Jahangirnagar University Journal of Management Research
Journal Homepage: https://journals.juniv.edu/index.php/jujmr

Antecedents affecting Intention to Use E-services in Bangladesh Police- An Application of TAM

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Keywords:
Bangladesh Police, E-services, E-governance, TAM Model, Intention to use

Jel classifications
O21, O31

DOI:
https://doi.org/10.59185/jujmra.v7i1.324

Abstract

Over the last two decades, government e-services have become popular worldwide. This study explores the antecedents affecting the intention of police officers (POs) to use e-services in Bangladesh. The study used survey data from 243 POs working in 26 police stations nationwide using purposive sampling. MS Excel and SmartPLS 4.2 were used to analyze the survey data. The analysis indicates that information quality, service quality, and system quality have a direct positive influence on the perceived usefulness (PU) of e-services in the Police department. However, these three antecedents do not influence police officers' perceived ease of use (PEU). However, PEU has a direct positive effect on intention to use (IU) but no effect on PU. The study will assist policymakers in understanding police officers' behavior when using e-services to serve citizens. It will also allow them to design an e-services system that will better assist citizens of Bangladesh in terms of public security.

1.0 Introduction

Police are an integral part of society that ensures law and order. The modern justice system is facing complex criminal activities due to modern technologies. Contemporary information technologies (IT) also allow police to deal with complex crimes efficiently. In response to modern-day circumstances, the Bangladesh Police have grasped the opportunity to use e-services in several areas of policing. Digital transformation has paved the way for a new era in crime fighting in Bangladesh using a centralized data management system (Bhuyan, 2022). The use of information and communication technologies (ICT) created an opportunity for smooth detection, tracking, and combating criminal activities to assure public safety. The

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use of online General Diaries (GDs), where people can report misplaced documents, bank checkbooks, and numerous other difficulties, is a remarkable example of e-services in the police. The use of national archives for case record administration, crime statistics, tracking of police verification and cases, criminal intelligence, vehicle clearing certificates, and GIS-based crime mapping expanded e-services in the police (Sharmin & Rahman, 2024). Additionally, an extensive series of e-services, including the IGP Complaint Cell, CT app in the crime branch, report to the anti-terrorism unit, and emergency helpline, have been employed to establish digital connections with citizens and address illicit activities. Within the dominion of digital platforms, the Personal Information Management System (PIMS) server operates as a warehouse for comprehensive information relating to each member of law enforcement. Contrariwise, the Crime Data Management System (CDMS) incorporates all relevant information concerning criminals, fugitives, and anyone involved in criminal activities. Furthermore, the Citizen Information Management System (CIMS) now provides detailed data on property owners and occupants residing in metropolitan regions (Bhuiyan, 2023). These services are helping several 214,000 law enforcement officers (LEOs) to ensure the safety and security of 162 million (Somoy News, 2024).

In this fast-paced world, people rapidly move toward a complete digital era. Citizens from many nations are using e-policing services and receiving numerous benefits from them (Ekaabi et al., 2020; Alblooshi et al., 2021). Therefore, the question arises, how are police receiving this disruptive technology to improve the citizen charter? This study investigates how police perceive the e-services and their intention to use them. It will not matter if the police do not utilize these services to the expected level. The investigation will use the technology acceptance model to analyze the police's intention to use it and the relevant factors affecting their intentions. The study also modified the original TAM framework, developed by Devis et al. (1989), to examine the relevant latent variables.

The outcome of the investigation will allow the current effort to reorganize law enforcement in Bangladesh. As the popular studies showed, considering the consumers' point of view, this study focused on employees' point of view on using the e-service technology in the police, because the establishment of this system for the public will only be worthwhile if the police are adequately motivated to employ e-services to assist the public.

Literature Review and Hypotheses Development

E-services in Bangladesh were initially begun in 2009 by introducing CDMS as a pilot project. It became mandatory for all police stations in Bangladesh to use this system from October 2016 (Chowdhury, 2023). The police stations in Bangladesh are expected to be connected to the central server using a fiber optic network, and the software will be developed using JAVA, PHP, and MySQL. A computerized database and dynamic website will be constructed that will incorporate daily news announcements, warrant notices, fingerprint examinations, lists of terrorists, names of police detainees, and records of accident injuries (Mollah et al., 2012). Islam and Ali (2008) examined the quality of service in the Bangladesh Police. The findings exhibited that beneficiaries of the services expect law enforcement officers (LEOs) to give importance to clients' interests, fulfill obligations, employ advanced equipment in

service, and have flexible operating hours. Criminal investigation is primarily based on the ethos of confession, a trend common in South Asian countries administered by the British Colonial Police Act of 1861. The legacy system for police investigation has changed over time in recent years through ICT (Kashem, 2017). Jabbar et al. (2023) found some common factors that hamper service effectiveness and job satisfaction. According to their survey data, job stress, unfair advancement policy, lack of technical support, and performance management processes are the standard drivers that affect their morale. E-police services are expected to enhance governance and reduce the communication gap between citizens and police administration.

Dwilaksanaa (2020) studied the technical and administrative aspects of e-policing services in Indonesia. People of Indonesia believe that the e-policing service has improved community service and administrative effectiveness. It also aided administrative harmony, serving as a bridge between task management and community participation. Trust and training are considered major drivers to enhance LEOs' intention to use different e-policing systems like advanced driver assistance (Shahini et al., 2022). In addition to trust and training, a proper pay and reward system can motivate LEOs to ensure e-services in the police force. Aviram et al. (2024) used the TAM model to explain LEOs' perceptions toward disruptive technologies. According to them, advanced technologies in e-policing create discretion and burnout among the officers.

The technology acceptance model (TAM) is considered a well-designed model to explain the factors influencing the adoption of different types of technology. This model offers a more thorough framework to analyze users' motivation to use new technology. Perceived usefulness (PU) and perceived ease of use (PEU) are two major drivers influencing a person to use a system. PU evaluates the system's benefits while PEU measures the centrifugal effect required in using the technology (Davis et al., 1989). The association between PEU and PU is well-established in the literature (Nazari-Shirkouhi et al., 2023). Hence, many studies overlook the justification to find the association between PEU and PU (Kitsios et al., 2021). The association between PEU and PU was not explored in this model because the objective focus of this study is to identify the impact of three major dimensions of system quality on IU through PEU and PU.

Oladimeji and Abdulkareem (2023) investigated the user satisfaction of e-policing services in Nigeria. They examined the effect of information quality (IQ), service quality (SRQ), and system quality (SSQ) on the users' satisfaction. These quality dimensions directly affect the users' perceived usefulness, affecting their satisfaction with e-services. Based on these factors and TAM, the study assumed

H1a: IQ positively affects PU

H1b: SRQ positively affects PU

H1c: SSQ positively affects PU

H2a: IQ positively affects PEU

H2b: SRQ positively affects PEU

H2c: SSQ positively affects PEU

According to the original model of TAM by Davis et al. (1989), PEU directly affects PU and intention to use (IU) a technology. Likewise, PU also directly affects IU. Similar results can be found in the technologies in the public sector. PEU was found to have a straight optimistic impact on the IU for e-filling in Indonesia (Tahar et al., 2020). Chen and Aklikokou (2019) investigated the effect of PEU and PU on IU's adoption of e-government services. The survey analysis concluded that both PEU and PU have a direct positive effect on the intention to use e-government services. Therefore, the study assumed,

H3: PEU positively affects PU

H4: PEU positively affects IU

H5: PU positively affects IU

Figure 1 shows the framework of the study.

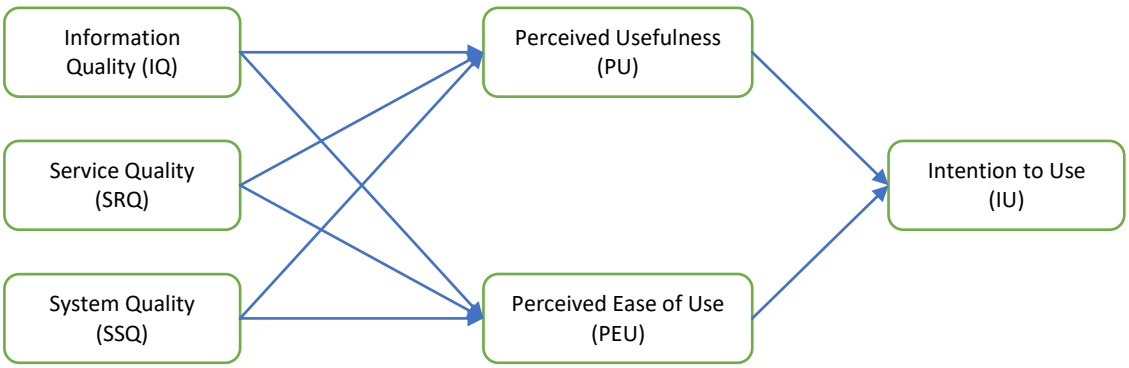


Figure 1: Study Framework based on the TAM model (Davis et al., 1989)

Methodology

Survey Data and Sampling Method

The study used a combination of online and paper surveys. In the survey, 314 responses were collected from the paper survey from 26 police stations nationwide, and 71 responses were collected using Google Forms. The respondents were chosen based on purposive non-probability sampling, which is suitable for social surveys (Kohler, 2019). The total sample size of 385 was selected based on the formula of Cochran (1977) with a confidence level of 95% from a population of 214,000 (Somoy News, 2024). Unfortunately, only 243 responses were selected for the final analysis due to the inconsistent responses and missing data. Considering the reference from Hair et al. (2019), five to ten times the total number of items, two hundred forty-three responses were sufficient for the analysis. The sum of items in the survey was nineteen.

Survey Instrument

The study employed a 7-point Likert scale to evaluate the latent variable. **Table 1** displays the sources of the items and Cronbach's alpha from the previous study.

Analysis Tools

The survey was conducted from November 2023 to March 2024. The study used Google Form for online data collection, MS Excel for data management and sorting, and SmartPLS version 4.2 to conduct structural equation modeling (SEM) (Ringle et al., 2024).

Table 1: *Sources of Items of the Constructs*

Construct	Item	Description	Source	Cronbach's alpha
Information Quality (IQ)	IQ1	The e-government system in the police provides up-to-date information.	Ameen et al. (2019)	0.959
	IQ2	The system provides accurate information.		
	IQ3	The system provides relevant information.		
System Quality (SSQ)	SSQ1	I think the system is easy to use.	Ameen et al. (2019)	0.952
	SSQ2	I think the system is flexible and easy to interact with.		
	SSQ3	My interaction with the system is clear and understandable.		
Service Quality (SRQ)	SRQ1	I can access and use the system anytime, anywhere I want.	Ameen et al. (2019)	0.919
	SRQ2	The offer interactive and practical multimedia		
	SRQ3	The system enables interactive communication.		
Perceived Usefulness (PU)	PU1	I think e-services are useful for my routine job	Zubir and Abdul (2023)	0.707
	PU2	E-services would improve the usefulness of the government.		
	PU3	E-services would make my life more convenient.		
Perceived Ease of Use (PEU)	PEU1	I think I do not need others' help to use the system	Zubir and Abdul (2023)	0.780
	PEU2	I am confident using the system even if I only have the website manuals for reference.		
	PEU3	Regular transactions are easy to conduct using the system.		
Intention to Use (IU)	IU1	I will use this technology regularly	Gani et al., (2024)	0.812
	IU2	I will frequently use e-services to do my job in the future.		
	IU3	I intend to use it whenever I get any chance.		
	IU4	I would use it for other scopes if I were given proper support.		

Analysis and Findings

The survey data were collected from both males and females. Among the 243 respondents, 179 were male. In maximum police stations (PSs), the average male and female ratio was 4:1. The respondents explained that this ratio is common in this sector due to the nature of the job.

The study only considered police officers who are the actual e-service providers in the police. Most of the respondents served as sub-inspectors of police. Furthermore, seventeen officers in charge (OC) responded to the questionnaire. All the officers surveyed in the investigation were minimum graduates. Only 46% of officers completed their post-graduation.

The study employed SmartPLS 4 for the analysis of the SEM model. Primarily, the study conducted confirmatory factor analysis (CFA) to study the reliability and validity. **Table 2** shows that the loadings of the items in each variable are higher than 0.708, ensuring the reliability of the collected data. Additionally, Cronbach's alpha of the variables is higher than the threshold of 0.700, indicating an inner uniformity among the items within the construct. AVE was calculated to analyze the convergent validity. The calculation shows that all the AVEs are higher than the verge of 0.500, confirming that the items effectively measure the designated construct (Hair et al., 2019; Bappy et al., 2022; Sarstedt et al., 2022; Tirno et al., 2023). Furthermore, the study applied the variance inflation factors (VIF) to assess the multicollinearity issue. All the investigation items had VIF scores less than 3.5, ensuring no serious multicollinearity issue in the model (Sarstedt et al., 2022).

Table 2: ***Measurement Model***

Latent Variable	Items	VIF	Loading	Cronbach's @	AVE
Information Quality (IQ)	IQ1	1.751	0.873	0.788	0.701
	IQ2	1.628	0.831		
	IQ3	1.604	0.807		
Intention to Use (IU)	IU1	1.806	0.841	0.799	0.625
	IU2	1.589	0.773		
	IU3	1.687	0.795		
	IU4	1.461	0.750		
Perceived Ease of Use (PEU)	PEU1	1.760	0.850	0.811	0.725
	PEU2	1.761	0.856		
	PEU3	1.799	0.850		
Perceived Usefulness (PU)	PU1	1.567	0.839	0.751	0.667
	PU2	1.484	0.821		
	PU3	1.471	0.790		
Service Quality (SRQ)	SRQ1	1.789	0.833	0.832	0.749
	SRQ2	1.922	0.862		
	SRQ3	2.166	0.899		
System Quality (SSQ)	SSQ1	1.397	0.784	0.735	0.654
	SSQ2	1.469	0.818		
	SSQ3	1.516	0.823		

The study tested the Fornell-Larcker Criterion for discriminant validity (**Table 3**). The calculation shows the diagonal correlation is higher than all correlations with variables, indicating the pertinent construct is dissimilar from other constructs (Fornell & Larcker, 1981; Tirno et al., 2020; Hair et al., 2019).

Table 3: ***Fornell-Larcker Criteria***

	IQ	IU	PEU	PU	SRQ	SSQ
IQ	0.838					
IU	-0.403	0.790				
PEU	-0.183	0.384	0.852			
PU	0.463	-0.574	-0.451	0.817		
SRQ	0.343	-0.485	-0.174	0.552	0.865	
SSQ	0.442	-0.317	-0.169	0.438	0.442	0.809

Additionally, the study addressed the heterotrait-monotrait ratio (HTMT) to further justify the discriminant validity as a superior tool (Tirno, 2024). According to the results of the HTMT analysis, none of the variables in the study exceed the threshold value of 0.850, as suggested by Hair et al. (2019).

Table 4: ***HTMT analysis***

	IQ	IU	PEU	PU	SRQ	SSQ
IQ						
IU	0.503					
PEU	0.225	0.473				
PU	0.597	0.731	0.576			
SRQ	0.420	0.596	0.211	0.696		
SSQ	0.584	0.407	0.218	0.594	0.563	

To test the hypotheses, the study conducted bias-corrected and accelerated one-tailed bootstrapping with 5000 subsamples as recommended by Hair et al. (2019). There were five hypotheses at the beginning of the study. The result shows that IQ, SRQ, and SSQ directly affect PU (β= 0.224, p= 0.000; β= 0.365, p= 0.000; and β= 0.123, p= 0.022). Hence, the first hypothesis is accepted. However, unexpectedly, the second assumption in this study was rejected. No significant relationship was found between IQ, SRQ, and SSQ with PEU (β= -0.115, p= 0.064; β= -0.102, p= 0.091; and β= -0.073, p= 0.160). Though PEU and PU have a highly significant relationship, the direction of the relationship is negative in nature, which is contradictory to the pre-assumption of the investigation (β= -0.326, p= 0.000). Hypothesis 4 was accepted with the pre-defined criteria, with a noteworthy positive relationship between PEU and IU (β= 0.157, p= 0.011). The last hypothesis stated that PU has a direct positive effect on IU; PU has a highly significant relationship with IU, but is negatively related. Therefore, the last hypothesis was rejected. In summary, three out of five hypotheses were rejected based on the analysis of the survey data **(Table 5)**.

Table 5: ***Hypotheses Test***

	Path	Original sample	Standard deviation	t statistics	p values	Result
H1a	**IQ -> PU**	**0.224**	**0.065**	**3.442**	**0.000**	**Accepted**
H1b	**SRQ -> PU**	**0.365**	**0.061**	**5.995**	**0.000**	**Accepted**
H1c	**SSQ -> PU**	**0.123**	**0.061**	**2.023**	**0.022**	**Accepted**
H2a	IQ -> PEU	-0.115	0.076	1.520	0.064	Not accepted
H2b	SRQ -> PEU	-0.102	0.076	1.334	0.091	Not accepted
H2c	SSQ -> PEU	-0.073	0.074	0.994	0.160	Not accepted
H3	PEU -> PU	-0.326	0.047	6.889	0.000	Not accepted
H4	**PEU -> IU**	**0.157**	**0.069**	**2.283**	**0.011**	**Accepted**
H5	PU -> IU	-0.503	0.067	7.570	0.000	Not accepted

Figure 2 represents the path coefficients of each relationship along with their p-value, and the inner circle shows the adjusted R-squared, which indicates that the three quality dimensions and PEU can explain 49.7% of the variance in PU. Similarly, 34.4% of the variance in IU can be explained by the exogenous variables in the study, which is a moderately well-fitting model in the behavioral study (Hair et al., 2019; Sarstedt et al., 2022; Tirno, 2023).

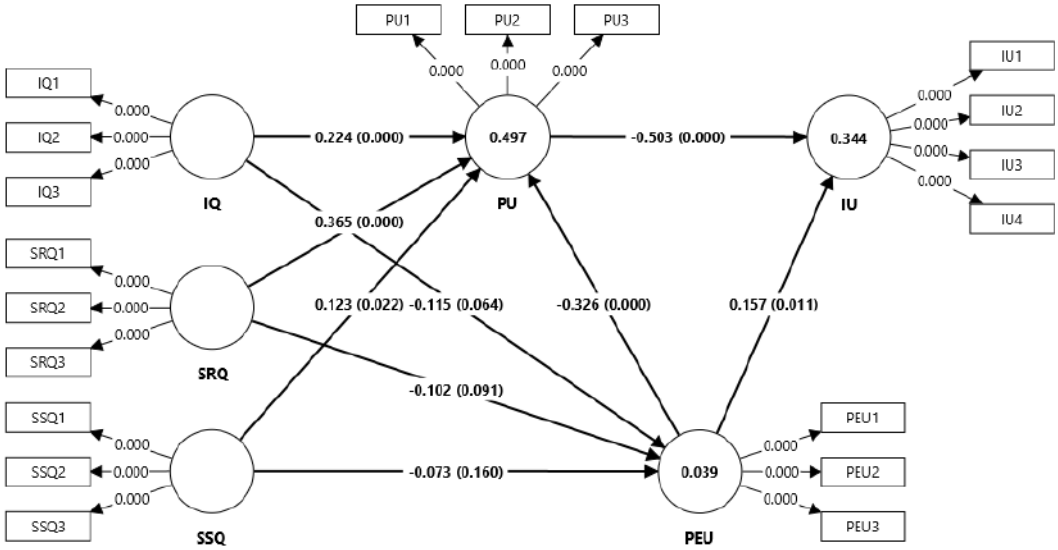


Figure 2: Path Coefficient and R Square Adjusted

Discussion

The study assumed five hypotheses initially. Quality of a system was branded into three categories, information quality (IQ), service quality (SRQ), and system quality (SSQ) based on prior literature (Ameen et al., 2019). The investigation inspected the direct effect of these three dimensions on perceived ease of use (PEU) and perceived usefulness (PU). This investigation attempted to explain the direct effect of PEU and PU on intention to use (IU).

The investigation from the survey data indicates that hypothesis 1 is accepted, where the study assumed that quality dimensions positively influence PU. Police officers (POs) feel that, if the quality of a system can be improved, it can positively affect the perceived usefulness of the e-service in the police. E-services can be improved by enhancing the quality of information, service, and system. A similar result was observed in the UAE using an innovative government system (Ameen et al., 2019). The result was also confirmed by Li and Shang (2020) in the context of China's adoption of e-government.

Though the POs feel that e-service quality can improve its usefulness, the study revealed that quality dimensions IQ, SRQ, and SSQ do not influence the PEU. Though the current system is easy to use, other factors influence PEU rather than IQ, SRQ, and SSQ. Other factors may include the tangibility of the system, user interface, system infrastructure, self-efficacy, computer anxiety, etc. (Bamigbola & Adetimirin, 2020; Brown, 2002). The study is contradictory to the prior research conducted in different settings. Hanjaya et al. (2019) found that IQ, SRQ, and SSQ positively influence the PEU based on online purchasing intention. Although the context was different in their study, the current investigation provided a noteworthy insight into e-service in the police. Therefore, the second hypothesis is rejected.

Many studies revealed that PEU positively affects PU (Hanjaya et al., 2019; Chen & Aklikokou, 2022). However, the survey data reveal that PEU negatively influences PU. The POs perceive that the current system is easy to use, but they are not helpful enough. People are not motivated enough to use e-services, though the POs feel that e-services are easy to use. Therefore, the systems need to be modified to motivate citizens to harness the actual benefit of e-services in the police. Thus, hypothesis three is rejected.

The fourth hypothesis assumed that PEU positively influences IU, which is supported by the survey data. POs believe that the current system is easy to use and reduces their job pressure, hence they are willing to use it. Tahar et al. (2020) studied the e-filling system in Indonesia. They observed that PEU positively affects the user's intention to use e-filling. However, PU did not affect the IU in their study. This investigation observed a pretty similar outcome. Though PEU has a direct favorable effect on IU, a negative relation is found between PU and IU on e-services in the police. Although POs in Bangladesh are unwilling to use e-services, they are easy to use. They feel the e-services are not helpful enough in Bangladesh. Informal interviews with the POs revealed that they prefer traditional police management systems to e-services. The current infrastructure and the citizens are not ready to capitalize on the benefits of e-services. Additionally, the current system is not up to the mark according to some POs' points of view.

Implications

The study addresses the gap between the intervention of service quality and system adaptability by combining the dimensions of service quality and TAM. The framework of this investigation adopted three critical factors from the original TAM model- PEU, PU, and IU, then investigated the influence of quality dimensions IQ, SRQ, and SSQ on the intention to use e-services by police in Bangladesh. The research reveals considerable operational insights to help improve the integration of digital services in the police. Law enforcement agencies may

develop easy-to-navigate, efficient e-service solutions that meet the officers' and public requirements and demands by addressing critical elements such as PEU and PU. Training and development programs must be designed to enhance POs' capacity to use the e-service platforms. To control the resistance to change, promotional campaigns should be designed to increase awareness of the benefits of e-services. The awareness program should focus on transparency and higher efficiency in the operations of the police. The e-service will augment the public image of the police through case resolution and transparency. It will also boost community participation and the safety and security of the citizens of Bangladesh.

This investigation indicates a considerable gap between POs' intention to use e-service platforms and their usefulness. They are reluctant to use e-services, though they are helpful. Police officers are not motivated enough to use e-service platforms. Therefore, a proper reward and remuneration policy needed to be introduced. Some of the POs indicated that citizens of Bangladesh are not comfortable enough to use the e-services. Most citizens take help from others to use e-services like online GD, e-police verification systems, or emergency complaints. They also believe PIMS, CDMS, CIMS, etc., can ease the operations and crime management, but e-services at the user level are not organized enough.

Conclusion and Future Directions

The investigation examined the factors affecting POs' motivation to use e-services in Bangladesh. Discoveries emphasized that the determinants of quality, IQ, SRQ, and SSQ positively affect PU, confirming the urgency of these components to boost the perceived value of e-services. Nevertheless, these traits had no impact on PEU. The study recommends emphasizing other factors that may have a noteworthy influence on PEU, such as platform infrastructure and the system's user interface. Unpredictably, PEU adversely affected PU based on the analysis of the survey data. The investigation indicates that the current platform is user-friendly but not particularly effective. However, PEU improves the intention to use the system. Although the platform seems modest enough, the investigation found that its PU has an opposing effect on it. Law enforcement agencies should tailor their e-service based on the demand of the POs and civilians of Bangladesh to meet the actual strategic goal of implementing e-services in the police.

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