

# Usability Analysis of e-Governance Services in Bangladesh - A Survey and Future Directions

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**Abstract**—This research addresses the issues affecting e-Governance implementation in Bangladesh in consideration with a detailed usability analysis and directions for future development. Implementing e-Governance has always been a challenge either it is social, economical, or political. Besides this, there are many technological problems, which should be understood and met, so that a user-accepted e-Governance system emerges. This research provides a quantitative investigation of e-Governance implementation problems with emphasis on analyzing quantitative data gathered in a survey using structured questionnaires that was generated on the basis of our theoretical study. Based on these results we provide a clear conception about those problems, which should be considered at the time of implementing e-Governance services in developing countries like Bangladesh.

**Keywords** - e-Governance, survey, awareness, usability.

## I. INTRODUCTION

E-Governance is defined as the application of electronic means in the interaction between government and citizens, government and businesses, as well as in internal government operations to simplify and improve democracy, service, and business aspects of Governance [1]. The term interaction stands for the delivery of government products and services, exchange of information, communication, transactions, and system integration. The external objective of e-Government is to fulfill the public needs and expectations on the front-office side, by simplifying the interaction with various online services. The use of ICT in government operations facilitates speedy, transparent, accountable, efficient, and effective interaction with the public, citizens, business, and other agencies. Significant cost savings (per transaction) in government operations can be the result.

Since mid 1990's, the Government of Bangladesh started its efforts towards e-Governance, through launching the automated railway ticketing system. It is now one of the main agenda of the Government to establish a *Digital Bangladesh*. Significant number of projects are developed and many more ongoing works are taking place. So it is a good time now to ask ourselves whether we are getting the maximum possible benefit of our initiatives and take steps if there is any discrepancy. In this work, we took the challenge to do a structured survey on different categories of people, and systematically analyzed their feedback to identify the current state and future directions of e-Governance development in Bangladesh.

The paper is organized as follows. We focus on the overall e-Governance scenario of our country and nearby regions in Section II. Section III presents the e-Governance initiatives

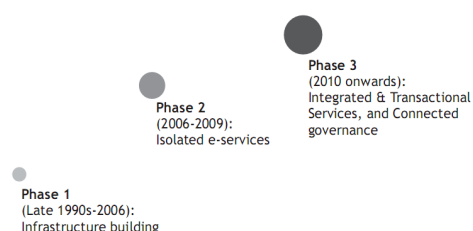


Fig. 1: e-Government evolution in Bangladesh.

taken in Bangladesh over the past decades along with the inherent challenges we faced. Description of our survey and observations are discussed in Section IV. Finally, we conclude in Section VI after discussing about future directions in e-Governance in Bangladesh in Section V.

## II. E-GOVERNANCE IN BANGLADESH AND OTHER COUNTRIES

The World Bank in 2007 ranked Bangladesh 92<sup>nd</sup> among 132 countries and bottom among 5 countries in the South Asian subcontinent, with regards to its ICT infrastructure. It is also ranked us 123<sup>rd</sup> worldwide and 5<sup>th</sup> in South Asia, in the e-services approving indicator.

Despite being behind most of its South Asian counterparts, Bangladesh has been coping up quickly in the e-Government sector. According to UN's e-Government preparation papers 2008, though most other countries (including India and Sri Lanka) in the region slipped significantly in the rankings, Bangladesh advanced 20 steps between 2005 and 2008. Bangladesh's *Readiness Index* value of 0.29 was not that far behind India (0.38), though it had some distance from Maldives (0.45). Nevertheless, Bangladesh was still behind all neighbors except Nepal, Myanmar, and Afghanistan.

Completed in 1994–5, and operative successfully since, the railway ticketing system automation was the one of front mentionable large-scale e-Government projects in Bangladesh, and was a star marking in the track of e-Government. Since then, a fairly large number of different initiatives have been taken by the Government for the implementation of e-Government [6]. Initially, there was a clear emphasis on building ICT infrastructure, possibly deemed as a pre-requisite to the delivery of e-citizen services. Nonetheless, despite what so ever successes, some of these e-Government projects could not provide service in the long run due to deficiency of long-term visions for those projects and myriad remaining challenges.

Rank	Country	e-Government development index value
1	Republic of Korea	0.8785
2	United States	0.8510
3	Canada	0.8448
4	United Kingdom	0.8147
5	Netherlands	0.8097
6	Norway	0.8020
7	Denmark	0.7872
8	Australia	0.7863
9	Spain	0.7516
10	France	0.7510

TABLE I: Top 10 countries in e-Government development.

Over the time, the Government modified its approach and undertook strategies to address some of those challenges (Fig. 1). Increasing number of citizen centric e-services projects was gradually undertaken. However, due to various factors, many of those projects had limited scope, and interoperability and integration between those services were largely absent. In the era of the present Government, a confluence of favorable factors has been playing a positive role towards a renewed vigor towards the prospects of e-Government.

#### A. e-Governance Across the Globe

The United Nation's e-Government Survey 2010 finds that citizens are benefiting from higher e-service style, access to information, extremely competent Government management and landscaped interactions with Governments, primarily as a outcome of incorporative use from the semi-public aspect of content and subject discipline. Most countries publicized a large amount of content online.

To better reflect the higher expectations of e-Government development around the world, the United Nations Department of Economic and Social Affairs introduced significant changes to the survey instrument in this round, focusing more on how Governments are using websites and web portals to deliver public services and expand opportunities for citizens to participate in decision making. The number of questions increased from 86 in 2008 to 95 in 2010. More specifically, twenty-five questions were added and 16 questions were removed from the questionnaire in the 2010 survey round, while 29 questions were modified.

As a result of these changes, the world average of the e-Government development index registered a slight decline compared to the previous years. Nevertheless, the decline should not be interpreted as the degeneration of e-Government on a global scale since the index measures e-Government development of countries relative to one another within a given period. More importantly, a drop in a country's ranking may serve as a reminder of the need to devote greater resources to improving online services and expanding access to telecommunication infrastructure.

#### B. Southern Asia

In this region, web portals and websites have developed insufficiently since the 2008 survey in terms of developing

Country	e-Government development index value		e-Government development ranking	
	2010	2008	2010	2008
Maldives	0.4392	0.4491	92	95
Iran	0.4234	0.4067	102	108
Sri Lanka	0.3995	0.4244	111	101
India	0.3567	0.3814	119	113
Bangladesh	0.3028	0.2936	134	142
Pakistan	0.2755	0.3160	146	131
Bhutan	0.2598	0.3074	152	134
Nepal	0.2568	0.2725	153	150
Afghanistan	0.2098	0.2048	168	167
Regional average	0.3248	0.3395		
World average	0.4406	0.4514		

TABLE II: e-Government development in Southern Asia.

new features and citizen usability. As a result, on an average, the position of this region has decreased in the 2010 Survey and remains far beneath the world average. Maldives (0.4392) continues to advance the arena because it has accomplished the infrastructure basement and education indices. Iran (0.4234) and Bangladesh (0.3028) are the two exceptions, both having significantly improved their governmental development scores and global rankings in the 2010 Survey.

### III. E-GOVERNANCE INITIATIVES IN BANGLADESH

Early efforts started in mid 1990s, when the government automated the railway ticketing system. Another notable project from this period was the e-birth registration project, which made the process significantly faster and more efficient. Another of the early success was the automation of BANBEIS, which included GIS mapping of all schools and detailed information regarding them (including logistics, teachers, etc.), enabling unprecedented efficiency in education planning [3].

This trend of infrastructure building and process automation continued in a more coordinated manner from 2002-03, with the formation of the Support to ICT (SICT) Task Force Project, a publicly funded implementation arm of the National ICT Task Force based at the Planning Commission. SICT undertook a total of 38 projects, approximately 63% of which were focused primarily on internal automation and infrastructure building, and has completed 34 so far [4].

Recent developments yield indications that e-Government is moving to the next phase in Bangladesh, away from isolated e-services towards more integrated, connected, and transactional e-services. The present Government came to power with the pledge of building a "Digital Bangladesh" [5], and has kept consistent focus on this promise thus far. This has resulted in a political climate highly supportive and conducive to e-Government projects. A very recent initiative, the *Digital Innovation Fair*, born out of the A2I (Access to Information) program at the Prime Minister's Office (PMO), took this opportunity and showcased the various successful and ongoing projects undertaken by the Ministries, effectively putting government agencies in a competitive environment and giving citizens an unprecedented opportunity to witness what services the Government is providing, thereby creating a demand for these services. A list of completed, ongoing,

TABLE III: Demographic description of the survey participants

Occupation	Male	Female	No Response	Total
Student	235	103	12	350
Teacher	12	8	0	20
Doctor	9	6	0	15
Engineers	20	8	2	30
General Service Holder	75	21	4	100
Housewife	0	25	0	25
Business Person	17	3	0	20
Others	17	7	16	40
Total	385	181	36	600

and future e-Governance projects can be found in [6]. In the next section, we will focus on measuring the success of these initiatives.

#### IV. USABILITY ANALYSIS OF E-GOVERNANCE SERVICES IN BANGLADESH

We have conducted a structured survey on general people, businesspersons, students from different levels, housewives, and service holders from different Government and non-Governments institutions in Bangladesh. These people constitute a significant portion of the populace. The results show interesting opinions about Internet usage and accessing e-Governance services. The questionnaire can be found in [7]. We have conducted both online and offline survey using the same questionnaire in Bangla and English.

##### A. Demographic Description of the Participated Persons

We tried to choose people from different groups based on their gender, age group, marital status, educational qualification, and economic class. Among our 600 participants, about 64.17 percent of them were male and 30.17 percent were female students (Table III). We tried to keep it as balanced as possible, but we could find more male participants than the female ones in Universities and in service. But interestingly enough, their response on different areas related to the topic was not radically different, so we can safely assume that this difference in gender ratio do not have considerable impact on this survey.

Most of our participants belong to the 18–30 years age group (56.67% of them), the other significant portion is from the above 30 years age group (28%) and below 18 years age group (11.17%). Traditionally, the 18–30 years age group represents the most tech savvy part of the population. This is an important feature of our survey as we can depict the opinion of the more advanced portion of the society and yet see the lacking in them. Again, most of our participants are unmarried (78.33%).

Undergraduate university students (who has passed the 12th grade and now studying at University) constituted the most significant part of our participants. A few of others are from 10th grade, MSc, or higher degree students (Fig. 2). So our survey represents the opinion of the educationally advanced part of the society. And if we look at the financial status of the participants (Fig. 3), they represent the middle and upper middle class people of the society.

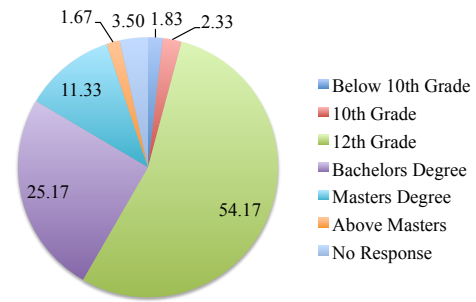


Fig. 2: Educational qualification of the participants.

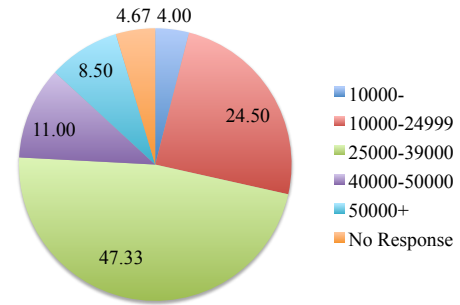


Fig. 3: Monthly income (in Bangladeshi Taka, BDT) of the participants/parents of the participants.

##### B. Access to e-Governance Services by the Participants

The government has taken a lot of initiatives to expand the e-Governance services for the people's welfare. A significant portion of the national budget is devoted for developing ICT infrastructure and related issues to make the dream of *Digital Bangladesh* a reality. However, our survey can show a notable indication towards the challenge of this goal - lack of awareness. The Government has divided its e-Government initiatives into 16 principal categories. Related ministries and other offices are working on their relevant projects. Many of them are already implemented, while many more are in the midway of implementation. We tried to find out the awareness of people regarding these e-Governance services.

Our results are quite interesting (Fig. 4). As the results obtained from students varied significantly from the others, we have shown all three results - students, others, and overall ratio in these two graphs. Out of these 16 categories of services, 50% or more people (in general) knows about only 3 of them. Note that we are trying to figure out if people know *anything* about the services in relevant categories, not *every* related e-Governance services in those sectors. Only 7 of such services could draw the attention of more than 25% participants (overall). People's knowledge regarding 8 of the remaining categories of services are quite marginal, all of them are below 20%.

From this figure, we can also get a view that students are generally more interested to know about the e-Governance initiatives, as in most cases, their knowledge ratio is higher than other general people. Students are more concerned about services related to education, immigration, scholarships, whereas general people are more concerned about employment, tax,

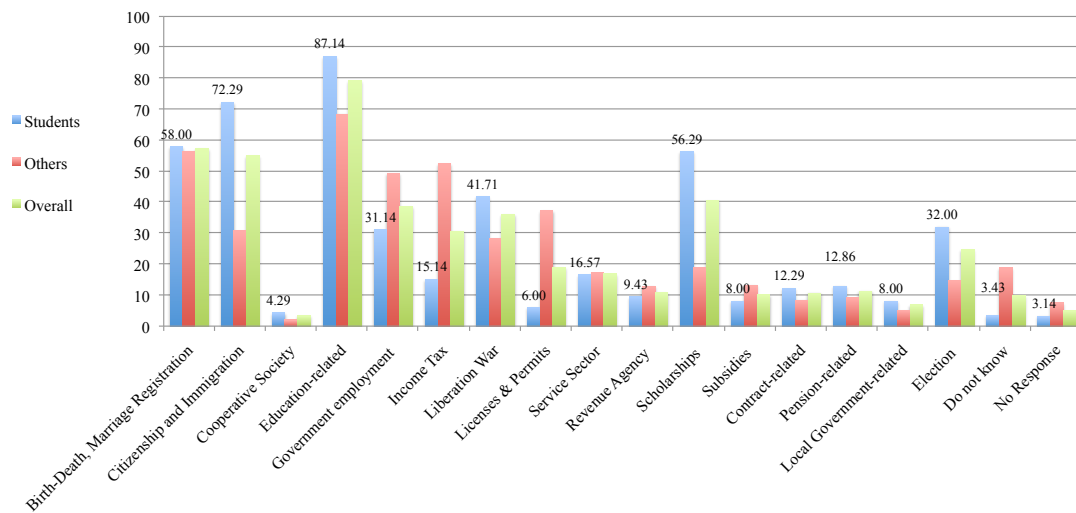


Fig. 4: Awareness about e-Governance services among the participants.

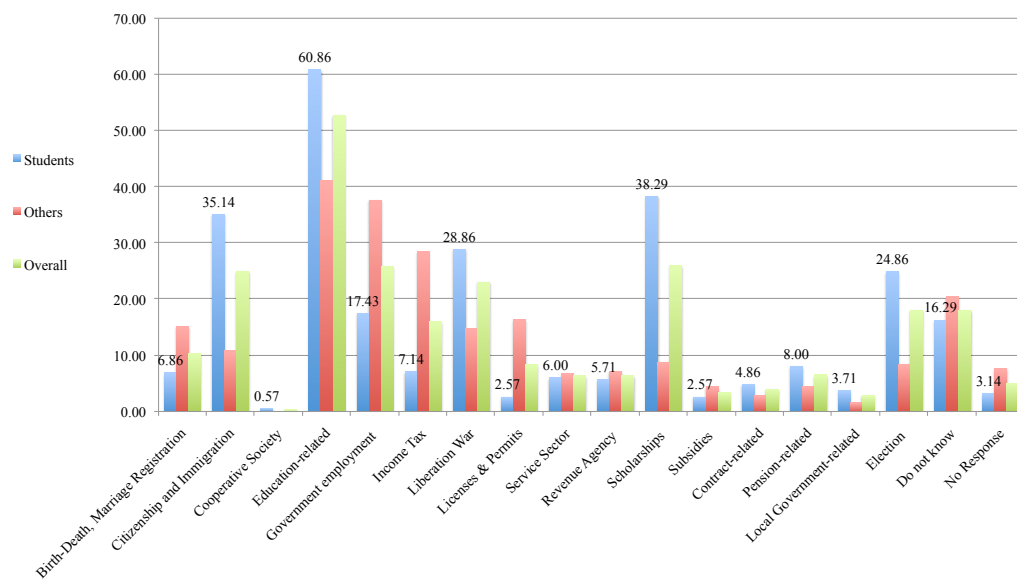


Fig. 5: Access to different e-Governance services among the participants.

and birth/marriage registration, which perfectly makes sense.

Now, let us consider the scenario where we consider the percentage of e-Governance services usage rate (Fig. 5). People were asked if they have ever used any e-Governance services from these categories. Conditions are even worse in this case. We can see that only four category of services are widely used by the overall participants, and that usage rate is only close to 25%. Among the top five e-Governance sectors based on usage, there are *citizenship and immigration*, *education related services*, *Government employment*, *liberation war*, and *scholarships*. Services related to *election* also drew interest of people, possibly the widely successful *national ID* project and the ongoing *electronic voting machine* project is behind the success. If we look at the students' opinion only, we can see that the related services are emphasized. The opinion of the other people varies as we can expect that the general people will be more concerned about *marriage/birth registration*,

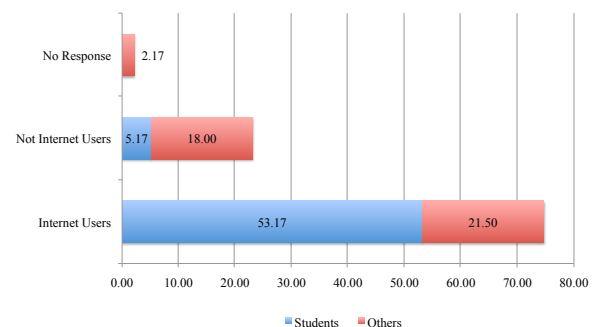


Fig. 6: Internet access ratio among the participants.

*income tax, license and permits, etc.*

### C. Internet Access Information by the Participants

Strong Internet connectivity is a prerequisite for successfully implementing e-Governance. Bangladesh has recently

TABLE IV: Statistics of Internet subscribers in Bangladesh at the end of February 2012

Category	Subscriber	Percentage
Mobile Internet	2,96,09,497	95.08%
ISP + PSTN	12,08,000	3.88%
WiMAX	3,23,307	1.04%
Total	3,11,40,804	

connected itself to the fiber-optic global network. But to get widespread benefit from it, we require building up the internal network backbone, which is quite a difficult task in a densely populated country like ours. For this reason, WiMAX and cellular network is growing very quickly. In fact, more than 95% of the populace is covered by the cellular network, so it can play a crucial role in reaching the benefits of e-Governance to the mass people. This is reflected in the total Internet users statistics [2] in Table IV. Also, more than 30% of the people have their own mobile sets. Nowadays, it is hard to find a family that does not have at least one mobile handset.

As a result of this mass penetration, high-speed 3G networks can play a major role in reaching the general people the benefits of e-Governance. The Government has announced that it will go for 3G-spectrum allocation tender on September 2012 and allow at least 5 cellular service providers with 3G licenses. Most of the major cellular service providers have already upgraded their network equipments to provide their customers 3G enabled services as soon as they get the license. But there has been little study on the implication that this 3G services will have on the implementation of e-Governance in Bangladesh. In this research we are trying to solve the need by a structured survey on general people to understand the readiness of them to enjoy the benefits of 3G.

Now, let us investigate the Internet usage scenario among the participants we surveyed. Fig. 6 shows us that majority of our participants living in the urban areas have access to Internet, which is very promising. Our survey also shows us about the devices they use to access Internet. We can see that mobile phones have become a powerful tool in Internet access, as its use (47.8%) is now higher than laptops (45.2%) and very close to the desktop user (56.1%) ratio. We also understand from this data that many people access Internet from multiple devices of their ownership. That also emphasizes the use of cell phones as a data-accessing device on the go.

We also analyzed the Internet access technology used by the participants. Cell phone based GPRS is the winner (51%) here after close competition with WiMAX (34%) and broadband services (43%). Many people access GPRS based Internet from their EDGE/GPRS modems and so the ratio is higher for cell phones than in the previous data. The percentage among prepaid and postpaid internet users is almost same.

Majority of our users have Internet speed in the range of 64 kbps - 256 kbps (Fig. 7). And if we look at the data plans taken by them (Fig. 8), we can see that the largest portion of our Internet users are nominal users using less than one gigabytes of data per month. But there are many users in the (3-5 GB) and (5-8 GB) data plan, possibly they are the people

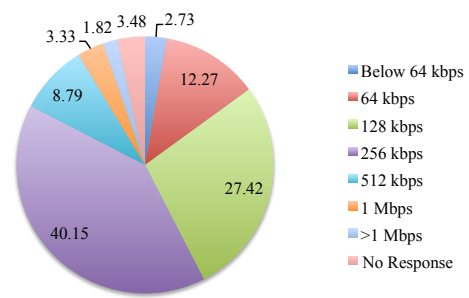


Fig. 7: Ratio of Internet access speed among the participants.

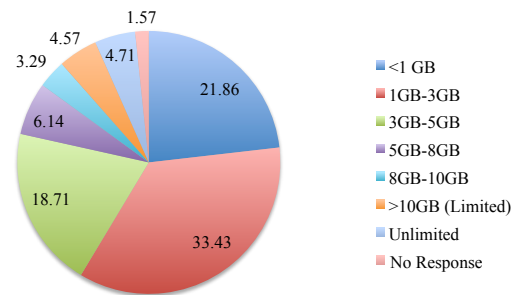


Fig. 8: Internet usage limit among the participants.

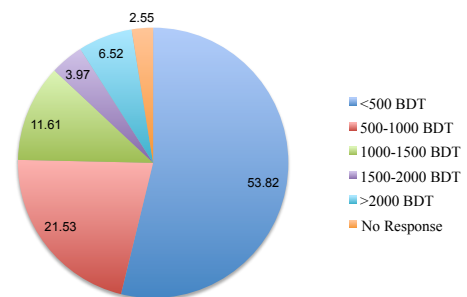


Fig. 9: Internet expense of the participants.

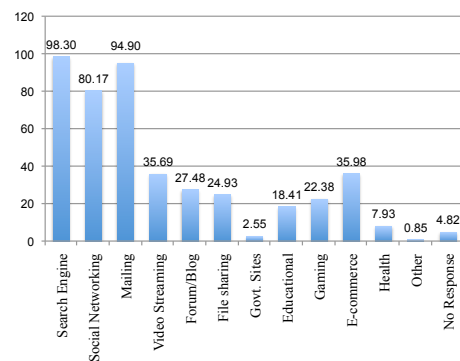


Fig. 10: Internet usage pattern of the participants.

surfing the net more often than the first ones. This is also supported by the fact that about 54% of the participants spend less than 500 BDT (less than 7 USD) per month on Internet bill (Fig. 9). About 87% of the participants spend less than 1500 BDT (less than 15 USD) per month on the purpose. Finally, the list of most visited sites (Fig. 10) confirm us that most of our users are end user with more interest in typical activities

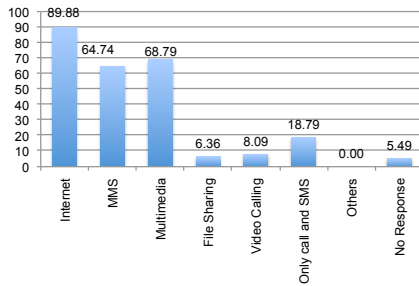


Fig. 11: Different data services available in the cell phones of the participants.

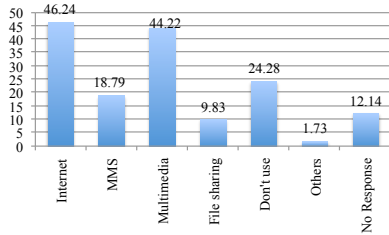


Fig. 12: Types of mobile data services used by the participants.

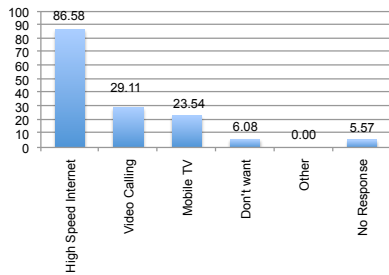


Fig. 13: Demanding data services asked by the participants.

like searching, social networking, emails, and entertainment.

#### D. Cell Phone Usage Pattern of the Participants

Now, let us move our focus into the usage of cellular phone technology in Bangladesh, which has one of the largest growing mobile penetration rate in the world. From our survey, we can see that about 93% of our participants are cell phone users and about 89% of them own their personal mobile handset. If we focus on the ratio of 3G enabled handsets among our participants, we can see that not much of them are 3G enabled (13.3% only). This is perfectly understandable as 3G services are not offered yet in Bangladesh. Many of the people are even not aware whether their handset is 3G enabled or not.

#### E. Data Services Currently Used and Wanted by the Participants

In this section, we cover the data access availability and usability by our current users. Fig. 11 shows the data services available in the current handsets of our participants. We can see that most of our users have Internet accessibility in their handsets. And if we investigate on their data service usage pattern, clearly they use their handsets to access the Internet and multimedia contents more than any other data services

(Fig. 12). And when asked for future demanding services, majority of them asked for higher speed in their cell phone data accessing applications (Fig. 13).

Most of our participants (79.75%) are also aware of 3G. There have been a lot of reports on 3G in both print and electronic media over the recent years and people are now quite enthusiastic to enjoy the benefits of 3G technology. We can see that more than 93% of the participants want 3G technology to be introduced in Bangladesh, and though many of them do not have 3G enabled handsets, more than 84% people are motivated to buy one if the service is available.

## V. FUTURE DIRECTIONS FOR E-GOVERNANCE IN BANGLADESH

In this research, we tried to identify the issues relevant to a successful implementation of e-Governance in Bangladesh, with special focus to its usability analysis. We can see that though the Government is trying to introduce many e-Governance services, often people are not aware of it. Thus many of these services remain relatively less used. So the Government should focus more on creating public awareness on e-Governance services and in many cases make its use as mandatory. On the other hand, there is a lot of hype about 3G networks and we can use it to spread different e-Governance services to mass people very quickly.

Up to now, we have performed survey on the students and general people of different socio-economic class and age groups in the urban areas. We now focus on the people from all other parts of the country, specially the rural ones. Traditionally these people are less aware of technological advances. So the aforementioned suggestions are also applicable for them. But hopefully we will find more information and research directions from doing survey on these people in future.

## VI. CONCLUSION

Bangladesh is going strongly to fulfill its commitment of making a *Digital Bangladesh*. We cannot deny the necessity of e-Governance for providing better citizen services to our people. On the same time, it is very necessary to train up the people so that the benefits of e-Governance can be utilized from the very beginning. Awareness campaigns in both the private and public sector should be considered in an urgent basis and the Government and the people need to work hand in hand for its success.

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