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Factors Influencing Citizen Adoption of e-Government services in Bangladesh: Analyzing citizen perception of digital e-services

Master Thesis

at the Chair for Information Systems and Information Management
(Westfälische Wilhelms-Universität, Münster)

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[redacted]

Date of Submission: 2021-08-08

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Abbreviations

A2i	Access to Information Division
BI	Behavioral Intention
DV	Dependent Variable
DOI	Diffusion of Innovation
eGov	eGovernment
G2C	Government to Citizen
ICT	Information and Communication Technology
IV	Independent Variable
KICA	Korea International Cooperation Agency
MFS	Mobile Financial Services
PEA	Perceived Economic Advantage
PS	Perceived Simplicity
PCS	Perceived Convenience and Satisfaction
PR	Perceived Relevance
PUB	Perceived Usability
PU	Perceived Usefulness
PEOU	Perceived Ease of Use
TAM	Technology Acceptance Model
TCV	Time, Cost and Number of Visits
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
UDC	Union Digital Centre
UNDP	United Nations Development Program
USAID	United States Agency for International Development

Chapter One: Background

E-government is the use of information technology to enable and improve the efficiency with which government services and information are provided to citizens, employees, businesses, and government agencies (Carter & Belanger, 2003). The use of information and communication technology (ICT) in Government services has created a plethora of ways for citizens to access government services and information (Hasan, 2016). Bangladesh, like many other developed and developing countries, has been and is developing its ICT infrastructure to provide access to information to its citizens, facilitate empowerment of people and promote democratic values and norms (Quddusi, 2015).

eGovernment Services in Bangladesh

Hiller & Belanger (2001) classify e-government into six categories: Government Delivering Services to Individuals (G2IS), Government to Individuals as a Part of the Political Process (G2IP), Government to Business as a Citizen (G2BC), Government to Business in the Marketplace (G2BMKT), Government to Employees (G2E), and Government to Government (G2G). G2IS and G2IP are comparable to the G2C government (Carter & Belanger, 2003).

The Government of Bangladesh has implemented eGovernance and introduced a single vision of “Digital Bangladesh” in 2009, integrating all the measures and initiatives related to eGovernment (Hasan, 2016). This strategy has largely four main components, i.e. Human Resource Development, Connecting Citizens, Digital Government for Pro-poor Service Delivery and ICT in Business (Karim, 2010). One of the major goals under this vision was to implement technology based delivery of services to the doorstep of the citizens (Hasan, 2016).

To achieve these goals, the Government of Bangladesh started the Access to Information (a2i) program in 2007 with support of the UNDP and USAID. The program aims at improving public services through informatization and reducing inefficiencies in their delivery in terms of TCV - time, cost, and number of visits associated with obtaining government services (KICA, 2018). Furthermore, the Bangladesh government is working to achieve Digital Bangladesh Vision 2021 by establishing the Seventh Five-Year Plan (2016-2020) and the National ICT Policy 2015 (KICA, 2018).

One of the major challenges of taking eGov services to the citizens even at the last mile is the lack of infrastructural support. Internet penetration in Bangladesh remains at only 41%

(Kemp, 2020) and that means that many citizens have been forced to travel a long distance, go to a Govt. office and avail services even after the service is available online (KICA, 2010). However, the situation is better now because of the Govt. initiatives to build support infrastructure for people even without internet access at the remotest of places.

The A2i Programme has established more than 5,400 digital centres as one-stop information and service delivery outlets (Chowdhury et al., 2018). These are called Union Digital Centres (UDC) and they support any citizen to avail any Govt. service online without digital device, internet connectivity or even digital literacy. A typical UDC in the rural areas is on average about four kilometres from the citizen's home (Chowdhury et al., 2018).

"Over 10,000 local entrepreneurs manage approximately 5,400 digital centres across Bangladesh, delivering a total of 5.1 million services every month. By November 2017, over 323 million services were provided, which include over 75 million birth registrations, 2.1 million migrant worker registrations, four million mobile-banking services, and 100,000 youth training programmes. Over 3,100 digital centres now have active agent banking service points who have opened bank accounts for over 145,200 citizens" (Chowdhury et al., 2018)

More than 1,400 digital services are currently offered through different Govt. websites or portals online. For further consolidation, "National Portal" of the Government of Bangladesh (bangladesh.gov.bd) was launched in 2014 integrating 25,043 Government sites (The Daily Star, 2015). A2i (2019) claims it to be one of the largest Government web portals in the world and "the most visible implementation of proactive information disclosure under the Right to Information act in Bangladesh" (A2i, 2019).

Motivation and Research Objective

Although there is evidence that eGovernance has improved living standards and enhanced the economy in developed countries, the adoption of eGovernment in developing countries such as: Bangladesh, remains an area that is not well understood and requires investigation (Talukder et al., 2014). Part of the reason for this phenomenon is that execution of eGovernment is a multifaceted issue that encompasses domains such as: technology, culture, politics, social norms etc. (Talukder et al., 2014). Because of this inherent complexity, there is no common model for eGovernment adoption (Talukder et al., 2014) and chances of success increases for a eGovernment initiative "if it acquires the scope of a truly 'regional' learning

experiment aimed at evolving and integrating closely with the local economic, social, cultural, and political contexts" (Ciborra & Navarra, 2005, p. 156). Gunter (2005) demonstrates that in addition to technological factors, citizens need to be willing to adopt digital services as the normal mode of public service delivery for eGovernment initiatives to be implemented. This entails a greater understanding of the factors that may influence citizens to adopt eGovernment services in Bangladesh to increase its adoption.

Hence, this paper aims to explain the factors influencing adoption of eGov services in Bangladesh and focuses on different components of the general perception of citizens about the services themselves. As discussed above, there can be many other factors that influence adoption. The scope of this research however, is limited to only the factors that are related to the technological solution itself and how citizen perception of these factors influence their adoption and use of the service. Hence, the main research question is “How does the citizen perception of eGov services influences the adoption?” and the question is explored in the context of Bangladesh.

The second chapter of the paper discusses the theoretical foundations for the research. The third chapter is about the methodology of the research. In the fourth chapter, the results of the analysis are discussed. Finally, there is a discussion section afterwards and the paper is concluded with further scope of research in the area to increase understanding of the topic and potential ways these findings can be used to increase adoption of eGov services in Bangladesh.

Chapter Two: Theoretical Framework

To explain technology adoption and acceptance, Porter & Donthu (2006) separated research efforts on the topic into two distinct research paradigms. One of those paradigms has driven researchers to explore how individual traits of a potential adopter influence the propensity to use new technology. Parasuraman's (2000) technology readiness index is an example of that.

The other paradigm focuses on how a technology's attributes affect an individual's perceptions and, ultimately, use of that technology (Porter & Donthu, 2006). The scope of the research question for this study is limited to this particular paradigm.

Adoption of eGovernance is a behavioral response from the citizens of a country. Theory of Reasoned Action (Fishbein, 1979) asserts that the most important determinant of behavior is the behavioral intention and direct determinants of individuals' behavioral intention are their attitude toward performing the behavior and their subjective norm associated with the behavior (Montano & Kaspryzk, 2008).

Attitude can be determined by individuals' beliefs about outcomes and attributes of a performed behavior and positive and negative attitude corresponds to the perceptions about the outcome of the behavior (Montano & Kaspryzk, 2008). Subjective norms are approval/disapproval from important referent individuals and how motivated a person is to comply with such referents (Montano & Kaspryzk, 2008).

The success of TRA in explaining behavior depends on the volitional control of the behavior. To account for such external factors, Azjen and colleagues created the Theory of Planned Behavior to account for perceived behavioral control that accounts for how much control a person perceives to have on a behavior (Ajzen, 1991; Ajzen & Driver, 1991; Ajzen & Madden, 1986). The effect of perceived control declines, and intention is a sufficient behavioral predictor in situations in which volitional control over the behavior is high (Madden, Ellen, & Ajzen, 1992).

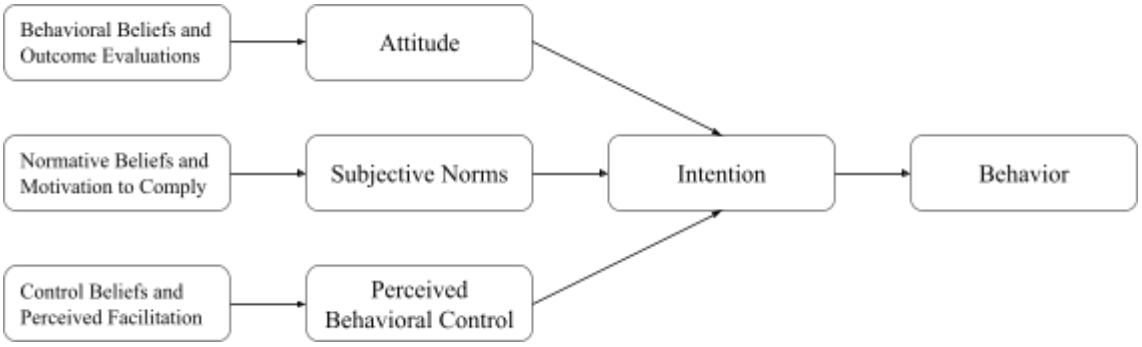

Fig 2.1. Theory of Planned Behavior (Mathieson, 1991, p.175)

The Technology Acceptance Model (TAM) (Davis, 1989) is one of the most influential and widely used theories for understanding users' acceptance of information technology (Lee et al., 2011) and TAM is grounded in the ideas of TRA and TPB. TAM discusses user attitude (Davis, 1989) and uses the role of perceived ease of use (PEOU) and perceived usefulness (PU) for understanding user acceptance of information systems (Taylor & Todd, 1995; Venkatesh & Davis, 2000).

Technology Acceptance Model (TAM)

According to TAM, perceived usefulness and perceived ease of use are beliefs that are presumed to (1) influence attitudes toward new technology and (2) mediate the relationship between external variables and attitude (Davis et al., 1989). TAM is also the most widely applied among other similar theories to explain adoption (Venkatesh, 2000).

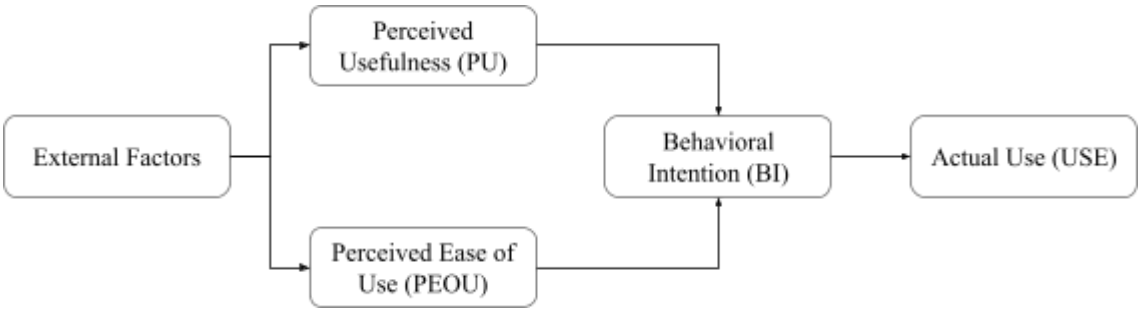

Fig 2.2. Final Version of TAM (Venkatesh & Davis, 1996, p.453)

Venkatesh & Davis (2000) proposed the TAM 2 model to accentuate the original TAM model and this model explained underlying factors influencing PU and the new model was tested in both voluntary and mandatory settings to account for volitional control of the population on

the usage. Their studies suggested that TAM 2 worked well in both involuntary and mandatory settings except that Subjective Norm had no effect in a voluntary environment but had some effect in the opposite.

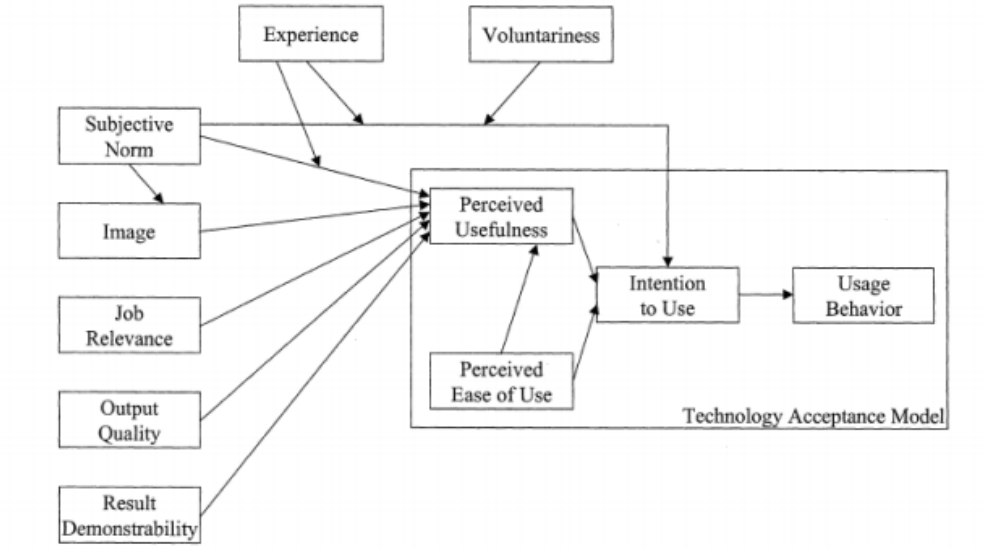

Figure 2.3. TAM 2 (Venkatesh & Davis, 2000)

Venkatesh (2000) extended the TAM model further to explain the underlying factors influencing PEOU. He divided these factors into two types, anchors and adjustments. Anchors explain general beliefs about computer and computer usage and adjustments explain beliefs that are shaped based on expected experience of the system.

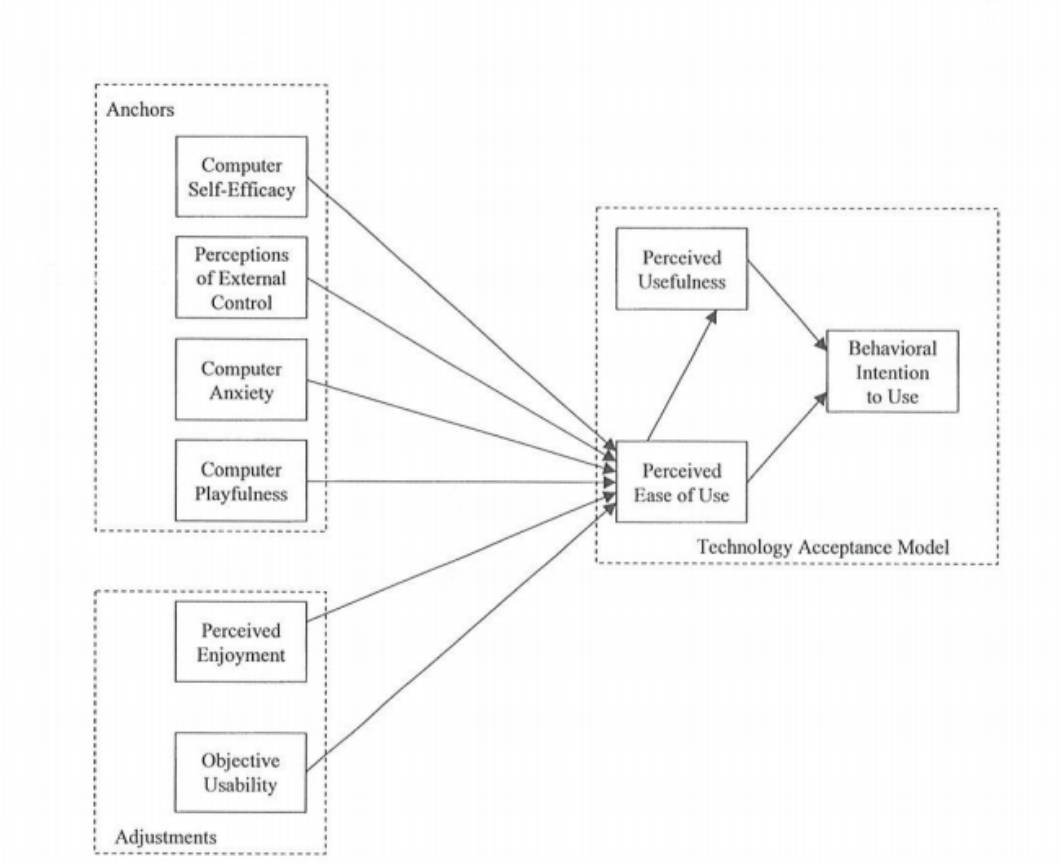

Figure 2.4 TAM with determinants of PEOU (Venkatesh, 2000)

Diffusion of Innovation Theory (DOI)

Diffusion of Innovation theory (DOI) together with TAM works to better understand rapid changes in information technology and provides a better explanation of user acceptance of such technology (Min et al., 2018). Diffusion is the process by which an innovation is communicated through different channels among the members of a social system (Rogers, 2010).

Rogers (2010) identified four main elements of diffusion, i.e. innovation, communication channels, time, and the social system. DOI proposes five general characteristics of the first element, innovation, and these characteristics, as perceived by individuals, help to explain their different rates of adoption (Rogers, 1983). Rogers identifies and defines the factors in the following way:

1 **Relative Advantage** is the degree to which an innovation is perceived to be better than the idea it supersedes.

2 **Compatibility** is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of adopters

3 **Complexity** is the degree to which an innovation is perceived as difficult to understand and use.

4 **Trialability** is the degree to which an innovation may be experimented with on a limited basis.

5 **Observability** is the degree to which the results of an innovation are visible to others.

Chapter Three: Methodology

To understand the influence of citizen perception of eGov services on its adoption, this study uses the Diffusion of Innovations Theory (DOI) to identify relevant attributes of the technology and Technology Acceptance Model (TAM) to explain how they might be influencing the general perception of the citizens about eGov services in Bangladesh. Hypotheses were formed against each of the perception variables explaining the core constructs to explain the usage behavior of citizens. Direct usage data was used as the outcome variable since behavioral intention is not necessarily representative of actual use (Bagozzi, 2007).

While extensions on the TAM by Venkatesh & Davis (2000) and Venkatesh (2000) provide antecedents of PU and PEOU, the role of external variables explaining variation in the TAM core constructs differs (Burton-Jones & Hubona, 2006). For the purpose of this research, only the antecedents that are related to technology attributes were considered as independent variables (IV) to explain the constructs.

For explaining the PU, Output quality, Job Relevance and Result demonstrability were used as independent variables because of its association with the technology itself. However, association of the other factors such as subjective norm, image, experience and voluntariness with the findings were discussed based on existing scientific literature.

Output quality, Job Relevance and Result demonstrability can be comparable to the Relative Advantage attribute proposed in the DOI. Relative advantage can be measured in economic terms while social prestige, convenience, and satisfaction are also important factors to be considered (Rogers, 2010). Considering both these theoretical guidelines, three variables were identified for the analysis. They are as follows along with the item used to measure each factor:

1. Using Govt. websites to do official tasks saves money and time (“Perceived Economic Advantage” - Result Demonstrability)
2. Govt. websites make it easier to avail Govt. services. (“Perceived Convenience and Satisfaction” - Output Quality)
3. I can do necessary official tasks using the Govt. websites. (“Perceived Relevance” - Job Relevance

For measuring the PEOU, none of the anchors suggested by Venkatesh (2000) were considered since none of them are directly related to technology attributes. However, computer self efficacy factors were included in the discussion section based on existing scientific literature.

Complexity attribute identified in the DOI was measured to get the objective usability of the technology since Complexity is closely related to PEOU (Carter & Belanger, 2003). Two variables were selected for the analysis and they are as follows along with items used to measure them.

1. Govt. websites are easy to understand ("Perceived Simplicity")
2. Govt. websites are easy to use ("Perceived Usability")

Rogers (2010) defines Compatibility as the congruence of an innovation with the values and norms of the population. By that definition, compatibility has two components. One is the technology and the other is the values or norms of the social system. Analyzing the values of norms falls outside the scope of the research.

However, the congruence of eGov services with different social conditions by analyzing the effect of certain demographic characteristics on the usage behavior. If there is any significant influence that is found, it can be assumed that eGov services offered currently in Bangladesh are more compatible with people with certain attributes. This, in turn, can demonstrate the impact of compatibility as a factor on usage. Moreover, Burton-Jones and Hubona (2006) suggest that some external factors can have a direct influence on adoption over and beyond PU and PEOU.

Among the demographic factors that are often cited as having an influence on ICT use include: gender; income; level of education, skills, and age (UNDP, 2011; Inan and Lowther, 2009). Income level was excluded from the variables considered since it is sensitive information to disclose and this decreases response rates and integrity of data provided from respondents in the data collection method used in this research. Skills were measured by gathering information about employed status and type. Hence, four variables, Education,

Gender, Age and Employment status and type were analyzed against the outcome to understand the impact of compatibility.

Relative Advantage, Complexity and Compatibility are regarded as most relevant constructs for adoption research (Tornatzky & Klein, 1982). Therefore, trialability and observability were excluded from this research.

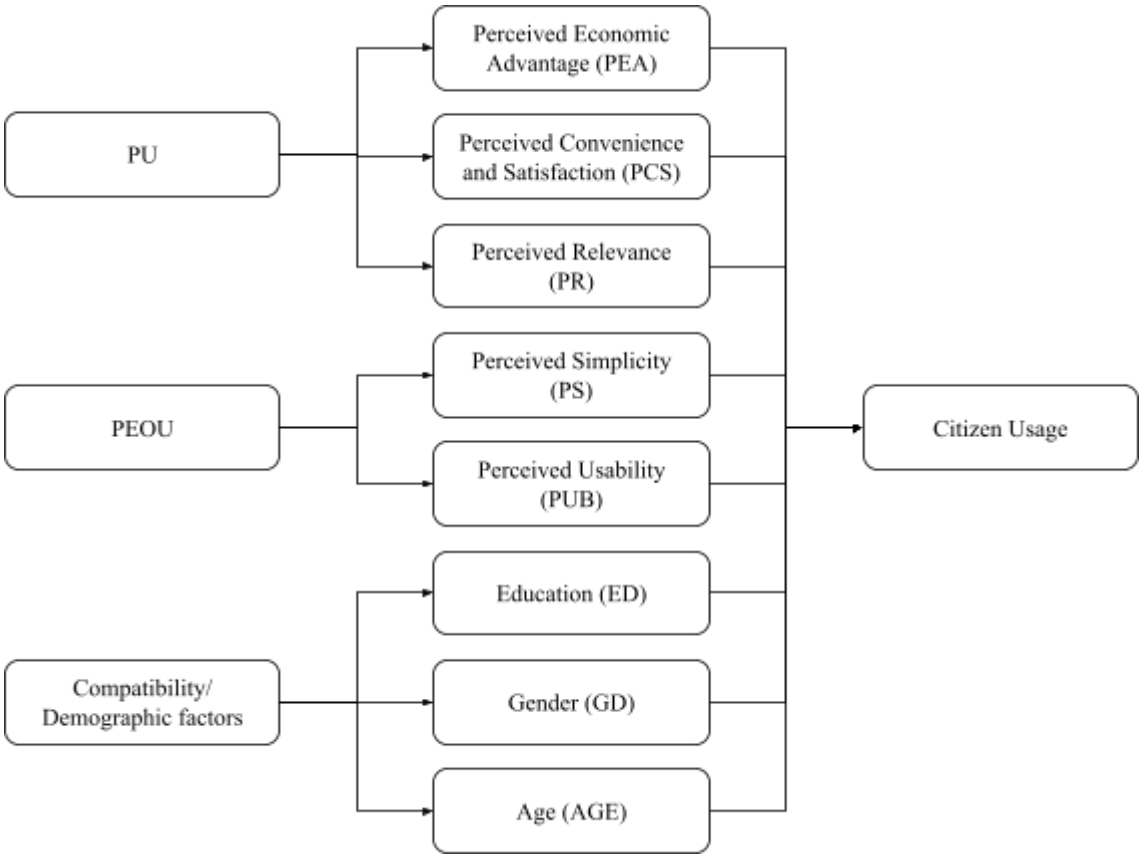

Fig 3.1: Research Model

Therefore, five variables related to PU and PEOU and four demographic variables related to compatibility were considered for the final analysis with the usage data. The perception variables, i.e. perceived economic advantage (PEA), perceived convenience and satisfaction (PCS), perceived relevance (PR), perceived simplicity (PS), and perceived usability (PUS) were all measured using a 5-point scale with bipolar disagree - agree with linking performance and outcome (Montano & Kaspryzk, 2008).

Education was measured using an ordinal scale where a lower score corresponds to a lower education level. Gender was measured with a nominal scale where 1 denotes and 2 denotes female.

The study is explanatory research using quantitative methods. For the purpose of the analysis, primary data was collected directly from citizens. Citizens were called on their mobile phones and asked questions which were recorded by the interviewer. There were 8 interviewers hired from a professional survey firm in Bangladesh. Interviewers conducted the interviews using an interview guide with a list of questions. The interview guide is provided in the appendix. Later the recorded data was compiled and organized in an excel document. All statistical analysis was conducted using IBM SPSS Statistics 23.

The sample size of the study was 303. Following are the details of the sample distribution:

Region	Proportion	Sample Distribution (n=300)
Barisal	5.8%	17.34
Chittagong	19.7%	59.19
Dhaka	25.3%	75.87
Khulna	10.9%	32.67
Mymensingh	7.6%	22.89
Rajshahi	12.8%	38.49
Rangpur	11.0%	32.88
Sylhet	6.9%	20.64

Gender	Proportion	Sample Distribution (n=300)
Male	50.3%	150.3
Female	49.7%	149.7

Area Type	Proportion	Sample Distribution (n=300)

Urban	23.3%	69.97
Rural	76.7%	230.03

Age	Proportion	Sample Distribution (n=300)
18-24	20.4%	61.18
25-34	26.8%	80.40
35-44	21.0%	62.94
45-54	14.7%	44.10
55-64	9.3%	27.80
65+	7.9%	23.58

Table 3.1 Sample Distribution

The analysis was conducted both on the overall sample and also separately on different groups of users based on their usage experience. The total sample can be segregated into Self users (people who used eGov services themselves in their own device), Non users (people who have not used any eGov services and UDC users (people who have used distribution channels such as UDC entrepreneurs for availing eGov services). Statistical analysis was conducted on the data to provide descriptive statistics on all the variables.

Standard multiple regression analysis was used to find the influence of different factors on usage of eGov services. The purpose of regression analysis is to relate a dependent variable to a set of independent variables (Mendenhal & Sincich, 1993). Regression analysis was seen as the most appropriate analytical technique since the goal of this study was to determine the relationship between usage (dependent variable) and citizen perceptions of state e-government initiatives (independent variables). The independent variables considered to be part of the regression analysis were assumed to be explaining one single construct, i.e. general perception of eGov services. The model will examine which components of this general perception about eGov services explains adoption and use of eGov services and to what extent.

For this purpose, two separate models were built. One model incorporates the responses from the whole population and another only captures the data of the users. The justification for

building two models is that it was found in the general analysis of the independent variables that the perception of eGov services differ for users and nonusers and this will be demonstrated later. So, the model with data from only the users can provide insights on how with the changed perception with at least one usage experience, usage behavior is influenced. The other model also incorporates the influence of factors that refrains people from using a service in the first place.

The dependent variable of the regression analysis is the Usage by citizens that is reported using a ratio scale measurement from 1-5. Here, in this scale, 1 indicates 1-2 times, 2 indicates 3-4 times, 3 indicates 5-6 times, 4 indicates 7-8 times and 5 indicates more than 8 times. 0 value is used to portray non-usage. The usage variable collates responses that were provided by the local shop/UDC users, Self users, and also Nonusers.

Constructs/ Themes	Independent Variables (IV)	Hypotheses
PU	PEA	H1 = Higher PEA significantly influences higher usage
	PCS	H2 = Higher PCS significantly influences higher usage
	PR	H3 = Higher PR significantly influences higher usage
PEOU	PS	H4 = Higher PS significantly influences higher usage
	PUB	H5 = Higher PUB significantly influences higher usage
Compatibility/ Demographics	Education	H6 = Higher Education significantly influences higher usage
	Gender	H7 = Gender significantly influences higher usage
	Age	H8 = Age significantly influences higher usage

Table 3.2 IVs and Hypotheses for the analysis

The data for the regression analysis was tested for reliability. The reliability analysis was conducted within IVs selected from each of the constructs of TAM as a whole assuming general perception as a separate construct that is explained by these variables. Reliability analysis was also conducted separately for PU and PEOU.

PU has the influence of 3 variables and PEOU has the influence of 2 variables. Therefore, two reliability statistics were reported assuming three scales, one for general perception and the others for PU and PEOU with 3 and 2 items respectively.

The most frequently reported reliability statistic for multiple-item scales is Cronbach's Alpha (Eisinga, Grotenhuis & Pelzer, 2013). However, Cronbach's Alpha almost always underestimates the true reliability of two item scales and sometimes substantially (Eisinga et al., 2013). Eisinga, Grotenhuis & Pelzer (2013) recommends reporting Spearman-Brown statistics, in addition to coefficient alpha for assessing the reliability of two-item scales. Ferketich (1991) recommends that the Corrected Item Total Correlation value be between 0.3 to 0.7 for the scale to be reliable. Items were tested for reliability using this method as well.

Multicollinearity was tested with variance inflation factors (VIF) for them to be less than 2.5 to identify significant multicollinearity (Johnson, Jones & Manley, 2018). Heteroscedasticity of the residuals was analyzed with a scatterplot of Regression Standardized Residual Vs Predicted Value. Heteroscedasticity was also tested statistically with the Breusch-Pagan test and Koenkar test. Standard errors were then adjusted for heteroscedasticity using the RLM macro written by Darlington & Hayes (2017) with SPSS.

There were several limitations of the study. From a methodological point of view, the scope of the research was intentionally limited to the perception factors only related or associated to eGov technology. The research also only focuses on the G2C services and hence looks at perception of individuals only.

The instrument used to measure general perception has only five items and there is little theoretical support for the items used to measure general perception. However, regression was conducted with all factors that fall under the chosen theoretical frameworks to get a list of all the factors as opposed to testing a hypothetical construct such as general perception.

The number of items on the scales were small because of budget limitations. Since this study involved a survey with a sample size of 300, the increase in number of questions would have surpassed the budget allocated for the data collection process.

Sampling bias could be possible since the respondents were chosen from a pre-existing database with phone numbers. Although respondents were chosen randomly out of that database, it is possible that there is some commonality among all the respondents that caused all of them to be enlisted in the database.

Chapter Four: Results

Although the Government of Bangladesh has made digital eGov services a priority, half of the respondents reported to be unaware of any digital services delivered through Govt. websites. On average it was found that around 47.2% of the population are consciously aware of such services offered by the Government (Question no. 1, Awareness). Among the respondents who were aware of such services, 37.3% have used services from Govt. websites by themselves, which is 9.9% of the whole population (Question no. 2, Usage). However, a lot more of the respondents reported to have used eGov services through UDC or a local computer shop. Including them, 24.09% of the respondents have used eGov services in the past at least once (Question no. 3; Crosstab Q2 Vs Q3). On the other hand, only 1.32% of the respondents have used eGov services (Crosstab Q2 Vs Q3), only on their own (without using at least once through UDC).

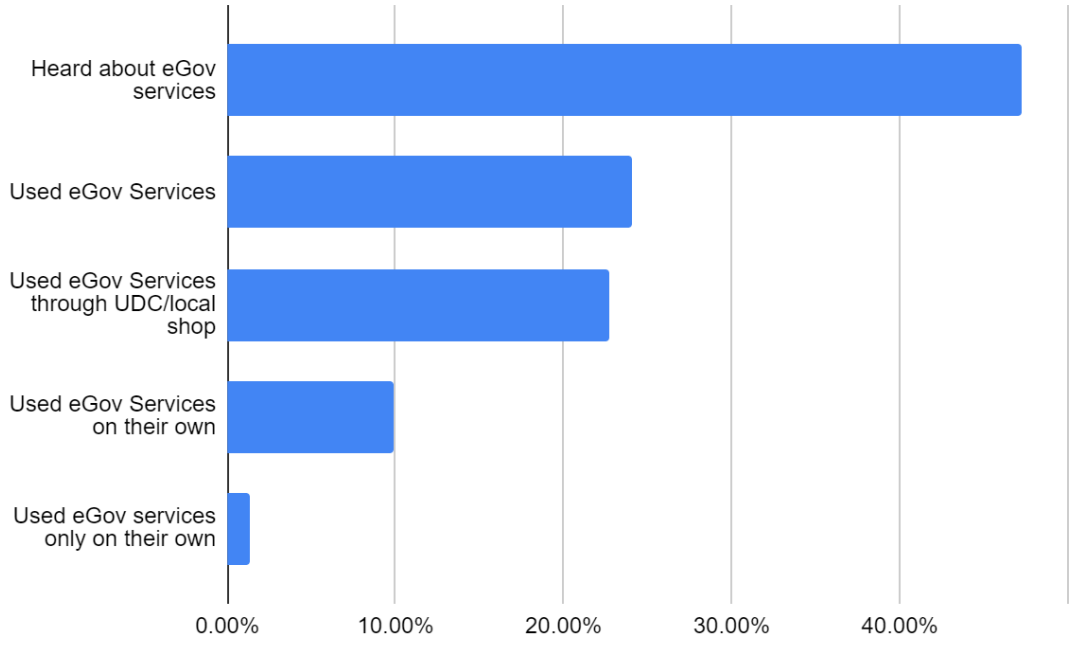

Figure 4.1 Usage of eGov services

In terms of Gender, Males show higher adoption of eGov services in the sense that a higher percentage of male respondents have reported to have used eGov services in the past. 32% of the males report to have used eGov services in the past and the percentage for females is at 16.34% (Gender Vs Usage).

When segregated in terms of area type (urban and rural), there isn't high variability. 27.16% of the urban people have used eGov services while the percentage for the rural population stands at 22.97%.

In terms of occupation, significant variability of past usage experience was found among different occupation groups. For example: among respondents who have reported being unemployed at the moment, 37.5% have used eGov services before while among homemakers, the percentage is only 14.29% (Occupation Vs Usage)

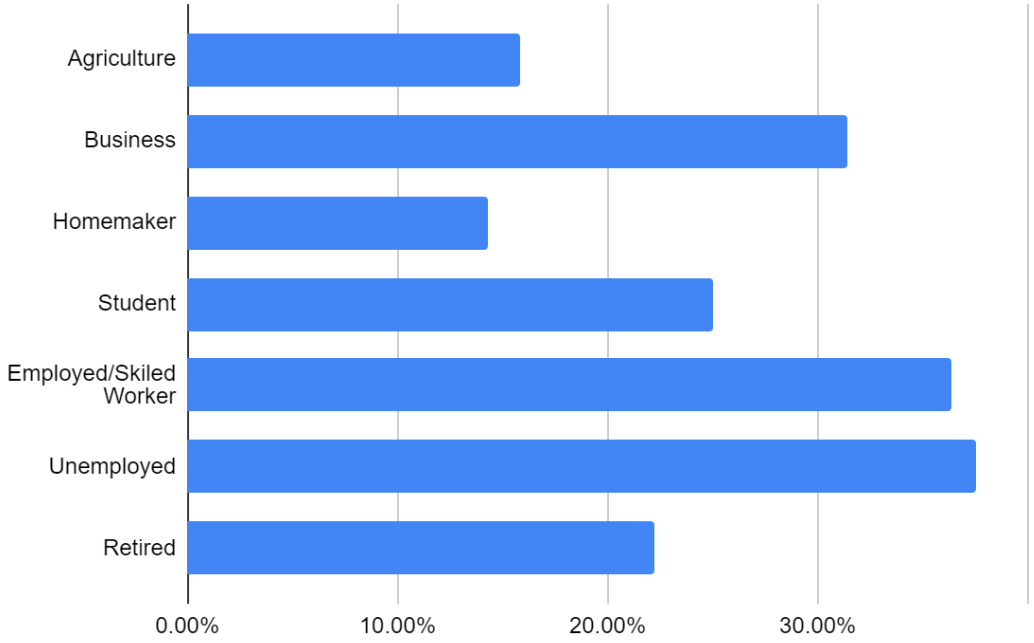

Figure 4.2: Occupation vs Usage

45.2% of the citizens reported not having access to any digital device (Digital Device Preference). Despite having the option of using the UDC or local shop channels, eGov usage is significantly lower for people who do not have access to a digital device. Only 10.22% of the respondents have used eGov services despite not having access to any digital device. Among people who prefer a laptop or a desktop computer for using such services, 57.63% have used eGov in the past and the percentage is 23.36% for people who prefer smartphones (Digital Device Preference Vs Usage).

Central tendency analysis of the perception variables show that there is variability in general perception of the population about eGov services in Bangladesh. On average for each of the

perception variables, users seem to have a general higher opinion of eGov services than non-users.

Perceived Economic Advantage (PEA)			
	User	**Non User**	**Total Population**
Mean	3.9	3.55	3.63
Median	4	3	3
Mode	4	3	3
Std. Deviation	0.802	0.745	0.773

Perceived Simplicity (PS)			
	User	**Non User**	**Total Population**
Mean	4.1	3.42	3.58
Median	4	3	3
Mode	4	3	3
Std. Deviation	0.836	0.687	0.78

Perceived Convenience and Satisfaction (PCS)			
	User	**Non User**	**Total Population**
Mean	3.78	3.41	3.5
Median	4	3	3
Mode	4	3	3
Std. Deviation	0.804	0.699	0.741

Perceived Relevance (PR)			
	User	**Non User**	**Total Population**

Mean	4	3.53	3.64
Median	4	3	4
Mode	4	3	3
Std. Deviation	0.85	0.813	0.845

Perceived Usability (PUB)			
	User	**Non User**	**Total Population**
Mean	3.88	3.43	3.53
Median	4	3	3
Mode	4	3	3
Std. Deviation	0.912	0.799	0.848

Table 4.1: Central Tendency of Perception Variables

For the model, other general demographic data such as: education, gender, age and Area type variables were considered. The following table shows a summary of the correlations found between these factors and usage behavior.

		Age	Education	Gender	Area Type
Usage	Pearson Correlation	-0.087	.320	-.182	-0.051
	Sig. (2-tailed)	0.13	0	0.001	0.373

Table 4.2: Correlation between usage and demographic factors.

Both education and gender has a statistically significant correlation with usage with a p-value lower than .01. These two variables were considered as independent variables for the final analysis.

Education			
	Self User	**Non User**	**UDC/Local Shop User**
Mean	3.07	2.85	3.7
Median	3	3	4
Mode	2	2	2
Std. Deviation	1.461	1.17	1.456

Table 4.3: Description of Education.

Reliability analysis was conducted on the scales used in the regression analysis. Considering all five perception variables to be explaining general perception of eGov services, data on the five scales has a Crohnbach's Alpha value of 0.837, which is considered to be over the minimum threshold of 0.80 for basic research (Nunnaly & Bernstein, 1994), and Spearman-Brown Coefficient value of 0.828 and 0.833 for equal length and unequal length. The Corrected Item Total Correlation value of each item is between 0.3 to 0.7 except for PR which has the score of 0.780.

Furthermore the scales were tested for reliability using the other two theoretical constructs, i.e. PU and PEOU. Considering PU, scales for PEA, PCS and PR have a Crohnback's Alpha value of 0.717 and Spearman-Brown coefficient value of 0.772 and 0.778 for equal and unequal length which are close to reliability standards. Considering PEOU, PS and PUB scales have a Crohnback's Alpha value of 0.740 and Spearman-Brown Coefficient value of 0.742. The Corrected Item Total Correlation value of each item under both constructs falls between 0.3 to 0.7.

As discussed in chapter 3, two regression models were built for analysing the influence of general perception of eGov services on the actual use of them by citizens. The first model considers the whole population (users and nonusers). The following table presents the summary of the model.

Model Summary (Users and Non-users)				
Model	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Durbin-Watson**
1	0.257	0.239	0.85	1.891

Table 4.4: Regression Model Summary (Users and non users)

At 95% confidence interval, R square value of the model is 0.257 which implies that the independent variables, together, can explain 25.7% of the variances in usage behavior from citizens. The Durbin-Watson statistic is 1.891 which is within the normal range of 1.5 to 2.5 indicating the model is not significantly influenced by serial correlation. VIF was in general less than 2.5 except for that of PR which was 2.785.

To test heteroskedasticity in the model, a scatter plot diagram with Regression standardized Residual vs Predicted value was built. The patterns in the diagram indicate the presence of heteroskedasticity. Heteroskedasticity was then tested statistically. Breusch-Pagan test provided a chi-square value of 160.655 with $p < .05$. Koenkar test revealed a chi-square value of 65.994 with $p < .05$. Both these tests indicate that the null hypothesis of homoscedasticity can be rejected and there is statistically significant heteroskedasticity. Hence, the model was adjusted for heteroskedasticity and the values presented here are the adjusted values.

Regression Model				
	Co-efficient	**Standard Error**	**t- value**	**p- value**
Constant	-1.6528	0.3564	-4.6371	0.0000
Education	0.1622	0.0419	3.8749	0.0001
Gender	-0.2329	0.0992	-2.3483	0.0195
PEA	0.0144	0.0814	0.1769	0.8597
PS	0.4201	0.0848	4.9562	0.0000
PCS	0.1839	0.0764	2.4064	0.0167
PR	-0.0472	0.0965	-0.4891	0.6251
PUB	-0.0221	0.0883	-0.2502	0.8026

Table 4.5: Regression Model (Users and non users)

H2 tests the influence of IV PS on DV Usage. H2 is justified if PS has a significant positive influence on the DV Usage. PS indeed significantly influenced Usage, $F(7, 295) = 14.54$, $p <$

.05 which indicates the statistical significance of the influence (b = 0.4201. p < .05), and these results direct that IV PS has a positive influence on DV Usage.

H3 tests the influence of IV PCS on DV Usage. H3 is justified if PCS has a significant positive influence on the DV Usage. PCS indeed significantly influenced Usage, F (7, 295)= 14.54, p < .05 which indicates the statistical significance of the influence (b = 0.1839. p < .05), and these results direct that IV PCS has a positive influence on DV Usage.

H6 tests the influence of IV Education on DV Usage. H3 is justified if Education has a significant positive influence on the DV Usage. Education indeed significantly influenced Usage, F (7, 295)= 14.54, p < .05 which indicates the statistical significance of the influence (b = 0.1622. p < .05), and these results direct that IV Education has a positive influence on DV Usage.

H7 tests the influence of IV Gender on DV Usage. H7 is justified if Gender has a significant negative influence on the DV Usage. Gender indeed significantly influenced Usage, F (7, 295)= 14.54, p < .05 which indicates the statistical significance of the influence (b = -0.2329. p < .05), and these results direct that IV Gender has a negative influence on DV Usage. Since, Gender is a dichotomous variable with score of 1 denoting males, these findings indicate that being male makes it more likely for a citizen to use eGov services.

For IVs that are tested with H1, H4 and H5, p >.05 and therefore at 95% confidence interval null hypotheses corresponding to these hypotheses cannot be rejected.

The second model considers only the population who have taken an eGov service at least once. The following table presents the summary of the model.

Model Summary (Users and Non-users)				
Model	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Durbin-Watson**
2	0.414	0.351	.986	2.243

Table 4.6: Regression Model Summary (Users only)

At 95% confidence interval, R square value of the model is 0.414 which implies that the independent variables, together, can explain 41.4% of the variances in usage behavior from citizens. The Durbin-Watson statistic is 2.243 which is within the normal range of 1.5 to 2.5 indicating the model is not significantly influenced by serial correlation. VIF in general was less than 2.5 except for that of PR which was 2.996.

The patterns in the scatter plot diagram with Regression standardized Residual vs Predicted value indicate the presence of heteroskedasticity. Heteroskedasticity was therefore tested statistically. Breusch-Pagan test provides a chi-square value of 18.523 with $p < .05$. Koenkar test reveals chi-square value of 18.03 with $p < .05$. Both these tests indicate that the null hypothesis of homoscedasticity can be rejected and there is statistically significant heteroskedasticity. Hence, the model was adjusted for heteroskedasticity and the values presented here are the adjusted values.

Regression Model 2				
	Co-efficient	**Standard Error**	**t- value**	**p- value**
Constant	-1.9525	0.7472	-2.6131	0.0111
PEA	0.2529	0.1947	1.2987	0.1986
PS	0.0995	0.2053	0.4848	0.6294
PCS	0.6271	0.1777	3.5289	0.0008
PR	-0.1014	0.2368	-0.4282	0.6699
PUB	-0.0912	0.1997	-0.4567	0.6494
Education	0.3113	0.0856	3.6378	0.0005
Constant	-1.9525	0.7472	-2.6131	0.0111

Table 4.7: Regression Model (Users Only)

H3 tests the influence of IV PCS on DV Usage. H3 is justified if PCS has a significant positive influence on the DV Usage. PCS indeed significantly influenced usage, $F (7, 65)= 6.56$, $p < .05$ which indicates the statistical significance of the influence ($b = .6271$. $p < .05$), and these results direct that IV PCS has a positive influence on DV Usage.

H6 tests the influence of IV Education on DV Usage. H6 is justified if Education has a significant positive influence on the DV Usage. Education indeed significantly influenced usage, $F (7, 65)= 6.56$, $p < .05$ which indicates the statistical significance of the influence (b =

.3113. $p < .05$), and these results direct that IV Education has a positive influence on DV Usage.

For IVs that are tested with H1, H2, H4, H5 and H7, $p > .05$ and therefore at 95% confidence interval null hypotheses corresponding to these hypotheses cannot be rejected.

Chapter Five: Findings and Discussion

This chapter presents all the findings from the analysis and provides explanations and implications for the findings. The discussion also tries to derive insights from other related scientific literature and through triangulation of different data sources, possible interpretations are presented.

Key Finding 1: Compatibility with citizens' personal/social context increases adoption of eGov services:

The compatibility of the eGov services currently delivered in Bangladesh was not directly measured because by definition, such measurement would require more in-depth investigation of the individual and the social context of the citizens and because of the limitations of the research scope, these factors were not analyzed. However, eGov adoption was analyzed against the most common demographic factors that are often cited to be significant when it comes to ICT. From the analysis, it was found that some of these variables significantly influenced adoption by the citizens.

Education was found to have a statistically significant influence on the use of eGov services both for citizens who have used eGov services in the past and those who have not done so. Instances of use of eGov services were more frequent among people with higher education. This might imply that the current technical solution for eGov service delivery in Bangladesh might not be compatible for people with lower education.

The effect of education on the usage might also be explained with increased computer self-efficacy with higher education. Self-efficacy is widely accepted as one of the major determinants of ICT adoption behavior (Rahman et al., 2016). However, Self-efficacy is a person's confidence in doing a specific task and it is very much context-specific (Haddoune, 2009) and general higher education is not one of the direct sources of computer self-efficacy (Reid, 2015). It has been shown by Torkzadeh and Koufteros (1994) that specific training on computers can increase computer self-efficacy. Based on that idea, the Govt. of Bangladesh has made ICT a mandatory subject in general education starting from fifth grade. But, this does not help explain the influence of general education on self-efficacy.

It might be possible that citizens pursuing higher levels of education have greater exposure to computer usage which could establish a connection between the influence of Education and Self efficacy on the adoption of eGov services. But, this hypothesis can also be questioned since it has been shown that computer usage experience influences self-efficacy based on the quality of experience, and the amount of use does not have any effect on self-efficacy (Cassidy & Eachus. 2002).

Self-efficacy might also be the reason Gender was found to be one of the statistically significant factors influencing adoption. According to Miura (1987), males, in general, have higher computer self-efficacy than females. Murphy et al. (1989) found that gender differences in self-efficacy are only observed when considering advanced computer skills and are not significant when judging for basic computer skills. This might imply that if the influence of self-efficacy is being reflected through Gender, then eGov services are perceived to be a sufficiently complex type of task. The influence of perceived complexity was also observed in the data analysis of this research.

It is also possible that the effect of Gender on adoption can be explained by traditional gender roles (Subjective norm). This assumption is also supported by the finding that only 14.29% of the respondents who fall under the occupational group homemaker had the experience of using an eGov service. This percentage is the lowest among all other occupational groups. In the context of Bangladesh, homemakers are almost always females.

It is possible that the influence of higher education and gender that was observed in the analysis could be part of the influence of computer self-efficacy on technology adoption. Alternatively, it could also be possible that factors such as subjective norm and experience have caused this influence. However, it is worth investigating if eGov initiatives in Bangladesh are in some ways making it difficult for women and people with no/lower level of educational qualification to eGov services.

In the compatibility discussion, age often comes up as a factor and it was analyzed as part of this research as well. However, the existence of much-discussed digital divide was not found in this case. In this context, older people who are not adopting ICT can be divided into two categories, i.e. people who do not have access to digital devices and people who have access to devices but decide not to use them (Colombo et al., 2015). There are two major reasons that

are usually given by the latter group. One is their digital competence. The other is that they do not think ICT can have a useful role in fulfilling their necessities (Alvarez-Dardet et al. (2020). Hur (2016) asserts that these people are more likely to use ICT if they find a reason for it.

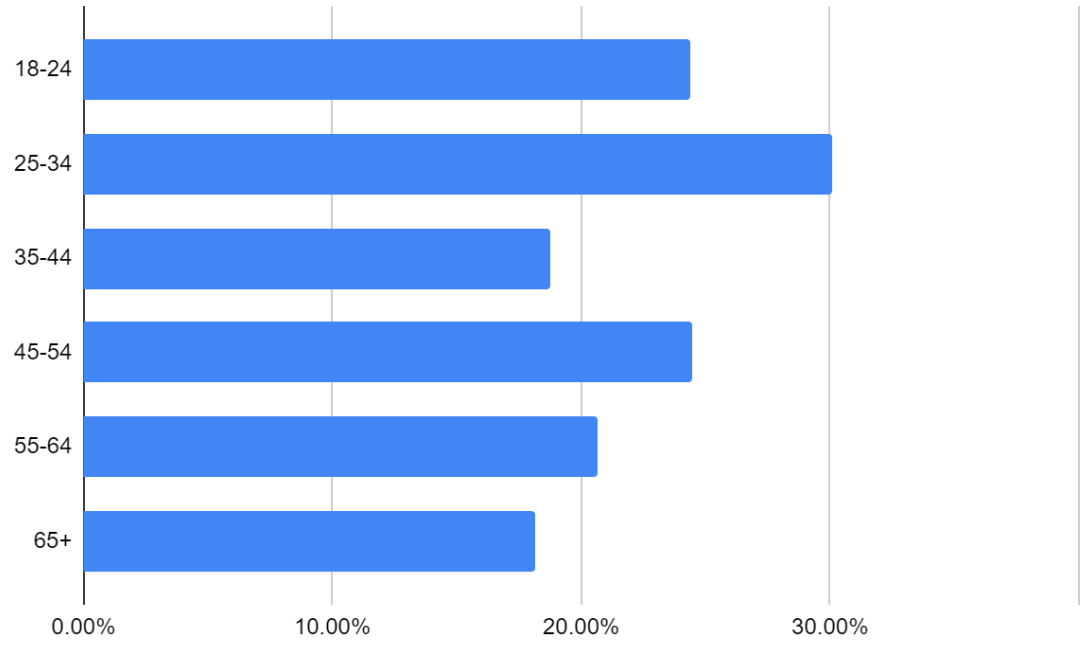

Figure 5.1 Age Group Vs Adoption of eGov services

Figure 5.1 shows that there is a slight decrease in the adoption percentage among age groups as age becomes higher. However, no significant correlation was found between increasing age and adoption of ICT. This phenomenon can be explained by the necessity of the service provided by Govt. websites. As discussed above, elders are more likely to use ICT if there is a reason for it. Some eGov services are such that one has to avail the service as part of an obligation of being a citizen. Given the presence of UDCs, the other component of digital competence can be overcome since through that channel, the citizen only has to go to the UDC for a service, much like the channels before ICT became integrated. The only difference is that UDCs are possibly located closer.

Key Finding 2: Citizens perceive eGov services to be more complex to avail than they actually are:

Perceived Simplicity (PS) was found to be a statistically significant factor that influences eGov adoption. This aligns with the DOI that the Complexity attribute of innovation is negatively correlated with adoption. This was also exhibited by Tan et al. (2009) for example where internet-based ICT adoption among SMEs in Malaysia was analyzed and Complexity was found to have a significant negative correlation with adoption.

But, this effect of PS was only significant when considering the use of eGov services for the first time. When regressed against the model with only the citizens who have used eGov services in the past, PS doesn't remain a significant factor anymore. This claim can further be bolstered with the finding that past users rate PS higher than non-users do.

One of the reasons behind such a difference in perception could be that eGov services are all services that citizens had to do without the support of ICT prior to its introduction. This is supported by the fact that citizens who had used eGov services in the past have used them for purposes that are relevant for every citizen. Examples of such purposes are birth certificate registration, National ID card application, filing tax returns, applying for colleges, etc.

It is possible that non-users perceive availing these services through digital channels to be a radically different action from availing those services without ICT. Adanir et al. (2020) in a study of Kyrgyz learners' and teachers' ICT usage in high school courses found that teachers use ICT for many actions such as teaching, administration, professional development, etc. However, teachers do not use ICT in a way that radically alters instructional practices despite the evidence that ICT use in education can increase motivation, gain learner interest and enhance learning (Savec et al., 2018).

However, the explanation requires further investigation into the matter for better understanding. Whether this perception of radically different action and attached uncertainty to it are driving the perceived complexity of eGov services should be explored. Nonetheless, it can be inferred from the data that there is some underlying factor that is creating the perception of complexity to be higher than it actually is. Rogers (2010) implies that perceived complexity is based on how simple it is to understand the idea behind an innovation. Perhaps,

promotional campaigns from the Govt. explaining eGovernment services as a whole simply might counter this factor that is influencing first-time use by citizens.

Key Finding 3: By improving perceived expected user experience, adoption of eGov services can be increased

Perceived Convenience and Satisfaction (PCS) significantly influenced usage both including and excluding non-users. Here PCS of eGov services was measured compared to the system before the digital systems.

Table 5.1 provides an overview of the relative benefits of eGov services through the UDC channel in terms of TCV (Time, Cost, and Number of visit).

Services	Before UDC			After UDC		
	Time (Hrs)	Cost (USD)	Visit	Time (Hrs)	Cost (USD)	Visit
Birth Registration	211.52	1.6	2.19	7.58	0.9	1.23
Citizen Certificate	24.9	0.7	1.71	2.97	0.5	1.07
Death Registration	39.39	1.9	2.5	4.52	0.6	1.09

Table 5.1: Benefits of eGov services through UDC (KICA, 2018).

In terms of convenience, if a citizen avails these services through the digital system, time and number of visits are significantly reduced, increasing the relative convenience of eGov services. Although UDC channels also decrease the price in objective terms, Perceived Economic Advantage did not have a significant influence on usage.

One reason can be that Govt. services through eGov channels and traditional channels, officially have the same costs. But, by reducing the distance between citizens and the service point (UDC or digital device for eGov and relevant Govt. office for traditional channels), the transportation cost is reduced as well which ultimately constitutes the economic advantage. However, this advantage might be hard to distinguish for citizens.

Nonetheless, relative convenience significantly influences usage. One way to use this finding is that during the promotion of eGov services, these convenience factors should be highlighted in the communication. Another way to respond to this finding is to investigate why despite objective advantages over traditional methods, the adoption rate of eGov is not as high and stands at only about 10%.

Key Finding 4: General perception of non-users is worse than the general perception of users of eGov services.

From the analysis, it can be seen that the general perception of non-users is in general worse than the general perception of users. This implies that their perception of eGov services becomes better after they actually use it. This also implies the presence of constructs that are contributing to the worsening of the perception that will account for its difference from reality as perceived by a user.

One possible way to explain this is the presence of Technophobia. The link between technophobia and technology avoidance is well established in the literature and it is established to be present when technology is in use in any physical location (Khasawneh, 2018). Van Djik (2015) also supports this explanation for the non-use of some people because they are simply harder to convince because of emotional reasons such as technophobia. Cambre & Cook (1985) suggested that the introduction of technological change might invoke emotional and cognitive reactions in some people. This area requires further research since not much research has been done on the role of technophobia and technology adoption (Sinkovics et al., 2002).

Key Finding 5: Delivery channels ideally suited to the context might be a major driver for eGov adoption.

From the analysis, it was found that only 1.3% of the population (2.8% of the users) have used eGov websites on their own devices, but have not used the UDC channel. This implies that the majority of the eGov service users have been introduced to the services through the UDC channel.

The success of the UDC initiative can be explained by the concept of building trust in ICT through creating safe and reliable public access venues as discussed by Gomez & Gould (2010). They explained this concept with libraries, telecentres, and cyber cafes in developing countries. Public access venue is one that offers public access to information with services available to all and not directed to one group in the community to the exclusion of others Gomez & Gould (2010). By that definition, UDCs are a great example of public access venues where people can do activities other than accessing public services such as: applying for jobs, browsing the internet, using social media, etc.

Roberts (2000) analyzes the importance of trust in ICT use and he claims that trust works against the uncertainties that might be associated with knowledge transfer through ICT. This phenomenon works as the balancing force for the technophobia factor that might be alienating people from ICT use. The institutional reputation of UDCs and the political support for them might be contributing to citizens' trust for UDCs.

Key Finding 6: Govt. websites might not be perceived as very mobile friendly.

Analyzing the digital device access and preference against usage, it was found that there is a large variability in eGov use among different groups.

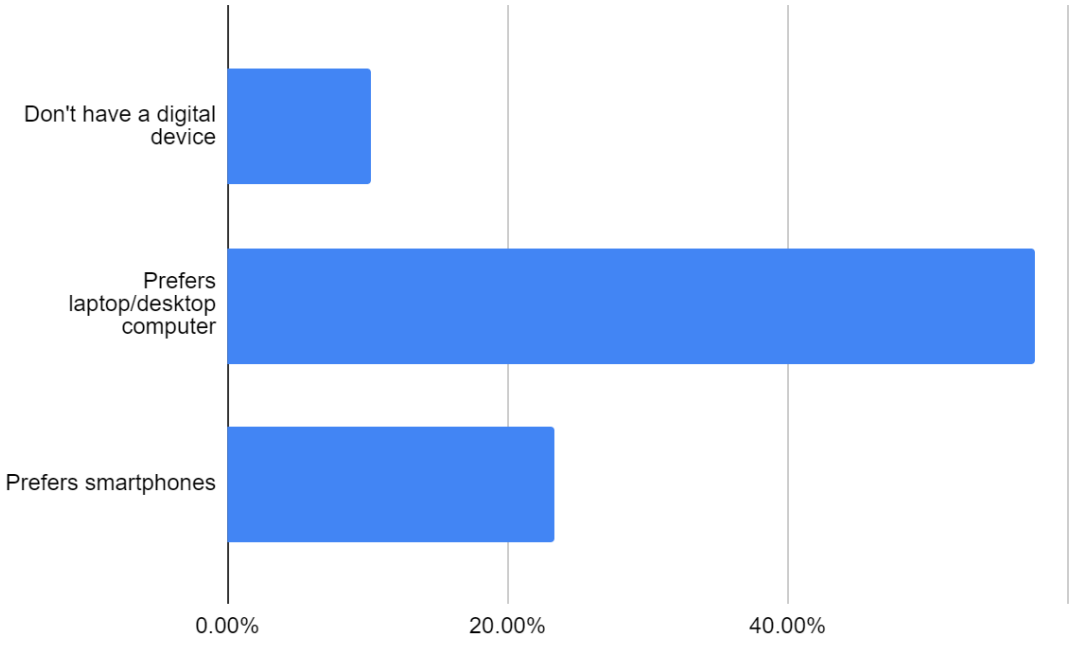

Figure 5.2: Digital Device Access/preference vs adoption.

The low adoption rate for people without access to a digital device can be explained by the proposition that one of the significant sources of computer self-efficacy is the level of comfort with using computers. However, a counter-argument to this could be the prominence of UDCs that do not require the person to use a computer. Perhaps past experience with the technology itself is a significant factor (Reid, 2017) influencing adoption behavior even if the delivery channel doesn't require active engagement with the technology. Further research can be conducted in this area to understand the phenomenon and identify adjustments required in the approach so that people without the financial means to afford a digital device or internet connectivity are still nudged to use them, blurring the digital divide.

Another pattern that exists in the data is that people who have a preference for using a desktop/laptop computer for browsing the internet and functioning online, show a significantly higher adoption rate compared to those who prefer smartphones for the mentioned activities. This might imply that solely smartphone users are not finding it convenient and/or easy to use these services with a potential contribution to their non-use.
From a brief first-person observation, it is fair to comment that some Govt. websites are not responsive to smartphone browsers, most of the services are not available via any mobile app and often the information forms are too lengthy to navigate through a smartphone. Further initiatives could be taken here to create websites that are smartphone browser-friendly, pages that are not too lengthy, and native mobile apps that run well on smartphones. Another factor could be that since the main mode of eGov service delivery in Bangladesh is through the UDC channel and all UDCs have computers with only some of them with options for Mobile Financial Services (MFS), this phenomenon might have created a social norm that eGov services are to be availed using a computer.

Although literature supporting the utility and efficacy of using mobile phones for eGov services is barely sufficient (Saxena, 2017), it is a relatively new field and its potential is yet to be explored (Misuraca, 2009). This approach has been tried for different services, such as mental health apps, but there are still significant challenges in increasing the adoption of these apps (Huang & Bashir, 2017).

Conclusion

This research was explanatory in nature that only discusses perceptions of citizens about eGov services in Bangladesh. The r-square value of two regression models, 0.257 and 0.414 indicate that the factors discussed in this paper are only part of the equation that predicts adoption behavior from citizens. It is also possible that a construct that has not been considered in this research influences one or more of the variables considered here. Nonetheless, this paper aims to cover one specific part of the complex equation for adoption of eGov services.

Findings of this study show also that citizens of Bangladesh perceive eGov services to be at least decent. Given that eGov services are accessible to practically everyone at every corner of the country with infrastructure support fitting to the context, the adoption could have been more.

One of the conceptualizations that could be considered along with increasing adoption is identifying and solving issues causing non adoption. These issues are causing digital inequality and these inequalities are unlikely to diminish on their own (Selwyn & Facer, 2007). Overcoming digital inequalities is considered to be one of key drivers for social and economic welfare (Brants & Frissen, 2005). However, traditional studies have shown very little interest in understanding "Non-use" of technological solutions (Verdegem & Verhoest, 2009). Hence, explorative research on different factors that influence non adoption should be investigated further.

To summarize the findings of the research, education level, perceived complexity, perceived convenience and satisfaction, and Gender significantly influence the adoption behavior from citizens, when data from both users and non users are considered. On the other hand, if only users are considered, then only education and perceived convenience and satisfaction remain as significant factors influencing adoption.

However, the four variables (Education, Perceived Complexity, Perceived Convenience and Satisfaction and Gender) explain only 25.7% of the variances in usage. For users, Education and Perceived Convenience and Satisfaction explains 41.4% of the variances in usage. That could imply that post usage perception has a bigger influence on the usage behavior.

Pre-usage perceptions about the technology have a smaller influence and usage for first time users is explained largely by other constructs that were not considered in this research.

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Appendix

Appendix A: Interview Guide

Name:
Age:
Gender:
Education level:
Email:
Phone Number:

1. Have you ever heard of any Government website that provides services digitally? (For example National ID card application, Passport Application, Issuance of Birth Certificate, Application for Driving License, Payment of Personal/Business Tax, etc.)

a) Yes
b) No (Skip to Question no. 10)

2. Have you used any of these Government websites for any purpose in the past by yourself?

a) Yes
b) No (Skip to Question no. 10)

3. Have you ever taken any Government service from a local computer shop or a Union digital center?

a) Yes
b) No (Skip to question 13)

4. How many times have you used such digital services from a Government website?

a) 1-2 times
b) 3-4 times
c) 5-6 times

d) 7-8 times
e) More than 8 times

5. What service/services have you taken from the Government websites?

Description: _____

6. Please rate how much you agree with the following statements. The ratings range from 1 to 5 with the following being the significance of each of the numbers:

1= Strongly Disagree
5= Strongly Agree

No.	Statements	
1	Using Govt. websites to do official tasks saves money and time	
2	Govt. websites are easy to understand	
3	Govt. websites make it easier to avail Govt. services	
4	I can do necessary official tasks using Govt. websites	
5	Govt. websites are easy to use	

7. How many times have you gone to a computer shop or UDC for such services?

a) 1-2 times
b) 3-4 times
c) 5-6 times
d) 7-8 times
e) More than 8 times

8. What digital communication device do you prefer for doing something online?

a) I don’t have any digital devices

b) A desktop or a laptop computer

c) Smartphone

Appendix B: Data Analysis

Data Codes

Gender	Male	1	**Occupation**	Agriculture	1
	Female	2		Business	2
				Homemaker	3
Area Type	Urban	1		Student	4
	Rural	2		Employed/Skiled Worker	5
				Unemployed	6
Division	Dhaka	1		Retired	7
	Chittagong	2			
	Khulna	3	**Education**	No education	1
	Barisal	4		Primary	2
	Sylhet	5		Secondary	3
	Rajshahi	6		Higher Secondary	4
	Mymensingh	7		Graduate	5
	Rangpur	8		Post-graduate	6
Digital Device	I don't have any digital devices	1			
	A desktop or a laptop computer	2			
	Smartphone	3			

Age	18-24	1
	25-34	2
	35-44	3
	45-54	4
	55-64	5
	65+	6

Frequency Distribution Analysis

Question no. 1 (Awareness):

	Frequency	Percent	Valid Percent	Cumulative Percent
1	143	47.2	47.2	47.2
2	160	52.8	52.8	100
Total	303	100	100	

Question no 2 (Self User):

	Frequency	Percent	Valid Percent	Cumulative Percent
1	30	9.9	21	21
2	113	37.3	79	100
Total	143	47.2	100	
System	160	52.8		
	303	100		

Question no. 3 (UDC user):

	Frequency	Percent	Valid Percent	Cumulative Percent
1	69	22.8	22.8	22.8
2	234	77.2	77.2	100
Total	303	100	100	

Crosstab: Q2 Vs Q3

		UDC User						Total
		1			2			
Self User	1	26	18.18%	8.58%	4	2.80%	1.32%	30
	2	25	17.48%	8.25%	88	61.54%	29.04%	113
Total		51			92			143

						Sample		303

Question no. 4 (Usage)

	Frequency	Percent	Valid Percent	Cumulative Percent
0	230	75.9	75.9	75.9
1	42	13.9	13.9	89.8
2	19	6.3	6.3	96
3	3	1	1	97
4	3	1	1	98
5	6	2	2	100
Total	303	100	100	

Digital Device Preference

	Frequency	Percent	Valid Percent	Cumulative Percent
1	137	45.2	45.2	45.2
2	59	19.5	19.5	64.7
3	107	35.3	35.3	100
Total	303	100	100	

Digital Device Preference Vs Gender

		Gender				Total
		1		2		
Digital Device	1	56	37.33%	81	52.94%	137
	2	37		22		59
	3	57		50		107
Total		150		153		303

Education

	Frequency	Percent	Valid Percent	Cumulative Percent
1	14	4.6	4.6	4.6
2	127	41.9	41.9	46.5
3	72	23.8	23.8	70.3
4	44	14.5	14.5	84.8
5	30	9.9	9.9	94.7
6	16	5.3	5.3	100
Total	303	100	100	

Occupation

	Frequency	Percent	Valid Percent	Cumulative Percent
1	19	6.3	6.3	6.3
2	35	11.6	11.6	17.8
3	126	41.6	41.6	59.4
4	24	7.9	7.9	67.3
5	66	21.8	21.8	89.1
6	24	7.9	7.9	97
7	9	3	3	100
Total	303	100	100	

Gender

	Frequency	Percent	Valid Percent	Cumulative Percent
1	150	49.5	49.5	49.5
2	153	50.5	50.5	100
Total	303	100	100	

Area Type:

	Frequency	Percent	Valid Percent	Cumulative Percent
1	81	26.7	26.7	26.7
2	222	73.3	73.3	100
Total	303	100	100	

Gender Vs Usage

	Gender				Total
	1		2		
0	102	68.00%	128	83.66%	230
1	30	32.00%	12	16.34%	42
2	9		10		19
3	2		1		3
4	2		1		3
5	5		1		6
	150		153		303

Area type Vs Usage

	1		2		
0	59	72.84%	171	77.03%	230
1	11	27.16%	31	22.97%	42
2	6		13		19
3	1		2		3
4	1		2		3
5	3		3		6
	81		222		303

Education vs Usage

	1	2	3	4	5	6	
0	12	102	58	31	21	6	230
1	1	18	11	7	4	1	42
2	1	5	2	5	2	4	19
3	0	1	1	0	0	1	3
4	0	1	0	0	0	2	3
5	0	0	0	1	3	2	6
	14	127	72	44	30	16	303
Used	14.29%	19.69%	19.44%	29.55%	30.00%	62.50%	
Not used	85.71%	80.31%	80.56%	70.45%	70.00%	37.50%	

Occupation vs Usage

	1	2	3	4	5	6	7
0	16	24	108	18	42	15	7
1	1	8	11	1	13	6	2
2	1	2	6	2	6	2	0
3	1	0	1	0	0	1	0
4	0	1	0	0	2	0	0
5	0	0	0	3	3	0	0
	19	35	126	24	66	24	9
Not used	84.21%	68.57%	85.71%	75.00%	63.64%	62.50%	77.78%
Used	15.79%	31.43%	14.29%	25.00%	36.36%	37.50%	22.22%

Digital Device Preferences

	1	2	3	
0	123	25	82	230
1	11	18	13	42
2	3	10	6	19

3	0	2	1	3
4	0	1	2	3
5	0	3	3	6
	137	59	107	303
Not used	89.78%	42.37%	76.64%	
Used	10.22%	57.63%	23.36%	

Age Vs Usage

		Usage						Total		
		0	1	2	3	4	5		**Non user**	**User**
	1	31	6	2	0	1	1	41	75.61%	24.39%
	2	65	11	10	2	1	4	93	69.89%	30.11%
	3	65	8	6	0	1	0	80	81.25%	18.75%
	4	37	11	0	0	0	1	49	75.51%	24.49%
	5	23	5	1	0	0	0	29	79.31%	20.69%
Age	6	9	1	0	1	0	0	11	81.82%	18.18%
Total		230	42	19	3	3	6	303		

Central Tendency Analysis for Scales

For the whole population:

	PEA	**PS**	**PCS**	**PR**	**PUB**
Mean	3.63	3.58	3.5	3.64	3.53
Median	3	3	3	4	3
Mode	3	3	3	3	3
Std. Deviation	0.773	0.78	0.741	0.845	0.848

For people with experience of eGov service use (User)

	PEA	PS	PCS	PR	PUB
Mean	3.9	4.1	3.78	4	3.88
Median	4	4	4	4	4
Mode	4	4	4	4	4
Std. Deviation	0.802	0.836	0.804	0.85	0.912

For people with no experience with eGov service use (Non user)

	PEA	PS	PCS	PR	PUB
Mean	3.55	3.42	3.41	3.53	3.43
Median	3	3	3	3	3
Mode	3	3	3	3	3
Std. Deviation	0.745	0.687	0.699	0.813	0.799

Reliability Analysis for Scales

For items under General Perception

Cronbach's Alpha		0.837
Spearman-Brown Co-efficient	Equal Length	0.828
	Unequal Length	0.833

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PEA	14.26	6.708	0.587	0.374	0.818
PS	14.31	6.413	0.666	0.453	0.797
PCS	14.39	7.232	0.47	0.226	0.847
PR	14.25	5.771	0.78	0.641	0.762
PUB	14.36	6.025	0.698	0.569	0.787

For items under PU

Cronbach's Alpha		0.717
Spearman-Brown Co-efficient	Equal Length	0.772
	Unequal Length	0.788

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
PEA	7.14	1.824	0.548	0.342	0.615
PCS	7.27	2.067	0.446	0.21	0.731
PR	7.14	1.535	0.628	0.406	0.506

For Items under PEOU

Cronbach's Alpha		0.740
Spearman-Brown Co-efficient	Equal Length	0.742
	Unequal Length	0.742

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation
PS	3.53	0.72	0.59	0.348
PUB	3.58	0.609	0.59	0.348

Regression Models

Regression Model with Whole population (Users and Non-users)

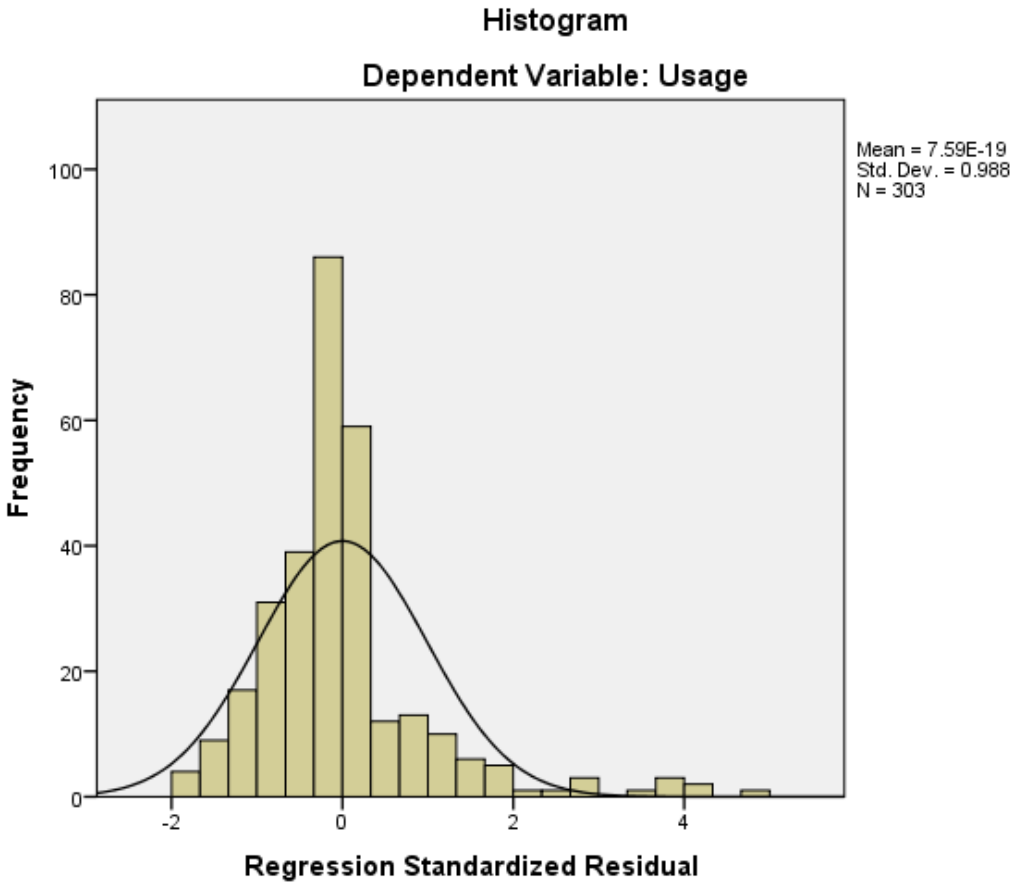
Model Summary (b)					
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Durbin-Watson**
1	.506 (a)	0.257	0.239	0.85	1.891
a Predictors: (Constant), Gender, Education, PS, PCS, PEA, PUB, PR					
b Dependent Variable: Usage					

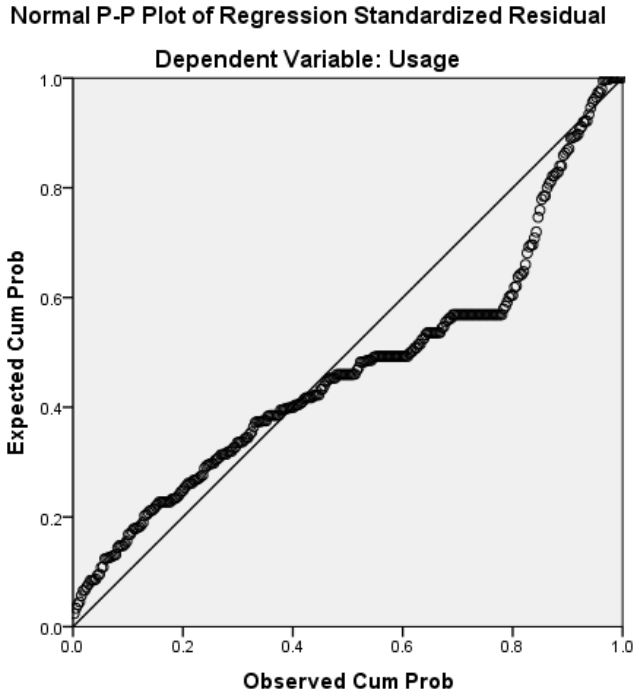
ANOVA (a)						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	73.455	7	10.494	14.54	.000 (b)
	Residual	212.908	295	0.722		
	Total	286.363	302			
a Dependent Variable: Usage						
b Predictors: (Constant), Gender, Education, PS, PCS, PEA, PUB, PR						

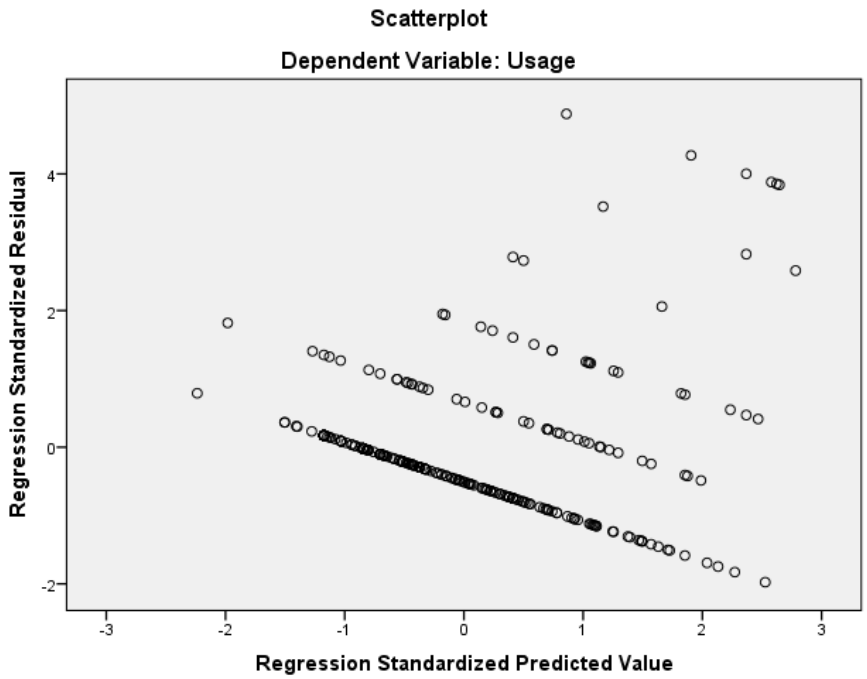
Coefficients (a)									
	Unstandardized Coefficients		**Standardized Coefficients**	**t**	**Sig.**	**95.0% Confidence Interval for B**		**Collinearity Statistics**	
	B	**Std. Error**	**Beta**			**Lower Bound**	**Upper Bound**	**Tolerance**	**VIF**
(Constant)	-1.653	0.356		-4.637	0	-2.354	-0.951		
PEA	0.014	0.081	0.011	0.177	0.86	-0.146	0.175	0.604	1.655
PS	0.42	0.085	0.337	4.956	0	0.253	0.587	0.547	1.83
PCS	0.184	0.076	0.14	2.406	0.017	0.033	0.334	0.746	1.341

PR	-0.047	0.097	-0.041	-0.489	0.625	-0.237	0.143	0.359	2.785
PUB	-0.022	0.088	-0.019	-0.25	0.803	-0.196	0.152	0.425	2.351
Education	0.162	0.042	0.212	3.875	0	0.08	0.245	0.839	1.193
Gender	-0.233	0.099	-0.12	-2.348	0.02	-0.428	-0.038	0.968	1.033
a Dependent Variable: Usage									

Collinearity Diagnostics (a)											
Model	**Dimension**	**Eigenvalue**	**Condition Index**	**Variance Proportions**							
				(Constant)	**PEA**	**PS**	**PCS**	**PR**	**PUB**	**Education**	**Gender**
1	1	7.651	1	0	0	0	0	0	0	0	0
	2	0.129	7.708	0	0	0	0	0	0	0.38	0.42
	3	0.111	8.299	0	0.01	0.01	0	0.01	0.01	0.57	0.21
	4	0.034	15.096	0.04	0	0.02	0.55	0.04	0.14	0.01	0.08
	5	0.027	16.852	0.01	0.59	0.01	0.19	0.01	0.16	0	0.01
	6	0.02	19.471	0	0.11	0.92	0.01	0.1	0.04	0.01	0.01
	7	0.016	21.894	0.66	0.03	0.04	0.14	0.17	0.19	0	0.2
	8	0.012	25.304	0.27	0.26	0	0.1	0.66	0.45	0.02	0.06
a Dependent Variable: Usage											


Histogram
Dependent Variable: Usage
Mean = 7.59E-19
Std. Dev. = 0.988
N = 303
Frequency
100
80
60
40
20
0
-2
0
2
4
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Usage
Expected Cum Prob
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
Observed Cum Prob



Test for Heteroscedasticity		
	Chi square	Sig (p value)
Breusch-Pagan Test	160.655	.0000
Koenkar Test	65.994	.0000

Adjusted value of Coefficients and Standard Errors (Adjustment with RLM macro for heteroscedasticity						
	Coeff	**se**	**t**	**p**	**LLCI**	**ULCI**
Constant	-1.6528	0.3564	-4.6371	0.0000	-2.3543	-0.9513
Education	0.1622	0.0419	3.8749	0.0001	0.0798	0.2446
Gender	-0.2329	0.0992	-2.3483	0.0195	-0.4282	-0.0377
PEA	0.0144	0.0814	0.1769	0.8597	-0.1458	0.1745
PS	0.4201	0.0848	4.9562	0	0.2533	0.5869
PCS	0.1839	0.0764	2.4064	0.0167	0.0335	0.3343
PR	-0.0472	0.0965	-0.4891	0.6251	-0.2372	0.1427
PUB	-0.0221	0.0883	-0.2502	0.8026	-0.196	0.1518

Regression Model with Users only

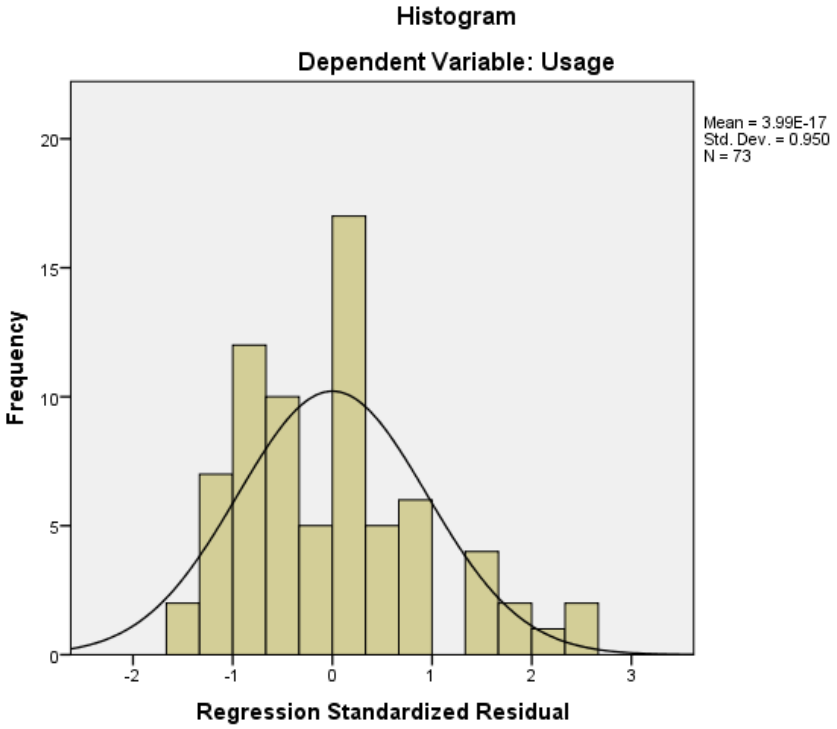
Model Summary (b)					
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Durbin-Watson**
1	.643 (a)	0.414	0.351	0.986	2.243
a Predictors: (Constant), Gender, PS, Education, PCS, PEA, PUB, PR					
b Dependent Variable: Usage					

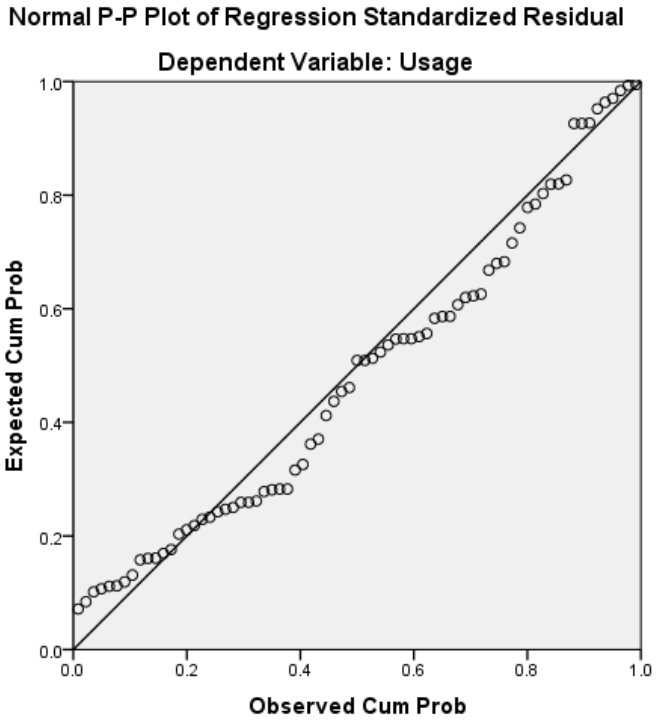
ANOVA (a)						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	44.678	7	6.383	6.56	.000b
	Residual	63.24	65	0.973		
	Total	107.918	72			
a Dependent Variable: Usage						
b Predictors: (Constant), Gender, PS, Education, PCS, PEA, PUB, PR						

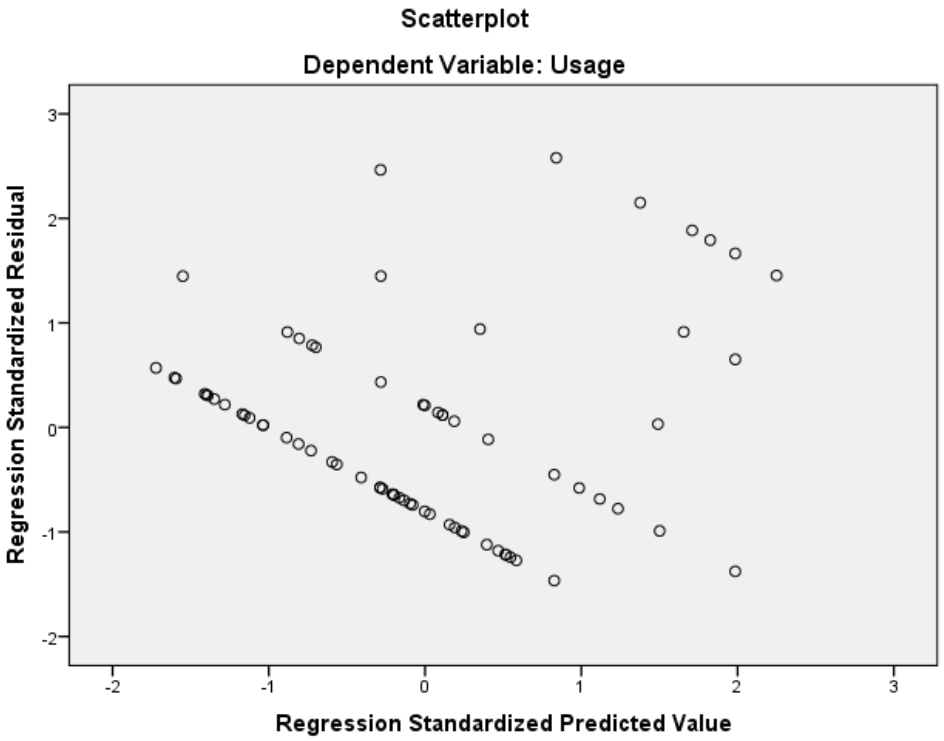
Coefficients (a)												
	Unstandardized Coefficients		**Standardized Coefficients**	**t**	**Sig.**	**95.0% Confidence Interval for B**		**Correlations**			**Collinearity Statistics**	
	B	**Std. Error**	**Beta**			**Lower Bound**	**Upper Bound**	**Zero-order**	**Partial**	**Part**	**Tolerance**	**VIF**
(Constant)	-1.952	0.747		-2.613	0.011	-3.445	-0.46					
PEA	0.253	0.195	0.166	1.299	0.199	-0.136	0.642	0.39	0.159	0.123	0.554	1.805
PS	0.1	0.205	0.068	0.485	0.629	-0.31	0.51	0.386	0.06	0.046	0.459	2.18
PCS	0.627	0.178	0.412	3.529	0.001	0.272	0.982	0.476	0.401	0.335	0.663	1.509

PR	-0.101	0.237	-0.07	-0.428	0.67	-0.574	0.371	0.347	-0.053	-0.041	0.334	2.996
PUB	-0.091	0.2	-0.068	-0.457	0.649	-0.49	0.308	0.325	-0.057	-0.043	0.407	2.456
Education	0.311	0.086	0.377	3.638	0.001	0.14	0.482	0.456	0.411	0.345	0.841	1.189
Gender	-0.246	0.248	-0.096	-0.991	0.325	-0.741	0.249	-0.02	-0.122	-0.094	0.963	1.038
a Dependent Variable: Usage												

Collinearity Diagnostics (a)											
Model	**Dimension**	**Eigenvalue**	**Condition Index**	**Variance Proportions**							
				(Constant)	**PEA**	**PS**	**PCS**	**PR**	**PUB**	**Education**	**Gender**
1	1	7.676	1	0	0	0	0	0	0	0	0
	2	0.13	7.694	0	0	0	0	0	0	0.69	0.23
	3	0.099	8.812	0	0	0.01	0.02	0.01	0.01	0.24	0.62
	4	0.028	16.6	0.22	0.01	0.01	0.33	0.05	0.21	0.03	0.06
	5	0.024	17.801	0.12	0.39	0.01	0.35	0.01	0.09	0.03	0.05
	6	0.018	20.742	0.56	0.33	0	0.23	0.01	0.17	0	0.01
	7	0.015	22.778	0.05	0.12	0.95	0	0.02	0.12	0	0.02
	8	0.011	26.81	0.03	0.14	0.01	0.06	0.91	0.4	0.01	0.01
a Dependent Variable: Usage											


Histogram
Dependent Variable: Usage
Mean = 3.99E-17
Std. Dev. = 0.950
N = 73
Frequency
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Usage
Expected Cum Prob
Observed Cum Prob



Test for Heteroscedasticity		
	Chi square	**Sig (p value)**
Breusch-Pagan Test	18.523	.0098
Koenkar Test	18.03	.0118

Adjusted value of Coefficients and Standard Errors (Adjustment with RLM macro for heteroscedacticity						
	Coeff	**se**	**t**	**p**	**LLCI**	**ULCI**
Constant	-1.9525	0.7472	-2.6131	0.0111	-3.4447	-0.4602
PEA	0.2529	0.1947	1.2987	0.1986	-0.136	0.6417
PS	0.0995	0.2053	0.4848	0.6294	-0.3105	0.5095
PCS	0.6271	0.1777	3.5289	0.0008	0.2722	0.982
PR	-0.1014	0.2368	-0.4282	0.6699	-0.5742	0.3715
PUB	-0.0912	0.1997	-0.4567	0.6494	-0.4901	0.3077
Education	0.3113	0.0856	3.6378	0.0005	0.1404	0.4822
Gender	-0.2458	0.2479	-0.9914	0.3251	-0.7409	0.2493

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Dhaka, 9 August, 2021

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