

Citizen's Adoption of an E-Government System: Validating the Extended Theory of Reasoned Action (TRA)

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ABSTRACT

The study explores the adoption of an electronic government (e-government) system called online PAN card registration system (OPCRS) in context of India. The study validates the extended theory of reasoned action (TRA) to understand the impact of some of its factors on the citizen's intention to adopt this system. The proposed research model is extended with the variables including perceived usefulness, perceived trust, and self-efficacy as antecedents of attitude and subjective norm, which are the core constructs of the TRA. The eight hypotheses were formulated between six constructs of the proposed extended TRA. The proposed research model is validated using the usable sample of data gathered from 377 respondents. The data was analysed using AMOS 22.0. The empirical findings of the proposed research model indicated the significant relationships of all proposed hypotheses. The study also provides its limitations, future research directions, and implications for theory and practice toward the end.

Keywords: Adoption, Citizen, TRA, E-Government, India, OPCRS

INTRODUCTION

For much of the last two decades, governments across the world have been adopting and expanding an innovative means of delivering government information and services to citizens (G2C), businesses (G2B), and governments (G2G). This phenomenon is known as electronic government or e-government (hereafter, eGov) (Norris and Reddick, 2013). In other words, eGov refers to the use of information technology (IT) (such as wide area network, the Internet, mobile computing etc.) by governments to expand the access and delivery of its information and service to its citizens, business partners, professionals, other organisations, and even government entities (Lin et al., 2011; McClure, 2000; Symonds, 2000; West, 2004) themselves. EGov allows citizens to search and obtain information at their own convenience without any limitations of geographical locations. The interactive nature of eGov provides benefits for citizens and officials alike (West, 2008). EGov is a key element in the transformation of any government, serving as a means towards improving transparency, accountability, and good governance; making the government more result-oriented, efficient

and citizen-centric; and enabling citizens and businesses to access government services and information as efficiently and as effectively as possible through the use of internet and other channels of communication (Aggelidid and Chatzoglou, 2009; Lin et al., 2011; Rana et al., 2011; Simintiras et al., 2014).

When eGov first became a sustainable solution to the diffusion of government information, experts believed that the rise of G2C services would improve government transparency, enhance civic engagement, and offer new and innovative service possibilities. These G2C services were expected to cut-out information middle-men and let users interact directly with their government (Taylor et al., 2014). As e-government has matured into a vibrant socio-technical system covering issues of governance, societal trends, technological change, information management, interaction, and human factors (Dawes, 2009), G2C services have become one of the central uses of e-government (Evans and Yen, 2006; Rana et al., 2013d; Reddick, 2004; Taylor et al., 2014).

E-government services can be largely categorised into informational and transactional services. Informational services refer to the delivery of government information through Web pages whereas transactional services enable users to complete transactions such as obtaining visas, licenses, passports, birth and death records etc. online safely and securely (Howard, 2001; Norris and Moon, 2005). At one hand, e-government provides a number of benefits to its stakeholders including reducing corruption, citizen-oriented focus, promoting e-democracy, delivering more accountable, transparent, cost-effective, and easily accessible public services, prevailing over the social divide, and faster adaptation to meet citizens' requirements (Akman et al., 2005; Hackney et al., 2007; Huang and Bwoma, 2003; Watson and Mundy, 2001). On the other hand, governments face a number of challenges in implementing transactional e-government services (Al-Sebie and Irani, 2005; Gauld et al., 2010), and these challenges are reflected in the low deployment rate of such services

(Venkatesh et al., 2012). About 98% of the countries in the world have developed government websites with less than one-third providing transactional services, such as online form submission (United Nations, 2010). Therefore, it is very important to understand the adoption of such transactional eGov services.

The online PAN (Permanent Account Number) card registration system (OPCRS) is one such eGov system, which provides transactional services to the citizens of India. This system is used voluntarily to obtain a PAN card, which is a mandatory document used for filing income tax return in India. The PAN card is essential and prerequisite by certain other authorities while doing financial transactions with them. For example, it is a must to produce a photocopy of PAN card while applying a new bank account be it public/private/co-operative or other banks. It is also compulsory to quote your PAN while applying for debit or credit card, insurance payment or opening a fixed deposit account or cash deposit for amount exceeding Rs. 50,000 in a year, purchasing or selling of vehicle, buying/selling property, or high-value jewellery purchase with a cost greater than five hundred thousand rupees or more. Moreover, all telecom companies have been directed by Government of India to get PAN details of each applicant for normal or cellular connection to keep a tab on terrorism, extortion charges etc. Also, the PAN card details are required in security investments and trading in share market. For example, transactions exceeding Rs. 50,000 for equities, mutual fund, debentures, and bonds require investor's PAN card details. For trading in share market, the person needs to open account with a share broker for submitting PAN details is mandatory. Failure to provide this information results in rejection of the application (AllOnMoney, 2014).

PAN is essentially a ten-digit alphanumeric number, issued in the form of a laminated card by an investigating officer of the income tax department in India. It is mandatory to quote a PAN on the return of income in all correspondence dealing with the income tax authority,

transaction of more than a certain amount of money through the bank, and for any payments to the income tax department. This card also serves as proof of identity. Every taxpayer who is required to furnish a return of income, even on behalf of others, must obtain a PAN. This system has been implemented with a goal of easing individual's burden of going through the cumbersome processes of obtaining a PAN card offline through government offices. As per the recent statistics, more than 35 million people in India pay direct tax on their incomes. This statistics indicates that only 3% of the overall population of India pay income tax, which is very less in comparison to the US where about 45% of the population pays taxes (Manshu, 2011). As having PAN card is mandatory for every tax payer, it is important to understand what people think about this relatively new system (i.e., OPCRS). In such case, importance of introducing an automated process of obtaining a PAN card is a welcoming initiative by the government of India.

Realising such significant benefits provided by the e-government particularly to citizens, a number of empirical studies (e.g., Belanger and Carter, 2008; Horst et al., 2007; Hung et al., 2009; Lean et al., 2009; Rana and Dwivedi, 2015; Rana et al., 2013a, 2013b, 2014a, 2014b; 2015a, 2015b, 2015c; Wang and Liao, 2008; Wang and Shih, 2009) have been published to explore the adoption of such systems. These studies have largely employed the widely used models of information systems (IS)/IT adoption such as the technology acceptance model (TAM), the theory of planned behaviour (TPB), the diffusion of innovation (DOI), and the unified theory of acceptance and use of technology (UTAUT) to understand the citizens' reluctance or slow adoption of various e-government services. Although all major IS/IT adoption models are directly or indirectly based on the philosophies of the TRA, none of the studies in our knowledge have directly used this model to examine the citizens' intention to adopt an eGov system yet. Realising the lack of empirical research on transactional e-government system (like the OPCRS) in general and the absence of the use of the model like

TRA in particular, this research will use the extended TRA (with perceived usefulness, perceived trust, and self-efficacy as additional constructs) to address this research problem to understand the citizens' behavioral intentions toward using the OPCRCS system.

RESEARCH MODEL AND HYPOTHESES DEVELOPMENT

This section will first present the overview of the proposed research model on the basis of the DTPB model. It then postulates hypotheses based on relationships identified.

Overview of the Proposed Research Model

The proposed research model is based on the theoretical foundation of the TRA (Fishbein and Ajzen, 1975). The TRA has been widely used as a model for the prediction of behavioural intentions and/or behaviour. The development and testing of the TRA were grounded on the assumption that the behaviours being studied were under full volitional control. The TRA posits that behavioural intentions, which are the immediate antecedents to behaviour, are a function of prominent information or beliefs about the likelihood that performing a particular behaviour will lead to a specific outcome (Madden et al., 1992). Fishbein and Ajzen (1975) divided the belief antecedents to behavioural intentions into two conceptually distinct sets: behavioural and normative beliefs. The behavioural beliefs are postulated to be the underlying influence on an individual's attitude toward performing the behaviour whereas normative beliefs influence the individual's subjective norm about performing the behaviour. Hence, information or salient beliefs influence intentions and subsequent behaviour either through attitude and/or through subjective norm.

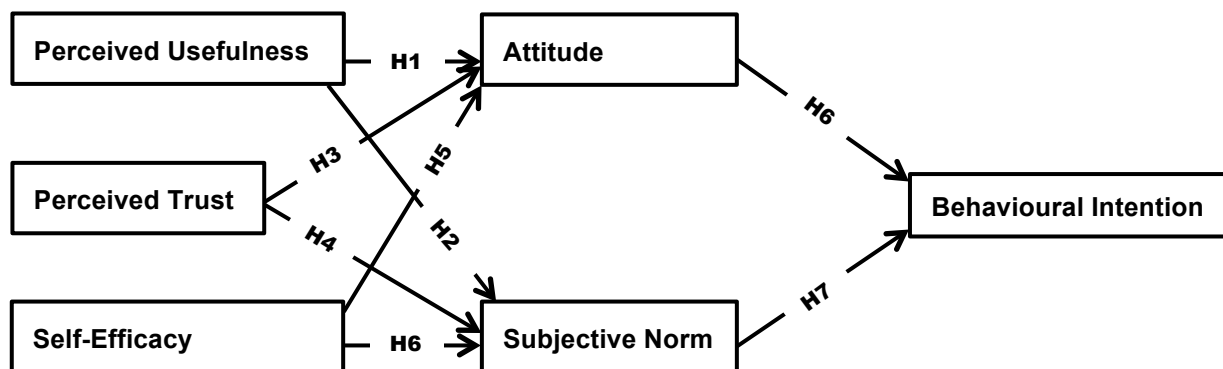


Figure 1. Proposed Research Model (Adapted from Fishbein and Ajzen, 1975)

First, we incorporate an important additional construct called perceived trust along the TRA, as use of such construct would explore the degree to which the user would like to provide their personal information related to the debit/credit card in pursuit of obtaining the PAN card online. Second, among many variables that cause individuals to accept or reject any information system is perceived usefulness (Davis, 1989; Davis et al., 1989) of the system. We have considered perceived usefulness as one of the antecedents of the core constructs of the TRA, as we believe that perceived usefulness of any eGov system plays a major role for an individual to decide whether that system is worth adopting or not. Finally, we have also included self-efficacy as the third additional construct along the TRA model, as we believe that judgement of individual's ability to accomplish a particular task (Bandura, 1986) could be a strong antecedent to decide any new eGov system like the OPCRS. Considering above discussion, the proposed research model hypothesises eight different relationships between six constructs. The proposed research model postulates that perceived usefulness, perceived trust, and self-efficacy will significantly influence individual's attitude and subjective norm. Also, attitude and subjective norm will significantly influence individual's behavioural intention. Figure 1 shows the proposed research model with various hypotheses. Testing the postulated relationships can help the researchers to understand the adoption of the OPCRS system.

Hypotheses Development

As shown in Figure 1, a total of eight hypotheses are proposed based on the relationships between six constructs. The core constructs are listed and defined in Table 1.

Table 1. Definitions of core constructs used in proposed research model

Variable/Construct	Definition
Perceived Usefulness	The degree to which a person believes that using a particular system would enhance his or her job performance (Davis, 1989, p. 320).
Perceived Trust	It is defined as expectancy that the promise of an individual or group can be relied upon (Rotter, 1971).
Self-Efficacy	An individual's perception of his or her ability to use the system on his or her own (Bandura, 1986).
Attitude	An individual's positive or negative feelings about performing the target behaviour (Fishbein and Ajzen, 1975, p. 216).

Subjective Norm	The person's perception that most people who are important to him think he should or should not perform the behaviour in question (Fishbein and Ajzen, 1975, p. 302).
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Perceived Usefulness

Perceived usefulness is considered as a fundamental determinant of individual's acceptance of any technology (Davis, 1989). The higher degree of perceived usefulness in context of the OPCRS system would be able to satisfy and response the needs from the users. The higher degree of perceived usefulness from the OPCRS would make the users perceive that the system can enhance the efficiency and convenience with which the PAN card can be obtained online (Lu et al., 2010). On the other hand, the convenience and promptness that this online system brings will improve user's perception toward obtaining it electronically than manually. The users will then have positive attitude toward using such system.

A number of prior studies (e.g., Hung et al., 2006; Hung et al., 2009; Lu et al., 2010; Zhang et al., 2011) on eGov adoption have supported the positive and significant impact of perceived usefulness on attitude. Hence, based on above discussion and literature support for the relationship between perceived usefulness and attitude, we can say that when the users perceive the usefulness of the OPCRS system is higher, their attitude will be affected positively. Therefore, the following hypothesis can be formulated on this basis:

H1: Perceived usefulness will be positively related to attitude.

We also tend to believe that higher perceived usefulness of an eGov system will allow individual's important others who influence his/her behavior and/or are important to him/her to think and suggest him/her to have a positive perception about the system. This hypothesis clearly exerts a great importance for the usefulness of the system, which plays a significant role toward the user's positive perceptions about a relatively new system such as the OPCRS one. Therefore, we hypothesise that:

H2: Perceived usefulness will be positively related to subjective norm.

Perceived Trust

When individuals are engaged in a particular behavior, they often search their memory for the knowledge gained from prior acquired experience (Hung et al., 2006). Furthermore, some researchers have also suggested that individuals become anxious about different types of risks when engaged in an online transaction process (Gefen et al., 2003). This indicates that trust is reduced when risk increases. Fishbein and Ajzen (1975) noted that individual attitude toward behavior is based on the estimates of the likelihood and desirability of the various possible outcomes of that behavior. All desirable outcomes of acceptance behavior are likely to impact attitudes toward such behavior (Hung et al., 2006; Hung et al., 2009). A reasonable number of studies (e.g., Hung et al., 2006; Hung et al., 2009) on eGov adoption have supported the positive and significant impact of perceived trust on attitude. In the context of current research, we also believe that perceived trust on the transactional eGov system like OPCRS will have a positive individual's attitude toward using the system. Therefore, we also hypothesise:

H3: Perceived trust will be positive related to attitude.

For subjective norm construct, researchers have found that mutual trust and mutual influence between users and IS units are highly correlated to each other. Derivatively, it can be predicted that perceived trust in e-government usage should play a role in determining subjective norm (Wu and Chen, 2005). We also believe that higher level of trust in the eGov system will facilitate users to adopt and use the system when conformed by their referent others including their friends, peers, family, and superiors who are in close proximity with the users. Therefore, we hypothesise:

H4: Perceived trust will be positively related to subjective norm.

Self-Efficacy

Self-efficacy is adapted from the social cognitive theory, which is one of the leading theories of human behaviour (Bandura, 1986; Compeau and Higgins, 1995). Self-efficacy is defined

as an individual's self-confidence in his/her ability to perform a particular behaviour (Bandura, 1982). Bandura (1982) argued that an individual with high self-efficacy would more likely to perform the behaviour in the future. As far as research on e-government adoption is concerned, there is an empirical evidence to suggest that self-efficacy has been found as a significant determinant of attitude (e.g., Rana and Dwivedi, 2015; Rana et al., 2013c). Therefore, we hypothesise:

H5: Self-efficacy will be positively related to attitude.

Given that self-efficacy is individual's perception of his or her own ability to use the OPCRS system in accomplishing the task related to obtain a PAN card online (Compeau and Higgins, 1995), it will be highly likely that the individual will tend to use the system on the recommendations of his or her important others in family and/or at the workplace. We also tend to believe that if the user is capable enough to handle the online operations to get his/her PAN card done, he would be more inclined and interested to listen to the suggestions to use the OPCRS system to get the PAN card rather applying for it through offline channels. Therefore, we hypothesise:

H6: Self-efficacy will be positively related to subjective norm.

Attitude

Attitude has been used across different theories of IS/IT adoption research including the TRA (Fishbein and Ajzen, 1975). Attitude is defined as the degree to which an individual has a favourable or unfavourable appraisal or judgment of his or her behaviour in question (Ajzen, 1991). In the field of public administration and e-government, a number of studies (e.g. Hung et al., 2006; Hung et al., 2009; Hung et al., 2013; Zhang et al., 2011) have supported the relationship between attitude and behavioural intention. For example, analysing the user's acceptance of mobile e-government services in Taiwan, Hung et al. (2013) found that attitude is a critical factor for understanding and predicting mobile users' behavioural intentions. Therefore, in the recent perspective of mission-driven e-government, investigating the

impacts of attitude is crucial (Hung et al., 2009). For example, analysing the user's acceptance of mobile e-government services in Taiwan, Hung et al. (2013) found that attitude is a critical factor for understanding and predicting mobile users' behavioural intentions. Therefore, in the recent perspective of mission-driven e-government, investigating the impacts of attitude is crucial (Hung et al., 2009). Realising its importance in IS/IT adoption research in general and e-government adoption in particular, the following hypothesis is formulated:

H7: Attitude will be positively related to behavioural intention.

Subjective Norm

Subjective norm reflects the individual's perception that most people who are important to him or her think he/she should or should not perform the behaviour in question. The more an individual perceives that significant others think he or she should engage in the behavior, the greater an individual's level of motivation to comply with those others (Ajzen and Fishbein, 1980). A number of studies (e.g., Chu et al., 2004; Hung et al., 2006; Hung et al., 2009; Lu et al., 2010) from e-government adoption have supported the significance of the relationship between subjective norm and behavioural intention. We also believe that positive suggestions and recommendations are required from the friends, colleagues, and family for an individual to think positive about intending to adopt the OPCRS system. Therefore, the following hypothesis can be formulated:

H8: Subjective norm will be positively related to behavioural intention.

RESEARCH METHODOLOGY

The sample of the study consists of respondents from different cities of India including Delhi, Pune, Mumbai, Bangalore, Patna, Siliguri, and Gangtok covering all different geographical locations from north, west, east, and south. The final questionnaire consisted of total 34 questions including 10 of them from respondents' demographic characteristics and remaining 24 questions from six different constructs of the proposed research model. All these questions

were multiple-type, closed-ended and seven-point Likert scale type questions. Likert scales [1-7] with anchors ranging from 'strongly disagree' to 'strongly agree' were used for all non-demographic items. Appendix [A] lists each item for constructs used in this study.

One researcher visited all these cities to contact people particularly in organisations and handed them questionnaire personally. The organisations in these cities were selected based on the personal contacts of researchers and their friends and colleagues. Some key executives from the top level management of various organisations including higher education institutions, banking organisations, and few software development organisations were contacted for the purpose of collecting data from their employees working at the different levels. The researcher visited these organisations personally to meet up the different respondents and to understand their views about the OPCRS system.

At the time of interacting to respondents, it was found that although majority of respondents were computer and Internet literate, they were new to the system. Therefore, it was decided to gather data only from the potential adopters (i.e., those users who are computers and Internet literate but have not used the OPCRS yet) of the OPCRS system. The system was demonstrated to respondents, largely in groups and they were given couple of days of time to interact with the system on their own before answering the questions.

A total of 1000 questionnaires were distributed to respondents through one-to-one and group interactions. A total of 474 completed survey questionnaires were received from respondents at the end of this survey exercise. The further scrutiny of questionnaires revealed that 96 of them were either partially completed or filled in a biased manner (i.e., only one option ticked throughout the questionnaire) and so rejected from the subsequent analysis. Hence, we were left with 377 usable responses, which made the basis for the empirical analysis of the data. The overall response rate was found to be 47.4% with 37.7% valid questionnaires.

RESULTS

The data gathered were analysed using structural equation modelling (SEM) technique of AMOS. First, we report the respondents' demographic characteristics. Second, we will present the reliability analysis, factor loading, and descriptive statistics of various constructs. Finally, the hypotheses testing for each relationship is analysed using the structural model testing.

Respondent Demographic Characteristics

The characteristics of the data gathered from the respondents of various geographical locations indicated that the majority of the population was from a relatively younger generation. For example, 83.5% respondents belonged to an age group of 20-34 years. As far as the occupation of the respondents is concerned, the largest 56.1% of the total sample were students followed by the next largest 22.4% represented by the private-sector employees. The education qualification for close to 82% of the overall population was found to be undergraduate and above. All the students were either at the graduate or the postgraduate level in some of the leading business and engineering institutions from the different cities in India. The computer and Internet literacy and awareness of the respondents can be adjudicated from their very high computer and Internet experience percentage of approximately 96%. The Internet use frequency of the respondents indicates that more than two-third (i.e., 69.2%) of the overall population always or very frequently used the Internet.

Descriptive Statistics and Reliability Analysis

Table 2 presents the mean and standard deviation for the items of each construct used for developing the research model. The mean values of majority of constructs were closed to or above five. For example, the mean values for all the items of PU, AT, SE, AT, and BI were found greater than five whereas the mean values for items for SN were also found very close to five. This indicates that users responded favourably for the system at large. The overall average standard deviation of all the items for constructs was computed as 1.41, which

indicates that even though users' opinions varied fairly extensively across the overall average mean of all items (i.e., 5.28), it still remains positive.

Table 2. Mean and Standard Deviation (SD) of Items (N=377)

Construct	Item	Mean	SD
PU	PU1	5.18	1.470
	PU2	5.15	1.474
	PU3	5.37	1.374
	PU4	5.34	1.318
PT	PT1	5.32	1.339
	PT2	5.24	1.416
	PT3	5.40	1.365
	PT4	5.01	1.449
	PT5	5.28	1.370
SN	SN1	4.93	1.500
	SN2	4.95	1.533
SE	SE1	5.33	1.408
	SE2	5.36	1.311
	SE3	5.14	1.431
AT	AT1	5.59	1.320
	AT2	5.50	1.380
	AT3	5.63	1.315
BI	BI1	5.31	1.457
	BI2	5.29	1.419
	BI3	5.33	1.455

[Legend: AT: Attitude, BI: Behavioral Intention, PT: Perceived Trust, PU: Perceived Usefulness, SE: Self-Efficacy, SN: Subjective Norm]

Reliability analysis was performed using Cronbach's alpha (CA). It was used for determining the reliability of the scale, which provides an indication about the internal consistency of the items measuring the same construct (Hair et al., 1992; Zikmund, 1994). Cronbach's alpha reliability for constructs is in the range 0.829-0.891 (see Table 3), which is considered as a good level of reliability. The value of Cronbach's alpha as 0.70 or greater is considered good (Nunnally, 1978; Hair et al., 1992). So, alphas imply strong reliability for all constructs.

Table 3. Cronbach's alpha for constructs

Construct	# of Items	CA (α)	Reliability Type
Perceived Usefulness	4	0.829	High
Perceived Trust	5	0.891	High
Subjective Norm	2	0.831	High
Self-Efficacy	3	0.851	High
Attitude	3	0.891	High
Behavioral Intention	3	0.847	High

[Legend: #: Number, CA: Cronbach's Alpha (α)]

Measurement Model

Convergent and discriminant validity of the scales were tested with confirmatory factor analysis. Convergent validity is examined using three ad hoc tests recommended by Anderson and Gerbing (1988). Table 4 lists the standardised factor loadings, composite reliabilities, and average variance extracted. Standardised factor loadings are indicative of the degree of association between scale items and a single latent variable. Two items from PU (i.e., PU2 and PU3), one item each from perceived trust (i.e., PT3) and attitude (i.e., AT4) have been discarded as their loading factors were less than the expected minimal value of 0.50. The loadings for the remaining items for various constructs are significant in all the cases with minimum value of greater than 0.50, which was obtained for an item PU2 of perceived usefulness. The composite reliabilities, (which is similar to Cronbach's alpha) for all constructs were found well beyond the minimum limit of 0.70 (Nunnally, 1978). In fact the minimum value for the composite reliability was obtained for behavioural intention (i.e., 0.798), which was found very close to 0.800.

Table 4. Results of Confirmatory Factor Analysis (CFA)

Measure	FL	CR	AVE
Perceived Usefulness			
PU1	0.630	0.828	0.638
PU2	0.520		
PU3	0.790		
PU4	0.790		
Perceived Trust			
PT1	0.800	0.890	0.835
PT2	0.850		
PT3	0.860		
PT4	0.660		
PT5	0.750		
Subjective Norm			
SN1	0.830	0.810	0.744
SN2	0.820		
Self-Efficacy			
SE1	0.850	0.860	0.808
SE2	0.910		
SE3	0.690		
Attitude			
AT1	0.870	0.908	0.746
AT2	0.780		
AT3	0.850		
Behavioral Intention			
BI1	0.740	0.798	0.691
BI2	0.740		

BI3	0.780		
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[Legend: AVE: Average Variance Extracted, CR: Composite Reliability, FL: Factor Loading]

Average Variance Extracted (AVE) is a measure of the variation explained by the latent variable to random measurement error (Netemeyer et al., 1990) and ranged from 0.691 to 0.835 for all constructs. These estimates by far exceeded the recommended lower limit of 0.50 (Fornell and Larcker, 1981). All tests support the convergent validity of the scales. Discriminant validity was evaluated with the test recommended by Anderson and Gerbing (1988). The Pearson's correlation between a pair of latent variables (see Table 5) should be less than the square root of AVE of each variable. Each combination of latent variables was tested, and each pairing passed, providing indication of the discriminant validity of the scales. For example, Pearson correlation between AT and BI is 0.732, which is less than the square root of AVE shown along the diagonal of both these variables (i.e., 0.864 and 0.831 respectively). In other words, a variable is considered to be different from other variables if the square root of the AVE for it is greater than its correlations with other latent variables (Barclay and Smith, 1997), which is satisfied for every variable of the proposed research model of the current study.

Table 5. Factor correlation matrix

Variable	PU	PT	SN	SE	AT	BI
PU	0.799^b					
PT	0.650 ^a	0.914^b				
SN	0.514 ^a	0.468 ^a	0.862^b			
SE	0.659 ^a	0.587 ^a	0.501 ^a	0.899^b		
AT	0.570 ^a	0.548 ^a	0.439 ^a	0.542 ^a	0.864^b	
BI	0.540 ^a	0.575 ^a	0.454 ^a	0.538 ^a	0.732 ^a	0.831^b

[Legend: ^bSquare roots of AVE [in bold] shown along diagonal, ^aSignificant at $p < 0.01$]

Structural Model Testing

The overall model fit is adequate as it is presented through Table 6. The test of overall model fit resulted in a Chi-square value of 409.655 with degrees of freedom as 157 and a probability value of less than 0.001. The significant p-value indicates the absolute fit of the model is less than desirable. However, as the Chi-square test of absolute model fit is sensitive to sample size and non-normality, a better measure of fit is Chi-square over degrees of freedom. The ratio of Chi-square over degrees of freedom (i.e., 2.609) is within suggested 3 to 1 bracket

(Chin and Todd, 1995). Typically, researchers also report a number of fit-statistics to examine the relative fit of the data to the model (see Table 6).

In addition to the above-mentioned ratio, we also report some of the fit indices. Descriptive fit statistics compare a specified model to a baseline model, typically the independence model, with a view to show the superiority of the proposed model. We report the Goodness-of-Fit index (GFI), the adjusted GFI (AGFI), and the Comparative Fit Index (CFI). Gerbing and Anderson (1988) found CFI as one of the most stable and strong fit indices. In addition, we also report RMSEA (Root Mean Square Error of Approximation), which measures the discrepancy per degree of freedom (Steiger and Lind, 1980).

Table 6. Model fit summary for the proposed research model

Fit Index	Model	Recommendation
Chi-Square	409.655	N/A
Degree of Freedom (DF)	157	N/A
P	<0.001	Non-Significant
Chi-Square/DF	2.609	<3.00 (see Chin and Todd, 1995)
GFI (Goodness-of-Fit Index)	0.909	>0.90 (see Hoyle, 1995)
AGFI (Adjusted GFI)	0.878	>0.80 (see Chin and Todd, 1995)
CFI (Comparative Fit Index)	0.948	>0.90 (see Bentler and Bonnet, 1980)
RMSEA	0.065	<0.08 (see Browne and Cudeck, 1993)

We found the fit-indices are well in accordance with the recommended values. For example, the GFI should be at or above 0.90 (Hoyle, 1995), while the AGFI should be at or above 0.80 (Chin and Todd, 1995; Segars and Grover, 1993). The CFI statistics should be at or above 0.90 (Bentler and Bonett, 1980; Hoyle, 1995). Finally, RMSEA has been suggested to represent a good fit if below the threshold of 0.08 (Browne and Cudeck, 1993).

Having recognised the relative competence of the model's fit, it is appropriate to evaluate individual path coefficients corresponding to our hypotheses. This analysis is presented in Table 7. All eight hypotheses are supported. Perceived usefulness (i.e., hypotheses H1 and H2 respectively), perceived trust (i.e., hypotheses H3 and H4 respectively), and self-efficacy (i.e., hypotheses H5 and H6 respectively) were found to significantly influence attitude and subjective norm. Also, attitude (i.e., hypothesis H7) and subjective norm (i.e., hypothesis H8)

were found to significantly influence users' behavioural intention to use the OPCRS system. Table 8 presents the path coefficients between constructs of various relationships, their significance levels, critical ratios, and the variance exerted by the model in its dependent variables (i.e., attitude, subjective norm, and behavioural intention).

Table 7. Path coefficients and hypotheses testing

H#	Hypothesis	SRW	CR	Sig.	Supported
H1	PU → AT	0.399***	4.10	<0.001	YES
H2	PU → SN	0.251*	2.31	0.021	YES
H3	PT → AT	0.241**	3.00	0.003	YES
H4	PT → SN	0.190*	2.11	0.035	YES
H5	SE → AT	0.178*	2.20	0.028	YES
H6	SE → SN	0.304**	3.26	0.001	YES
H7	AT → BI	0.805***	13.40	<0.001	YES
H8	SN → BI	0.155**	2.93	0.003	YES
R ² (BI): 0.76; R ² (AT): 0.43 R ² (SN): 0.33			[Legend: p:*p<0.05 **p<0.01 ***p<0.001]		

[Legend: AT: Attitude, BI: Behavioral Intention, CR: Critical Ratio, PT: Perceived Trust, PU: Perceived Usefulness, SE: Self-Efficacy, SN: Subjective Norm, SRW: Standardised Regression Weight]

DISCUSSION

This study measures the determinants of citizens' adoption of a transactional eGov system using the extended TRA. The constructs including perceived usefulness, perceived trust, and self-efficacy determine individuals' attitude and subjective norm. Furthermore, the causal relationships among the variables including attitude and subjective norm with behavioral intention that determine eGov system adoption were also examined.

The findings indicated that perceived usefulness was found to have a significant effect on user's attitude and subjective norm. This could be due to the fact that users tend to have a positive view toward the system only when it demonstrates appropriate level of usefulness (as the system is new to the users). Some prior studies (e.g., Bhattacharjee, 2000; Hung et al., 2006; Taylor and Todd, 1995) have also found perceived usefulness as a stronger antecedent on attitude. The significant impact of perceived usefulness on subjective norm indicates that usefulness or efficiency, speedy service, and easier to use web interface of the OPCRS system will allow users to sincerely contemplate and accept the suggestions given by their

important others including colleagues, friends, and family members. In other words, the positive and significant causal relationship between perceived usefulness and subjective norm indicates that the OPCRS system's traits of easily and effectively obtaining PAN card in a speedy manner by improving individual's effectiveness are something that positively influence user's thought process to accept his/her referent others' recommendations. That means the usefulness of the OPCRS system will more likely to instigate the user's co-workers, superiors, and family members to think positively about the use of the system by the concerned individual. Prior studies (e.g., Venkatesh and Davis, 2000) have supported the impact of subjective norm on perceived usefulness. However, the reverse is also seemed to be an appropriate and supportive choice in the current context of research.

It was also found that perceived trust has a significant impact on user's attitude. This relationship has been also supported by some prior research (e.g., Hung et al., 2006; Susanto and Goodwin, 2011) on eGov adoption. One possible argument for this significant relationship is that the users are although well acquainted with Internet and computer systems in general, they are relatively new to this transactional eGov system. In such case, the high trust toward the OPCRS system would lead them to develop positive attitude toward using the system. It is really important to analyse the impact of perceived trust as an additional attribute on the user's attitude as the eGov system being analysed in the current context is transactional in nature and users need to use their debit/credit card details through the OPCRS system to electronically obtain their PAN cards. However, the relatively feeble path coefficient of perceived trust on user's attitude toward using the eGov system indicates that the government agencies need to communicate their abilities to serve their citizens in reliable and dependable manner through the electronic channels. Government agencies should publicise stories of their electronic services that have been successful and the statistics of citizens who were positively supported and pleased with such services (Belanger and Carter,

2008). Also, the significant impact of perceived trust on subjective norm indicate that trust is not only restricted to improve individual's positive beliefs about using an eGov system like the OPCRS but it also improves the perceptions of the people in the society and enable them to positively convince the users of such systems to use it for their benefits. A weak though significant path-coefficient of perceived trust on subjective norm again advocates the need of government initiatives to establish a strong trust in general about the government and for the electronic services provided by the government to its citizens. Such initiatives would create a positive impression about government eGov initiatives and their effective implementations to further its intentions to promote and an effort toward successful diffusion of such an important public administrative ingenuity to its citizens.

Similarly, self-efficacy was found to have positive and significant impacts on attitude and subjective norm. Self-efficacy is an important theoretical construct that can help us better understand why individuals use specific eGov system (Torkzadeh and Van Dyke, 2002). It is suggested that self-efficacy can be used to predict user perceptions and further acceptance and use of any information systems among specific target user groups (Hong et al., 2002; Venkatesh and Davis, 1996). A positive impact of self-efficacy on attitude indicates that users' perception of their ability to use the system on their own will improve their feeling toward using such system. This relationship is supported by some prior research (e.g., Rana and Dwivedi, 2015; Rana et al., 2013c) of eGov adoption. The low though significant impact of self-efficacy on attitude indicates that as this eGov system is relatively new, users' level of efficacy and confidence does not strongly determine their positive attitude toward using the system. However, it is expect to become stronger when users gain more confidence with the system. The efforts can be initiated and augmented by the private-public partnerships to provide more awareness and training to use any such systems and the benefits that such system can provide to the stakeholders. A decent positive value of path-coefficient between

self-efficacy and subjective norm indicates that users' enhanced ability to handle the system by their own can help their important others also to think that they should perform the positive behaviour. Also, if individuals' important others are made confident on using the system in question, they can work as champions for this cause and can influence the each individual's behaviour in their close proximity whether it comes in the family, society, or at the workplace. The initiative of training such champions can be easily undertaken by the government top officials and also aligning the Internet and computer savvy people from the private sector organisations. As these people have good respect in their organisations and the locality they live in, they probably would be more effective medium to reach out to the larger section of our society.

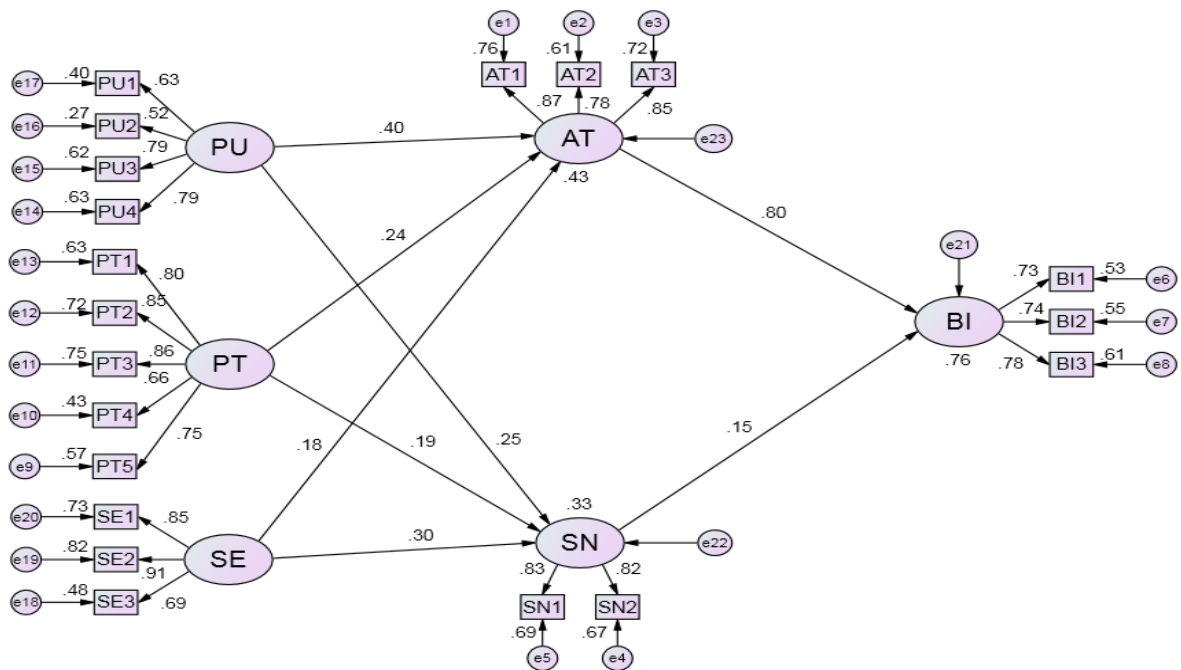


Figure 2. Validated research model [Legend: AT: Attitude, BI: Behavioural Intention, PT: Perceived Trust, PU: Perceived Usefulness, SE: Self-Efficacy, SN: Subjective Norm]

The final set of hypotheses exhibited that attitude and subjective norm are positively linked to the individual's intention to use the OPCRS system (Bhattacharjee, 2000; Lau, 2004; Lau and Kwok, 2007). In these, attitude is much stronger predictor of behavioural intentions than subjective norm. The strong and significant impact of attitude on behavioural intentions

indicates that individuals' attitude is shaped up by perceived usefulness, perceived trust, and self-efficacy of the system, which in turn positively influence their intention to use it. In other words, system's usefulness, perceived trust, and user's self-efficacy positively impact users' positive feelings toward using the OPCRS system, which is finally transformed into their positive intent to use it. The relatively weak though significant influence of subjective norm on behavioural intentions indicates that the OPCRS system is relatively a new e-government system and hence users' important others (i.e., family, friends, and colleagues) can persuade them to ensure that they tend to use the system.

Limitations and Future Research

Like any other research this research is not without certain limitations. First, the proposed research model has been validated without the use of usage behavior variable. The future research can incorporate usage behaviour in the proposed research model as it is originally defined in there. Second, the current research only uses the non-users' views of the OPCRS system. The future research can consider the existing users' views on the questions linked to the factors of the proposed model. In such case, the complete TRA model can be used with behavioural intention would be considered as the antecedent of the use behaviour in the model. Third, the study only examines a sample of 377 respondents based on convenient and non-probabilistic sampling approach and is skewed largely toward the computer and Internet savvy respondents.

Therefore, we acknowledge that the results may not be generalised to other states. Finally, as the culture is proven to have direct influences on trust perception of nations and this study has not considered culture as an independent entity to examine the citizens' adoption of the eGov system, investigative the eGov adoption based on different cultures will be a part of the future research. The future research in fact consider the variables such as age, education, gender, and culture as moderators to understand the individuals' attitude and subjective norm on their intention to use the eGov system.

Implications for Theory

Firstly, this is the first empirical study of its type on eGov adoption that has implemented the extended TRA to understand the citizens' adoption. Second, as this study has implemented a more comprehensive extension of a parsimonious model like the TRA that has relatively a high number of diverse factors (including important additional constructs such as perceived usefulness, perceived trust, and self-efficacy), it will provide a more complete and wide-ranging understanding of an eGov system adoption. Third, compared with any other study relating to technology and eGov adoption, the total variance presented by the proposed model on behavioural intention (i.e., 76%) to use the OPCRS system indicates that the extended TRA has been efficiently implemented and hence, provides a good basic grounds to measure non-user's intention to adopt any eGov services.

Implications for Practice

The research has validated two direct (i.e., attitude and subjective norm) and three indirect antecedents (i.e., perceived usefulness, perceived trust, and self-efficacy) of behavioural intentions. To successfully evaluate the performance of an eGov system, we suggest that policy makers can enhance strategic planning by monitoring these factors as performance indicators (Dwivedi et al., 2015; Hung et al., 2009). The findings indicate that perceived usefulness, perceived trust, and self-efficacy are particularly significant factors for the government policy makers to improve users' attitude and subjective norm. A relatively weak though significant impact of perceived trust on attitude indicates that the government policy makers should ensure that a true belief is created about the online functioning of the OPCRS system to its citizens. This could probably be done by using all previous successful efforts made by the government. The government can gain citizens' trusts using its successful story telling, distributing pamphlets in the brick-and-mortar offices, and doing the actual work through its electronic services. The significant impact of perceived trust on subjective norm indicates that the government needs to develop trust and confidence in citizens by providing

them positive experiences with the use of such similar systems over the period of time. As we have acknowledged that the key barrier hindering trust building exercise toward government online services is the lack of knowledge about the service. Therefore, it is very important for the government to publish and communicate its services to the citizens through various communication channels available such as newspapers, radios, and televisions.

The significant impact of perceived usefulness on attitude and subjective norm indicates that government should ensure how eGov can provide better service to citizens at less cost and how e-government increase efficiency and relevance of the state government in the eyes of citizens. The key benefits and usefulness that the government provides through the eGov systems may include convenience, improved quality of service to its users, and access to more higher quality information. Such benefits and usefulness provided by the OPCRS system to would improve users' positive feelings toward the systems and higher encouragement by their important others to use the system. It could be possible that the system is useful and beneficial but the government is not able to promote its true capability and benefits to its citizens. Hence, the government should take proper initiative to reach out to citizens and make them well aware and informed about the usefulness and capability of what the system can possibly do its best to make their life much easier, which a manual system cannot do.

The positive influence of self-efficacy on attitude and subjective norm also recommends that government should make all arrangement to have a proper short-term training to get the users acquainted with the newer developed system. Such awareness is even more evident when the system is transactional in nature such as the OPCRS system. The provision for online help and short training of how to use the system can well be embedded with the Website itself. Such help can allow users to know the way they can easily handle the system and can share their secure debit/credit card information through it. Such initiative will definitely allow users

to see the system more positively and help them adopt the system at the end. The common service centres (CSCs) can also play an important role at the village and block levels in making the people from the rural background self-confident and self-dependent by providing training to those people who are computer and Internet literate. In other words, the benefits of the eGov systems need to be taken at the last user who is interested to use such service, which is possible when the infrastructural development is expedited and the existing resources are properly used to cultivate the users' technological skills to use the eGov systems. Finally, the significant influence of attitude and subjective norm on behavioural intentions indicate that policy makers should make plan of actions on enhancing users' positive attitude, develop more local project champions in the society and ask them to persuade their important ones in the society.

CONCLUSION

The purpose of this study was to examine the factors influencing adoption of an e-government system using the extended TRA model. All eight hypotheses concerning six constructs were found significant. The findings indicated that the variables such as perceived usefulness, perceived trust, and self-efficacy directly determined user's attitude and subjective norm, which then subsequently explained the citizens' intention to use a transactional e-government system like the OPCRS system. The overall high variance of 76% explained by the model on behavioural intention indicates how important these constructs are toward determining the citizens' intention to adopt the OPCRS system. This paper is the first of its type on eGov that has implemented the extended TRA as a model to understand the impact of various factors on citizens' intention to adopt it. The responsible government officials and policy makers should consider all these factors to improve upon their strategic planning for better implementation and citizen adoption of the OPCRS system.

Appendix [A]: Survey Questionnaire Items [Likert Scale [1-7]: '1'-Extremely Disagree, '7'-Extremely Agree] [Source: Davis et al. (1989) - [PU], Davis et al. (1989), Fishbein and Ajzen (1975) - [AT], Gefen et al. (2003) - [PT], Taylor and Todd (1995) - [SN, SE], Venkatesh et al. (2003) - [BI]]

- BI1. I intend to use the online PAN card registration system
- BI2. I predict that I would use the online PAN card registration system
- BI3. I plan to use the online PAN card registration system in the near future
- AT1. Using the online PAN card registration system would be a good idea
- AT2. Using the online PAN card registration system would be a wise idea
- AT3. I would like the idea of using the online PAN card registration system
- AT4. Using the online PAN card registration system would be pleasant
- SN1. People who influence my behaviour think that I should use the online PAN card registration system
- SN2. People who are important to me think that I should use the online PAN card registration system
- PU1. Using the online PAN card registration system would enable me to accomplish my tasks more quickly
- PU2. Using the online PAN card registration system would improve my overall performance
- PU3. Using the online PAN card registration system would increase my productivity
- PU4. Using the online PAN card registration system would enhance my effectiveness
- PU5. Using the online PAN card registration system would make it easier to obtain my PAN card
- PU6. I would find the online PAN card registration system useful for obtaining my PAN card
- SE1. I would feel comfortable while using the online PAN card registration system on my own
- SE2. If I want to, I could easily operate the online PAN card registration system on my own
- SE3. I would be able to use the online PAN card registration system even if there is no one around to show me how to use it
- PT1. I believe that the online PAN card registration system would be honest
- PT2. I believe that the online PAN card registration system would care about citizens
- PT3. I believe that the online PAN card registration system would not be opportunistic
- PT4. I believe that the online PAN card registration system would provide good service
- PT5. I believe that the online PAN card registration system would be predictable
- PT6. I would trust online PAN card registration system

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