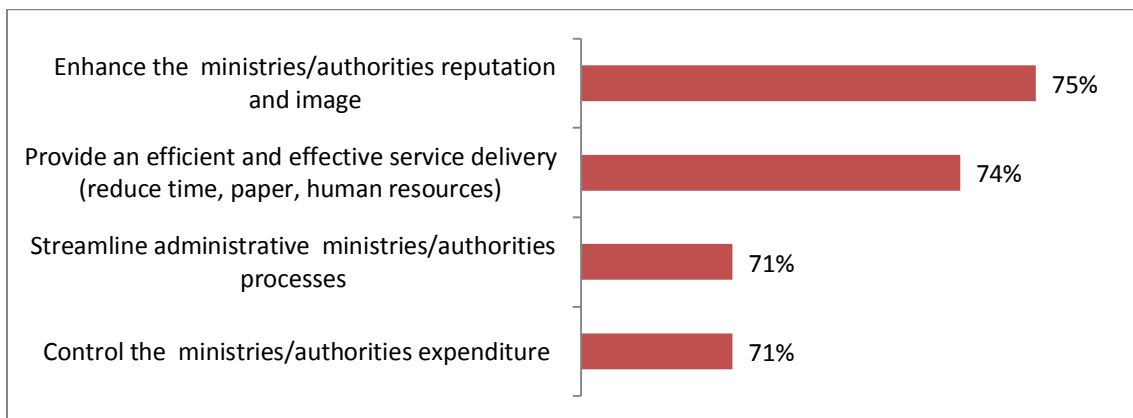


Figure 18: e-Government Economic Impacts

3.2.6 Future development

E-government authority strives to develop their e-government services and initiatives based on their stakeholders' needs. In addition, they are enhancing their participation with stakeholders in taking strategic decisions regarding future development and improvements. Therefore, the following section will investigate the stakeholders preferences for some stated initiatives and past recommended e-services.

Table 38 illustrates that enabling portal personalization was the most preferable initiative that is required to be fulfilled by EGA which matches e-government future strategy. Furthermore, providing higher protection and security of users' Information and personalized unified portal for all citizens e-services were the second and third required initiatives for further development. For the e-services, vehicle maintenance and service, passport related services through the e-government channels, checking individuals General Organization of Social Insurance (GOSI) and Pension Fund for government employees, online school fee payments, and traffic jam alert information were required in future respectively.

Table 38: The future development of e-government

	Rank
Enable portal personalization	1
Vehicle maintenance and service	2
Provide higher protection and security of users' Information	3
Provide personalized unified portal for all citizens e-services	4
Passport related services through the e-government channels	5
Check individuals General Organization of Social Insurance (GOSI) and Pension Fund for government employees	5
Online school fee payments	6
Traffic jam alert information	7
Provide more awareness of e-government services	8
E-government connections to banks	8
Payment of Batelco bills through e-government website	8
Hotel and Restaurant Booking	9
Online application and processing for Rent a car	10
Cinema tickets booking	11

3.3 Results on the customer satisfaction index of the e-government services based on BHCSI

As it has been mentioned in the previous section that BHCSI is a model for measuring the customer Satisfaction based on well-established international model. In this section, the results of the analysis of this model will be presented.

3.3.1 Identification of BHCSI

Table 39 shows that the overall customer satisfaction for the e-government services is 79.4 which is considered to be very high. BHCSI will be benchmarked with the average international CSI of the private e-services as few countries have adopted their own CSI model or used ACSI model to measure their online public services while many countries have adopted CSI model to measure private online-services where they set 75 to be the average score. Accordingly, BHCSI is considered above the average of the CSI of the private sectors. Such result is considered a significant achievement for the Authority of E-Government and Kingdom of Bahrain as a whole while many countries failed to reach this average (75).

Table 39: Overall customer satisfaction index

	Index
Bahrain Customer Satisfaction Index (BHCSI)	79.4

The study also measured the overall BHCSI of the e-service categories offered for the different stakeholders including: individual, business and government as shown in Figure 19. The results revealed that the overall BHCSI of the individual and business e-services are all above the average (79 and 80 respectively). However, the BHCSI of the government e-services is 71.5 which is below the average.

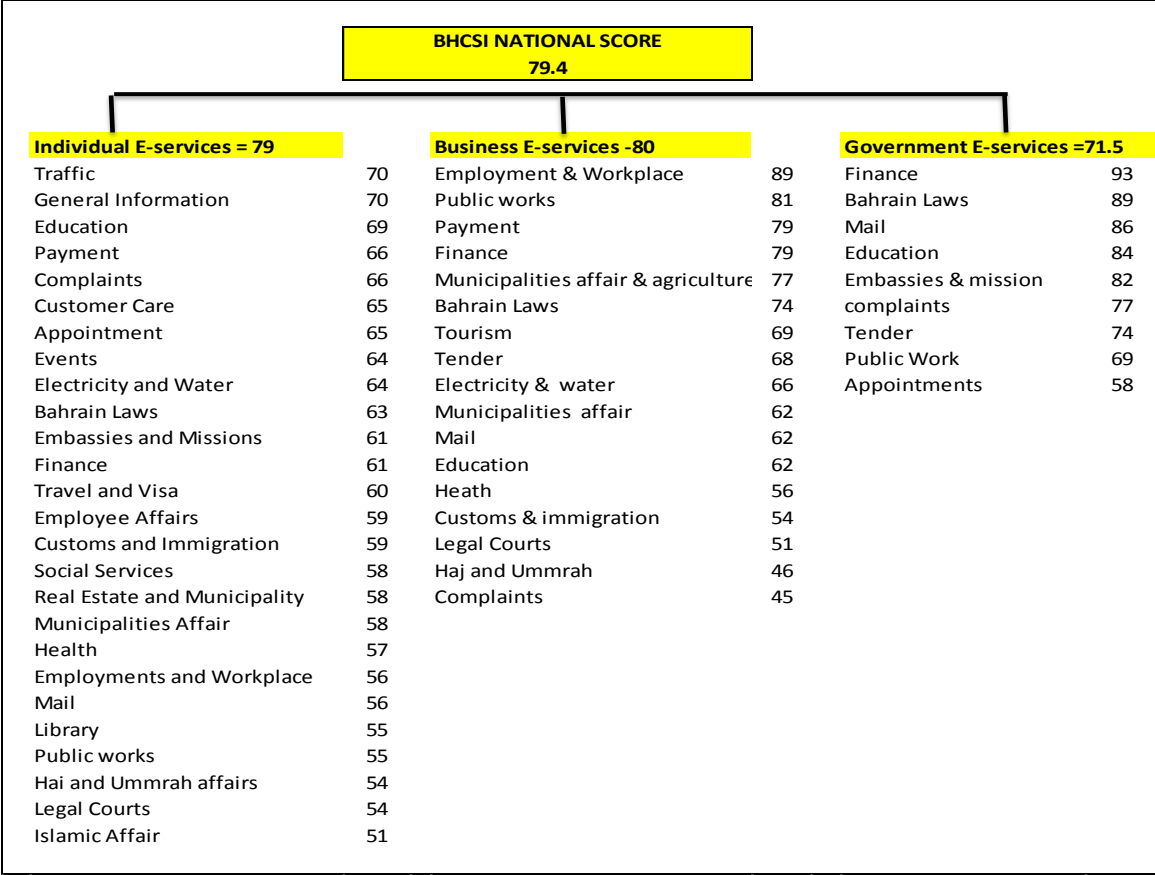


Figure 19: BHCSI National Score

Moreover the analysis of BHCSI identified further information on the customer satisfaction of the different categories of e-services. The results in Table 40 demonstrate that there are many e-services categories have achieved very low score cross the targeting stakeholders. For instance, e-services categories such as that Haj and Ummraa, Legal Court, Customer immigration and Health have achieved very low scores which are targeting different stakeholders.

Table 40: Examples of low SCI of e-service categories

	Individual E-services	Business E-services
Haj and Ummara	54	46
Legal Court	54	51
Customer immigration	59	54
Health	57	56

It can be observed from Table 41 that there is a contradiction in the scores of some e-services categories across the stakeholders. Thus there are some e-service categories that have achieved

very high score under certain stakeholder. However, the same e-service categories scored very low under other stakeholders such as Finance and employment and workplace.

Table 41: Examples of high SCI of e-service categories

	Individual E-services	Business E-services	Government E-services
Public works	55	81	69
Employment and workplace	56	89	-
Finance	61	79	93
payment	66	79	-
Education	69	62	84

The contradiction in the results is may cause by the present structure of the e-services categories in the National Portal. With such structure it will be difficult to assess the customer satisfaction of the e-services categories provided by certain government which targeting different stakeholders. The government then will get different scores for each stakeholder, although these e-services are provided by single entity. Accordingly, the results will be subjective not reflective. Different factors will impact such results like the importance and the needs of the provided e-services for the stakeholder, the usage rate and effectiveness of them.

The e-services categories need to be restructured to reflect the provided entities for example, Educational e-services with subcategories for individual, business and government. With such restructure, one score for customer satisfaction can be identified for the e-services categories and the authority or government providing such e-services.

In addition, it has been noticed that the overall CSI of the stakeholder e-services does not reflect the e-services categories under them. For instant overall CSI of the stakeholder e-services may have high score like the individual e-services, however many of the e-services under this stakeholder have very low scores. Conversely, government e-services has the lowest overall CSI, however, most of the e-serves under this stakeholder have high CSI scores as shown Table 42. The results show that 55% of e-services categories for the government have an index score between 80 and above, while individual e-services which scored very high (79) has no e-service categories with score between 80 and above as the majority (42.3%) has an index between 69 and 60.

Table 42: CSI score of three stakeholders

	Individual E-services	Business E-services	Government E-services
80 and above	0	11.8	55.6
Between 79 and 70	7.7	23.5	22.2
Between 69 and 60	42.3	35.3	11.1
Between 59 and 50	50	17.6	11.1
Below 50	0	11.8	0

Based on the above results, it can be noticed that the benchmarking will be complicated and ineffective. This complication raised from having three overall CSI represent individual, business and government e-services categories in addition to the overall CSI and the indices of the different e-services categories make the benchmarking more complicated and ineffective. If one overall BHCSI for all public e-services is identified in addition to the CSI of each entity or authority that are providing the e-services, measurements will be more effective and comparable with what the international countries are doing. In this case it will be easier to assess and evaluate the customer satisfaction of each e-services category as it is reflected by the CSI of the government entities providing them.

3.3.2 Exploring the BHCSI model - Cause Side

As it has been mentioned earlier in the report that the BHCSI is not account just for the usage experience, but also is forward-looking as it embedded in a cause and effect relationships. Moreover, BHCSI is a multi-items scale represents different aspects of customer attitudes: perceived quality, expectation, trust, complaints, participations and government-image. The following section will explore the cause-effect relationship and explore the impact of the different aspects of customer attitude in the overall BHSCI. Accordingly, the BHSCI will be explored from the two sides: the factor causing and impacting the CSI and the effect and impact of CSI.

Table 43 demonstrates information on the satisfaction Indices of the cause side of the model. The cause side of the model has factors that have an indirect effect on CSI via perceived quality in addition to the factors that have a direct effect on CSI such as perceived quality and customer expectation.

It can be noticed that the perceiving quality has a direct impact on the CSI and it has scored at 80.9 with scores identified for individual, business and government range between 73 and 86. In general the index is considered high which means that the quality of the e-services is perceived very high by the different stakeholders except the government as the index of perceived quality is below the average (73).

The perceived quality is impacted by four factors include e-services usability, information quality, security and public responsiveness. The results in Table 43 indicate that indices of e-services usability, information quality and security are high for business and individual, although they have low impact on the perceived quality as it shown in Table 43. However, these factors were scored low in government with indices of 63.1, 69.5 and 72.4 for e-services usability, information quality and security respectively.

Government employees are still facing problem with the e-services usability, information quality and security of their e-services categories which impacted the index of the perceived quality (73). However, public responsiveness index is above the average but lower than the index of the other factors. This indicates that the public responsiveness is very important factor but still customer not perceive good responses from the e-services providers. They may not promote a good response or they may busy to response to the customer requests or help. Therefore, more emphasis should be provided on this factor.

Customer expectation on the other hand, has lower index than the perceived quality but it is still high with 78 for individual, 85.5 for business and 73 for the government which is below the average. The index of the customer expectation indicates that e-services of individual and business have reached their expectation However, index for government e-services are not reaching the expectation of the government employees as they have high expectation on the provided e-services to facilitate their process and streamline their transactions progress. The customer expectation has an impact on the perceived quality in addition to its impact on the CSI. Thus, the index of customer expectation impacting that of perceived quality.

Table 43: Factors impacting the CSI

	Indirect cause				Direct cause	
	E-service usability	Information quality	Security	Public responsiveness	perceived quality	customer expectation
Individual	82	84	83	79	80	78
Business	98.8	92.9	91.4	79	86.4	85.5
Government	63.1	69.5	72.4	70	73	73
	79.9	83.3	82.6	78.6	80.9	78.8

3.3.3 Exploring the BHCSI model - Effect Side

Table 44 demonstrates information regarding the effect side of the BHCSI model. The results show that most of the score of the identified effect factors for CSI such as government image, trust, complaint and public participation are above the average for individual, business and government (82.7, 79.2 and 76.5 respectively). However, for government the score of the effect factors are still below the average (71.5, 67.8, 70.3 and 73 respectively) for the same factors. For business, the indices of the effect factors reach the highest scores ranging from 85 to 95. Thus, CSI has very high impact on these factors which is reflected by the index of the CSI of 79.4. CSI

indices for individual and government are very high (79 and 80 respectively) while government has very low index for 71.5 which is effected the indices of government image, trust, complaint and public participation.

Table 44: The effect of the CSI

	Government Image	Public Trust	Public Complaint	Public Participation
Individual	82	78	69	73
Business	95	93	85	95.5
Government	71.5	67.8	70.3	72
Overall	82.7	79.2	76.5	79.7

3.3.4 BHCSI structured Model Analysis:

Moreover, the cause and effect of the BHCSI can be explored through the structured model analysis and the correlation between the factors. Table 45, Table 46, Table 47, Table 48, Table 49 and Table 50 present a summary of the structured model analysis. Figure 20 demonstrates an example for the overall BHCSI of the three stakeholders.

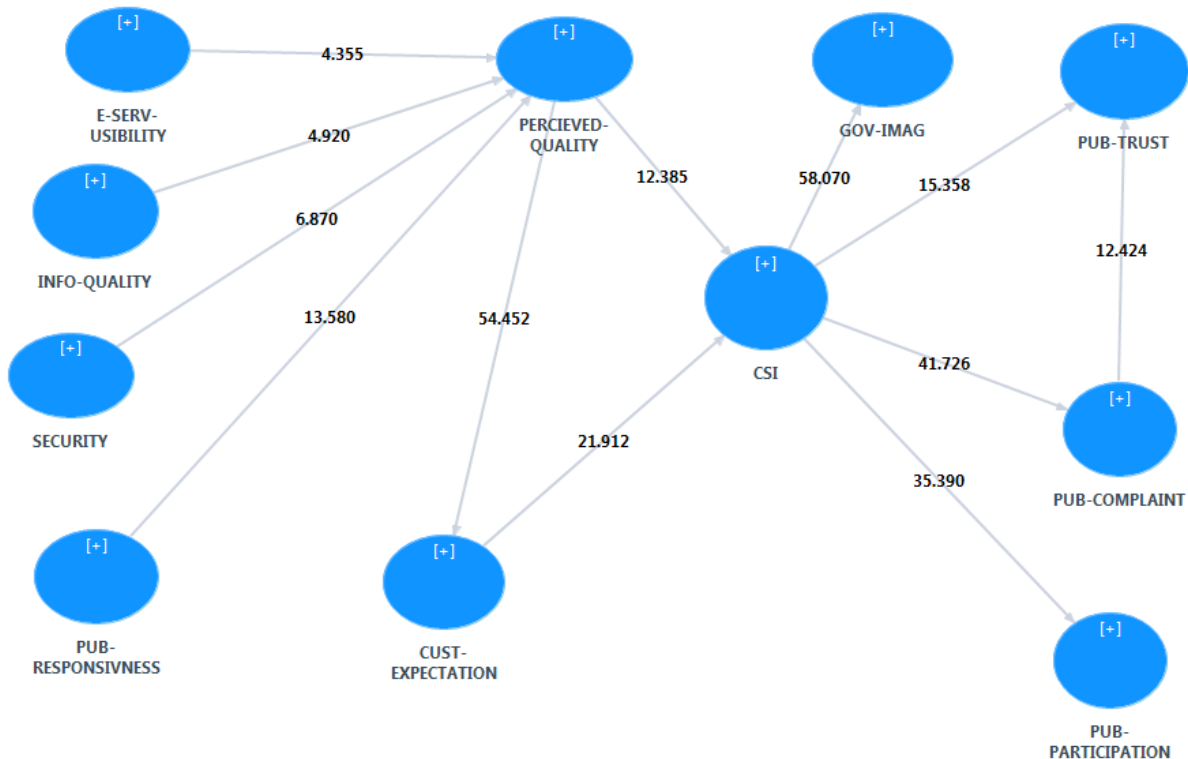


Figure 20: Overall CSI Model

Table 45 reveals that an average of 60% of the variance on the CSI is influenced by e-services usability, information quality, security and public responsiveness and that more than 50% of the variance on the customer expectation is caused by perceived usability. However, most of this variance is caused by public responsiveness as shown in Table 46.

Table 45: Variance on perceived quality and customer expectation

Path analysis				
	Individual	Business	Government	Overall
% of the variance on perceived quality	60%	70%	50%	60%
% of the variance on customer expectation	58%	63%	45%	57%

Results in Table 46 show that public responsiveness has a strong effect on perceived quality with both business and individual. This is not the case with government as public responsiveness has no impact (-0.120) on perceived quality. This can be interpreted by the reasons the public variable was measured as an aggregated meaning of responsiveness that includes willingness to help and government availability to respond to any requests.

However, this measure did not consider the different variants of responsiveness that includes dedicated, constrained, purposive, entrepreneurial, and negotiated responsiveness based on Bryer (2007) classification. Specially government employees are most concerned about a certain types of responsiveness that could satisfy their requirements such as purposive which targets the administrators defined goals or constrained responsiveness which help in identifying rules, norms and procedures which impose to address the other variants of responsiveness to customize the different stakeholders needs.

Table 46: Path analysis of factors impacting perceived quality

	Individual	Business	Government	Overall
E-service usability → perceived quality	0.16	0.10	.080	0.13
Information quality → perceived quality	0.19	0.23	0.19	0.16
Security → perceived quality	0.16	0.37	0.19	0.21
Public Responsiveness → perceived quality	0.37	-0.12	0.57	0.38
Perceived quality → Customer expectation	0.76	0.67	0.79	0.76

On the other hand, security has a weak impact on perceived quality for both business and individual while it has a good impact for government. Government employees are very concerned about the confidentiality and privacy of documents as they are not fully trusted the online transactions. Usability and information quality of e-services on the other hand have no impact on perceived quality for business as they are not their main concerns. Therefore, further investigation needs to be conducted to identify the other factors that affect business's perceived quality of e-services.

Table 47 and Table 48 shows clearly that an average of 66% of the variance on CSI is caused by Perceived Quality and Customer expectation where customer expectation has a stronger impact of 0.54 than that of Perceived Quality (0.33). This result raise the need to emphasize more on reaching customers' expectation as it is a critical factor for enhancing customers' satisfaction.

Table 47: Variance on CSI

	Individual	Business	Government	Overall
% of the variance on CSI impacted of perceived quality and customer expectation	68%	51%	78%	68%

Table 48: Path analysis of factors impacting CSI

	Individual	Business	Government	Overall
Perceived quality → CSI	0.32	0.37	0.30	0.33
Customer expectation → CSI	0.55	0.56	0.48	0.55

Table 49 and Table 50 present results on the impact side of CSI Model. It is clearly revealed that CSI has a high impact on government image, public complaints and public participation ranging from 0.66 to 0.77 but it has a lower impact on public trust. Table 49 shows that around 60% of the variance on government image is caused by CSI. While CSI cause only 52% of the variance on public complaints and 43% of the variance on participation. These result indicate that other factors are responsible for the variance on the public complaints and public participation which needs to be further investigated. On other hand, around 55% of the variance of public trust is caused by both CSI and Public complaints with direct and indirect impacts (via public complaints) of CSI.

Table 49: Variance on Government Image, Public Trust, Public Complaint and Public Participation

	Government Image	Public Trust	Public Complaint	Public Participation
Individual	57%	56%	45%	42%
Business	75%	71%	67%	64%
Government	46%	40%	48%	22%
overall	59%	57%	48%	43%

Table 50: Path analysis of the impact of CSI

	Individual	Business	Government	Overall
CSI → Government Image	0.76	0.87	0.68	0.77
CSI → Public trust	0.45	0.80	0.28	0.45
CSI → Public Complaint	0.67	0.80	0.69	0.69
CSI → Public participation	0.65	0.80	0.47	0.66
Public complaint → public trust	0.37	0.38	0.40	0.37

4 Recommendation and action plans

Based on the results revealed by this study, the following sections highlight key suggestions and recommendations that can be considered by the e-Government Authority to serve their key stakeholders in a more efficient way.

4.1 Interaction

- Based on the interactions with the government entities/authorities, it was found that most interactions were with physical entities that provide daily operations such as Ministry of Education, Ministry of Health EWA, Ministry of Labor and Ministry of Housing. Therefore, eGA should focus and enhance its services toward these ministries that have high interaction with stakeholders. Hence bring more benefits to the citizens.

4.2 Awareness

- The study revealed that citizens with age above have the lowest awareness and usage (Table 2). In order to encourage people in this segment to use e-government services, eGA should consider developing a strategy to increase the awareness to the relevant services that could be of valuable help to this age.
- During the study, it was observed that Word Of Mouth (WOM), Social Media and newspapers are the main sources of awareness toward eGA services (Table 11). However, Web Banners, malls, roadshows are not taking a major role in enhancing the awareness. eGA should consider the possibility of tackling a better strategy toward these sources of awareness. On the other hand, more attention should be given to social media; language of the new generation.
- Based on the awareness through channels, an inclination of awareness of e-services through Kiosk, ESC and mobile apps was clear (Table 12). The management of eGA should consider the possibility of providing more attention toward enhancing the awareness of the e-services through these channels, especially through mobile apps. Many respondents indicated through the face-to-face interaction with them that there is a lack of awareness of e-services availability.
- Most of the mobile Apps have low awareness (Table 13). Therefore mobile Apps need to be expanded to include more critical and daily operational e-services such as smart card appointment.
- To enhance the Mobile Apps awareness, eGA needs to apply innovative awareness strategies. For instance promoting the Mobile Apps through giveaways, using social media for intensive awareness program and advertisement.
- Since many of lower paid Asian, North African and some Western expats now own smart phones, eGA should increase their awareness program towards them through providing brochures in different languages and special targeted campaigns.

4.3 Usage

- Among the reasons of not using the e-services (17.5%) are the difficulty to navigate and use the national portal (2.2%) as well as the lack of awareness regarding the provided e-services (2.1%). Despite the efforts spent to develop and improve the national portal, the study indicates a need for further improvements over the design of the national portal to become more friendly and easy to use. Moreover, more efforts should be exerted from the service providers toward informing their stakeholders about the availability of e-services and the newly launched e-services.
- As the usage of kiosk is low according to our study's results, eGA should investigate the reasons behind it. The same issue applies to ESC specially for Business and Government sector.
- Post office is considered as the main competitor of the ESC, since both play similar in terms of providing non digital services. Therefore eGA should work on improving the quality and quality of the service provided by ESCs. In addition, selective Post offices could also play a good role as a mini ESCs, or even another service channel.
- eGA should give CC more attention as stakeholders are preferring to use it as a key channel of communication. One action could be to increase the number of the services that could be provided through this channel.
- The study showed a strong relationship between government interaction, e-government awareness and e-government usage. This relationship can help eGA in forecasting the usage of services from information of interaction or awareness. Hence eGA could now predict the usage by measuring the government interaction or awareness; if this increases then the usage will increase and vice versa.
- The users of e-services are either digital or non-digital in nature. Non-digital users go for ECS and CC, while digital users need the services to be available everywhere anytime. Kiosk neither supports digital nor non-digital channel, as it does not provide physical interaction. On the other hand, it is not available everywhere and every time. Furthermore, with the competition with the other kiosks in the market such as SADAD, that have more coverage and supports more services (from both private and public), eGA kiosk has lost its identity and hence usage. It is therefore recommended that eGA rethink its strategy and plan to either stop the service and redirects its effort and cost to another channel, or work hard to increase its usage by:
 - Developing and adding more services to it.
 - Leverage on the collaboration with private sector entities to enhance the e-services on Kiosk and increase the usage.
 - Re-locate kiosk position as preferred by stakeholders such as residential areas, malls, etc.
 - Investigate the possibility of outsourcing the operations of the Kiosk to private businesses, if it is more cost-efficient.

4.4 Satisfaction

- The main factors for the low satisfaction of National Portal were user friendly – simple steps to follow, Information organization, range of services offered and time taken to execute the service compared to on location. Based on the results aforementioned factors, the following are recommendation for improvements:
 - Consider the possibility of providing more graphical icons of services offered to avoid clustered information with too many written text.
 - Improve the speed of accessing the service in completing the transaction.
 - Categorize the service offered in a more friendly way using drop down menu options or any other effective display option for easy access and improved the search engine service.
 - Move towards personalization, where over the time the users would accumulate services that do require more frequently.

- Mobile Apps and Kiosks as e-service channels show very low satisfaction in all the satisfaction criteria. Therefore, to enhance the satisfaction of both channels, more efforts should be provided to improve the overall usability, ease of use and user friendly of both channels.
- Results on ESC showed a low satisfaction level in the following criteria: parking spaces disable facilities, listening to customers’ issues and public ambience. Therefore, more attention should be paid to disable facilities such as providing expert people in sign language, providing more wheelchairs, enabling the environment, etc. Furthermore, there should be a selective place for ESC that should be near public amenities with a good space parking. For instance, places preferred by customers can be considered such as malls, universities and residential places.
- For CC and ESC, either more training should be provided to the staff serving customers or recruiting more expert staff that can better respond to customers’ inquiries and provide more effective solutions.
- For a better satisfaction with the eGA top services, more emphasis should be directed toward making the e-services more accessible, reducing the time taken to complete the transactions and providing more clear instructions to use the services.
- Results of the current study provided satisfaction on selective e-service (Table 28, Table 29, Table 30). Hence it cannot be generalized and it does not indicate the stakeholder’s satisfaction on e-services. Therefore, more investigation to be conducted on the whole e-services provided by eGA for the different stakeholders through adapting more sophisticated and theory based criterion for measuring satisfaction.

4.5 Impacts of eGA e-services

- The study responded to UNDP's concern of measuring the impacts of eGA services that reflects the demand side of the e-services in addition of the supply side of it. Accordingly, the results showed good impacts on all levels including the individual, the economic and the social as such it enforces the principle of equal opportunities in the Bahraini society, creates a cleaner and greener world through reducing waste and pollution as well as paper usage, provides an efficient and effective service delivery, save cost of the transaction, travel and other direct costs. Therefore, eGA should continue on their efforts in providing the e-services that reflect the daily activities of stakeholders.
- The results of the study showed clearly that eGA enforced the principle of equal opportunity as it makes women more independent with her life activities. Therefore, eGA should focus more in providing e-services that support women's empowerment and needs.
- The study results showed that 11% of the respondents were relying on digital channels only to conduct their e-services. This reflects the eGovernment authority efforts toward the digital transformation of the society. The efforts of eGA have been confirmed by the results as 77% of the respondents believed that eGA has a key role in enabling Kingdom of Bahrain to transfer to digital society. Therefore, eGA should emphasize on this issue to reach higher level of digitalization in the Kingdom of Bahrain.
- The impact of eGA on creating a greener world is obvious as 75% of the respondents admit this impact. Therefore, more attention should be given to this matter through offering more e-services focused on daily operations of all stakeholder. This will eventually reduce carbon oxide caused by transportation systems as well as less consumptions of paper. Furthermore, eGA should encourage, sponsor and involve more in green IT awareness activities and campaigns.
- One of the confirmed impact of eGovernment is bridging the digital divide by building IT skills and knowledge. As such only 1% of the total respondents among the different stakeholders, stated that the lack of computer skills was a reason for not using the e-services. These results clearly reflect the efforts provided by eGA in IT capacity building to bridge the digital divide such as Qudara'at program for e-Training. Furthermore eGA should continue their efforts towards special communities like elderly and disabled.
- The results from both descriptive and BHCSI analysis confirmed the economic impact e-services in enhancing the government entities' reputation and image. These results should encourage the government entities to provide more innovative e-services proactively, which will positively reflect on their reputation and image.

4.6 Bahrain Customer Satisfaction Index (BHCSI)

- The BHCSI model will enable the e-government to benchmark itself against scores of other countries that are top ranked in eGovernment services.
- By adapting BHCSI eGA has created the baseline to build the future measures of citizen’s level of satisfaction of the provided e-services.
- Continuous tracking of BHCSI (overall level) can yield interesting insights for nation performance improvements. Table 51 and figure 21 provide an example of how e-government can track its performance quarterly.

Table 51: Cross sectional benchmarking

Quarter	BHCSI	National performance improvement
Jan-15	79.4	
Apr-15	80	0.6
Jul-15	78.9	1.1
Oct-15	81.5	2.6
Jan-16	82	0.5

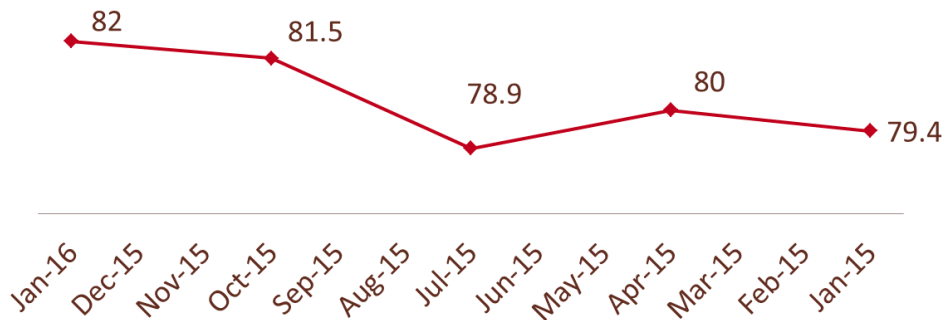


Figure 21: e-service CSI Scores Tracking

- Figure 19 shows that the current structure revealed many contradictions in the results. In addition the benchmarking is complicated and ineffective which raised from having three scores for the overall CSI represent individual, business and government e-service

categories, as well as the overall CSI and the indices of the different e-services categories. So, the e-services categories need to be restructured to reflect the provided entities instead of stakeholders. For example, educational e-services with subcategories for individual, business and government (Figure 22: Suggested e-service structure. With such restructure, one score for customer satisfaction can be identified for the e-services categories and the authority or government providing such e-services. Measurements in this case will be more effective and comparable with other countries internationally and it will be easier to assess and evaluate the customer satisfaction of each e-services category as it is reflected by the CSI of the government entities providing them.

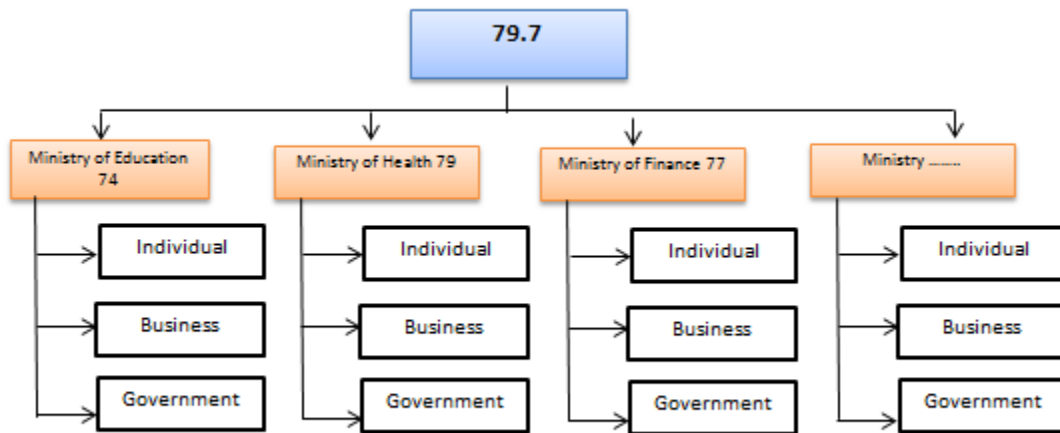


Figure 22: Suggested e-service structure

- BHCSI can be also compared cross-sectional within a given period. Hence, the e-government authority can determine how particular e-service category or ministry is doing relative to the best ministry (e-service category) as shown in

- Table .

Table 52: Cross sectional benchmarking

National BHSCI	79.4	79.5		
Individual services	79.1	80		
Best among the sector	70	74		
	QRT1	QRT2		
Individual services	March-15	June-15		
Education	69	-10.1	70	-10
Social Services	58	-21.1	56	-24
Complaints	66	-13.1	66	-14
Employments and Workplace	56	-23.1	54	-26
Traffic	70	-9.1	74	-6
Embassies and Missions	61	-18.1	65	-15
Bahrain Laws	63	-16.1	60	-20

- Results of the study highlighted the need for improvement in usability, quality and security. Results show that the public responsiveness as an important cause for high quality of e-services. Government entities should focus to be more responsive towards the needs of their customers.
- The CSI is impacted by both customer expectation and perceived quality as more than 50% in the variance of the CSI is caused by these two factors. However, customer expectation has stronger impact on CSI than that of perceived quality. Thus by improving the quality of the provided e-service that achieve the customer expectation, in turn the CSI will be improved.
- The effect of CSI was clearly identified by the results shown in Table 49 as it has an impact on the variance of the following factors: Government Image, Public Trust, Public Complaint, Public Participation. Thus, getting good CSI is the main factor in achieving good image and building citizens' trust. In addition, CSI can improve the citizens' participation in the provision of e-government services. Therefore, CSI should be one of the strategic objectives of the eGA.

- The results also revealed that complaints has a strong impact on trust. Therefore, the e-government authority in corporation with the other government entities should pay more attention towards simplifying the process of raising stakeholders' complaints through different channels as well as handling the complains properly.

4.7 Future Research Work

Following are some suggested future enhancements the research team would like eGA to consider for future projects:

1. Since the efforts needed for the comprehensive study (such as this one) is huge and time consuming, we suggest that it to be conducted every two years (and not annually). However, we suggest Customer Satisfaction Index (CSI) past of the current survey, which is a shorter one, to be conducted three times a year. Section 4.6, elaborates further on this matter.
2. Conduct more specific studies on services level covering all e-services and not selected one. This will give eGA a better understanding of e-service usefulness and could plan to do specific enhancements rather general one.
3. Develop a model to be used as tool to forecast usage and awareness of various e-services.
4. The descriptive survey to be modified so that it includes new factors for measuring awareness, usage and satisfaction.
5. Responsiveness in BHCSI to be customized for each stakeholder, i.e. each stakeholder (government entity) to have a CSI. This will enable eGA to monitor the performance of each entity, on the other hand create a spirit of competition between them.
6. Conduct a study to examine the impact of eGovernment services on digital transformation.

5 References

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Appendix A.

Sector	Total Bus. Activities	Weight	data collection	Stratified	Total Actual no
Agriculture, hunting and forestry	938	1%	13	1	1
Fishing	45	0%	1	0	1
Mining and quarrying	144	0%	2	0	1
Manufacturing	16185	9%	222	22	22
Electricity, Gas and Water Supply	76	0%	1	0	1
Construction	16416	10%	225	23	23
Wholesale and retail trade, Repair of Motor	88124	51%	1209	121	121
Hotels and restaurants	9373	5%	129	13	13
Transport, storage, communication	4524	3%	62	6	6
Financial Services	3117	2%	43	4	4
Real estate, Renting, Business Activity	25682	15%	352	35	35
Education	171	0%	2	0	1
Health and social work	325	0%	4	0	1
non-health related social work	7548	4%	104	10	10
	172668		2368	237	240

Appendix B.

Government	No Employees	Weight	Data Collection	Stratified
MINISTRY OF FOREIGN AFFAIRS	322	1%	14	1
Deputy PM	33	0%	1	0
CIVIL SERVICE BUREAU	282	1%	13	1
CIO	370	1%	16	2
SCYS	30	0%	1	0
MINISTRY OF CULTURE	260	1%	12	1
Supreme council for Health	1	0%	0	0
JUDICIAL SUPREME COUNCIL	230	0%	10	1
BAHRAIN POLYTECHNIC	365	1%	16	2
National Health Regulatory Authority	37	0%	2	0
Consultative and Parliament Affairs	66	0%	3	0
ODPM - Deputy PM	13	0%	1	0
MINISTRY OF ISLAMIC AFFAIRS	630	1%	28	3
MINISTRY OF LABOR	337	1%	15	2
Deputy PM	29	0%	1	0
Prim Minister's Advisor for security	6	0%	0	0
MUN & AGR 0 Building Permit Group - Muharraq	1	0%	0	0
Ministry of Cabinet Affairs	61	0%	3	0
MINISTRY OF EDUCATION	22181	43%	988	99
MINISTRY OF JUSTICE	762	1%	34	3
MINISTRY OF HOUSING	243	0%	11	1
MINISTRY OF TRANSPORTATION	752	1%	34	3
MINISTRY OF MUNICIPLATIES AFFAIR	2952	6%	132	13
MINISTRY OF INDUSTRY AND COMMERCE	381	1%	17	2
Deputy PM	27	0%	1	0
BAHRAIN TRAINING INSTITUTE	355	1%	16	2
Prime Minister's Advisors for Industry & Oil	3	0%	0	0
INFORMATION AFFAIR AUTHORITY	892	2%	40	4
Legislation and Legal Opinion Commission	71	0%	3	0
Ministry of state for follow up affairs	6	0%	0	0
Ministry of state for info affairs	14	0%	1	0
GOP - General Organization for Sea Ports	93	0%	4	0

JUDIC - the supreme Judicial council	3	0%	0	0
NOGA	70	0%	3	0
Deputy PM	18	0%	1	0
MINISTRY OF WORKS	1537	3%	68	7
Consultant of P M Court	5	0%	0	0
TB	31	0%	1	0
E & W field Maintenance	1	0%	0	0
LABOUR MARKET REGULARITY AUTHORITY	306	1%	14	1
BIX	30	0%	1	0
Ministry of Human Rights	21	0%	1	0
Ministry of Communications affairs	10	0%	0	0
Bahrain Exhibition and Convention Authority	65	0%	3	0
Supreme council for Environment	1	0%	0	0
MINISTRY OF SOCIAL DEVELOPMENT	624	1%	28	3
Bahrain chamber for dispute resolution	23	0%	1	0
CUSTOM AFFAIRS	710	1%	32	3
QAA for Edu and Training	89	0%	4	0
TRA	59	0%	3	0
UOB	2000	4%	89	9
MINISTRY OF HEALTH	9765	19%	435	44
THE PRIME MINISTER COURT	133	0%	6	1
MINISTRY OF FINANCE	308	1%	14	1
ELECTRICITY AND WATER AUTHORITY	3244	6%	145	14
SURVEY AND LAND REGISTRATION ORG	356	1%	16	2
GENERAL ORG FOR YOUTH&SPORT	231	0%	10	1
PM Consultants for Econ aff	5	0%	0	0
BIPA	45	0%	2	0
	51495		2294	229