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# MEASURING INTENTION TO USE AND SATISFACTION WITH ELECTRONIC DISTRICT SYSTEM: VALIDATION OF A COMBINED MODEL OF IS SUCCESS

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**Abstract**

*The purpose of this paper is to examine the intentions to use and satisfaction with electronic District system from the perspective of largely computer and Internet literate citizens from the state of Bihar in India. Measuring success of the system becomes significant also because this system was at the pilot-testing phase at the time of gathering data for it. The study used a combined IS success model to measure the success of this system. The proposed model contains constructs including information quality, system quality, perceived usefulness, intention to use, and user satisfaction. The empirical outcomes positive and significant relationships between all seven hypotheses formulated between five constructs. The empirical findings and discussion presented in this research might help the state government of Bihar to fully utilise the potential of the e-District system as an efficient tool to curb corruption and help government toward minimising it.*

**Keywords**: e-Government, e-District System, DeLone and McLean's Model, Seddon's Model, Citizen, India.

## 1.0    Introduction

Electronic government (hereafter, e-government) is defined as the use of Internet in the operation of the government (Cohen and Eimicke, 2002; Jorgensen and Cable, 2002). The institution of e-government projects is a move started by the governments to become more service oriented by aiming on the implementation and diffusion of the predominant digital services through single window access for citizens (Anthopoulos et al., 2007). The ongoing development of e-government services has opened new opportunities to deliver information and services more conveniently and cost effectively to the citizens (Wang and Shih, 2009). E-Government is an essential component in the transformation of any government, serving as a means towards enhancing transparency, accountability, and decent governance; making the government more result-oriented, efficient and citizen-centric. It also enables citizens and businesses to access government services and information as competently and efficiently as possible through the use of Internet and other channels of communication (Aggelidid and Chatzoglou, 2008; Lin et al., 2011). Also, the purpose

of e-government development and implementation is to endorse people's information literacy, minimise the digital divide, and warrant the widespread applicability of the system (Wang and Shih, 2009).

Electronic District (hereafter, e-District) system provides integrated and flawless delivery of citizen services by the district administration through a single window to ensure efficiency, transparency, and reliability of such services enabled by an automatic district administration. Its benefits include faster processing of citizens' cases, appeals, and grievances, effective electronic work flow system, better and fast decision-making services to district administration, improvement in the efficiency of the workforce, post-delivery evaluation for further improvement, and faster service delivery to the citizens. It provides services to citizens including certificate services (such as caste, residential, character, income, birth, and death certificates), pension services (such as national old aged pension, Indira Gandhi national widow pension, Bihar handicapped pension, etc.), land revenue-related services (such as land-related certificates, land less certificate, etc.), public distribution systems (such as below poverty line certificate, ration card, etc.), right to information (RTI) services (such as recording, listing, and status of RTI), grievance management services (such as recording, listing, and status of grievance), election services (such as addition, modification, or deletion of a name in the electoral role), and court case services (such as maintaining status and order of cases). This system is a mission model project launched in the four districts (i.e. Aurangabad, Madhubani, Gaya, and Nalanda) of Bihar and currently undergoing the process of pilot testing.

The key motivations behind using such system are largely due to the socio-economic reasons such as widespread corruption in the government offices and bureaucratic systems, which is pervasive in the current society as far as the country like India is concerned. The significance of such e-government systems is felt even more for smooth, transparent and impartial running of governments. In addition, even though the government is in the process of implementing the e-District system, its success could be realised in real sense only when users intend to use it once and again. The literature on IS success models (DeLone and McLean, 1992, 2003; Seddon, 1997) indicate that a number of studies (e.g. Hu et al., 2009; Sambasivan et al., 2010) have used it for various e-government systems. However, no research has yet assessed the success of e-District system using any of the IS success models. Therefore, measuring the success of e-District system using Seddon's (1997) model would be timely and

research worthy effort to let the designers, practitioners, policy makers, and the government know about the current state of the system in terms of users' intention to adopt it and their overall satisfaction associated with it.

## 2.0    Literature Review

A number of studies (e.g. Chen, 2010; Floropoulos et al., 2010; Rana et al., 2013b, 2013c, 2014b; Sambasivan et al., 2010; Scott et al., 2009; Teo et al., 2008; Wang and Liao, 2008; Wang et al., 2010) have used the IS success models (i.e. DeLone and McLean, 1992, 2003; Seddon, 1997) as some base models for examining the intentions to use, system usage, and satisfaction with various e-government systems. As the government develops e-government systems to offer such enhanced services to its citizens, further assessment efforts are needed to examine the efficiency of the e-government systems. Such evaluation efforts would allow government agencies to regulate whether they are proficient to provide what citizens require and deliver expected services accordingly (Gupta and Jana, 2003; Wang and Liao, 2008).

For example, Chen (2010) discussed taxpayer's satisfaction with an online system for filing individual income tax returns in context of Taiwan. Path analysis using structural equation modelling confirmed that all quality antecedents including information, system, and service quality strongly influenced taxpayer's satisfaction with the online tax-filing system. Moreover, they also found that factors of information and service quality were more significant than service quality demonstrating the importance of systems outputs and processing ability to the system users.

Similarly, Floropoulos et al. (2010) examined the success of the Greek taxation information system with the point of view of expert employees. They adopted constructs including information quality, system quality, service quality, perceived usefulness, and user satisfaction and found the strong relationships between five success constructs. However, they found the relationship of system quality on perceived usefulness as weak though significant and on user satisfaction as non-significant. Sambasivan et al. (2010) used DeLone and McLean's (2003) extended IS success model to assess factors influencing intentions to use and actual use of the electronic procurement system (EPS) in Malaysian government ministries. The research used an extension of DeLone and McLean's model of IS success by

including trust, facilitating conditions, and web-design quality. The findings indicated that perceived usefulness and perceived ease of use among others as strong determinants of intentions to use EPS.

Scott et al. (2009) provided a multi-faceted framework for understanding the success of e-government websites from the citizen's perspectives. They established the role of net benefits in the evaluation of e-government success and extended the knowledge of e-government success by determining the influence IT quality constructs. Teo et al. (2008) have analysed the impact of trust on the specific e-government systems on the quality constructs (i.e. information, system, and service quality) of the IS success model. They argued that higher level of citizen's trust would be positively associated with information, system, and service quality of the systems (Teo et al., 2008). Similarly, backed by the IS success model, Wang et al. (2010) devised a model for citizen's sustainable trust in e-government. Examining the e-Government systems success in context of Taiwan, Wang and Liao (2008) proposed and validated using DeLone and McLean's (2003) updated IS success model. The findings supported marginally or significantly all relationships excluding system quality on use.

Some recent publications (e.g. Rana et al., 2013b, 2013c, 2014b) on e-government research have explored the different models of IS success on the online public grievance redressal system in Indian context. For example, Evaluating the validity of IS success models, Rana et al. (2013b) revealed that information quality and system quality significantly influenced both behavioral intentions and user satisfaction. The study also proposed an integrated IS model and demonstrated that the construct such as trust in addition to the quality constructs (i.e., information quality, system quality) makes the model more robust than any of the three individual widely accepted IS success models (i.e. DeLone and McLean's (1992, 2003) and Seddon's (1997) IS success models). Similarly, Rana et al. (2013c) only used Seddon's (1997) model to understand factors influencing adoption of and satisfaction with this system. Moreover, Rana et al. (2014b) used some external constructs including social influence, self-efficacy, and trust along the DeLone and McLean (1992) IS success model.

Moreover, Rana et al. (2012a, 2012b, 2012c, 2013a) also performed a literature review on e-government adoption literature and explored cumulative relationships of information, system, and service quality with user's satisfaction and intentions to use the e-government systems. For example, Rana et al. (2013a) explored the cumulative

influence of information quality and system quality on user's satisfaction and found them significant. Other studies have also demonstrated similar results about these relationships.

## 3.0    Research Model Development and Hypotheses

### 3.1    Theoretical Background - IS Success Models

Researchers have developed different models to designate what makes some IS 'successful'. It was argued that acceptance of an information system does not necessarily indicate its success; however it can be considered as a possible precursor for a success of the system (Petter et al., 2008). There are primarily three theories in the area of IS success. The first IS success model was given by DeLone and McLean (1992) using six factors. There were many criticisms of this model by various researchers (including e.g. Pitt et al., 1995; Seddon, 1997; Seddon and Kiew, 1996) on some of its constructs such as individual impact, organizational impact, and use. Seddon (1997) introduced a re-specified model of DeLone and McLean where use of the system was considered to have results of various types. The construct perceived usefulness was introduced in the model as an IS measure. Responding to the criticisms by the researchers on their model, DeLone and McLean (2003) updated their prior model by introducing new constructs including service quality, intention to use and net benefits. Also, the model removed the constructs namely individual impact and organizational impact from its prior model. The brief description of these key IS success models is provided below.

### 3.2    DeLone and McLean's (1992, 2003) IS Success Model

DeLone and McLean (1992) performed a review of the research published during 1981-1987 to develop a taxonomy of IS success. They showed that IS success was the association of six factors namely system quality, information quality, use, user's satisfaction, individual impact, and organizational impact (DeLone and McLean, 1992). Soon after the publication of this model, IS researchers started proposing changes to it.

Later in the year 2003, DeLone and McLean discussed many of the significant IS research efforts that have affected, tested, challenged, and proposed enrichments to their original model. Realizing the proposed modifications to their model, the updated

IS success model accepted the Pitt et al. (1995) recommendations to incorporate service quality as a construct. DeLone and McLean (2003) substituted the variables, individual and organizational impact, with net benefits with accounting for benefits at different levels of analysis and proposed an updated model which represents the relationship between system quality, information quality, service quality, use, user satisfaction, and net benefit.

## 3.3    Seddon's (1997) Model of IS Success

A key difference between Seddon's (1997) and DeLone and McLean's (1992) model is the definition and placement of IS use. Seddon (1997) argued that 'use' must precede impacts and benefits, but it does not cause them. The author assumed IS use as a behavior that reflects an expectation of net benefits by using an IS and hence models IS as a resultant behavior of IS success (Seddon, 1997). This alternative definition of IS use points out that it is the outcome of the IS success, rather than being an intrinsic attribute of IS success. Therefore, IS use in the form of a behavior is detached from IS success model (Rai et al., 2002). The important aspect of this model is the inclusion of perceived usefulness in the model as an IS success measure (Seddon, 1997). The model holds a direct path from both system and information quality to both perceived usefulness as well as user satisfaction.

## 3.4    Overview of Research Model

Our theoretical development will mainly follow up and emerge from Both DeLone and McLean's (1992, 2003) and Seddon's (1997) IS success models. The decision for not considering certain constructs is based on evident logical facts. At the outset, so far as the arguments for service quality are concerned it mainly examines user's beliefs and their insight of IT department (Petter et al., 2008). Therefore, we are not considering service quality in our proposed research model, as the purpose of this research is to measure intentions to use and satisfaction with a specific e-government system.

As far as the construct 'use' is concerned, we do not intend to consider in our model due to the fact that the respondents to whom data have been collected are the potential adopters of the systems. As an outcome of this logical reasoning, perceived usefulness is placed in the DeLone and McLean model as an individual impact (Rai et al., 2002). We adopt the perceived usefulness construct of Seddon (1997), instead of use. Seddon

and Kiew (1996) and Seddon (1997) argued that 'use' can be opted as a system success measure only if a system is used, leading to the system being useful, and therefore successful.
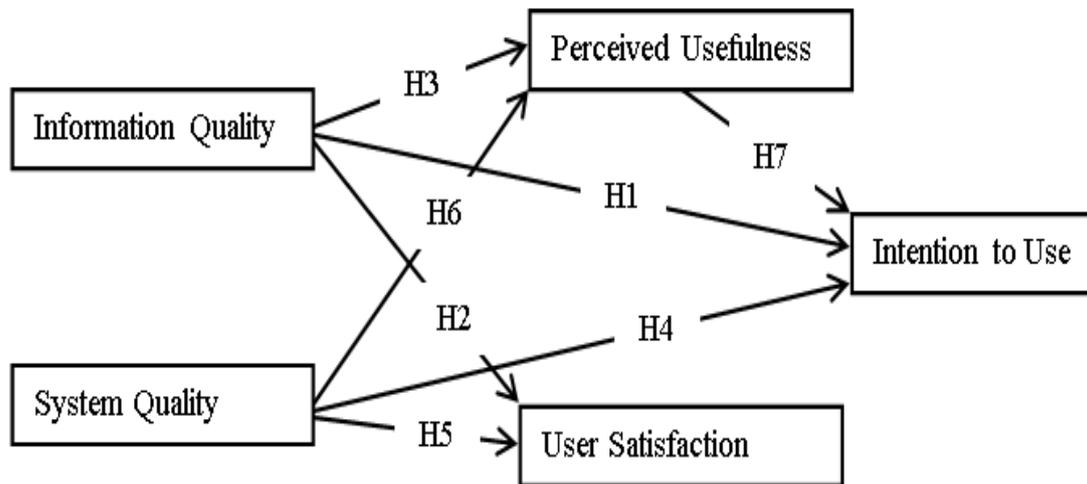


**Figure 1.     Proposed Research Model**

However, non-use of a system does not necessarily indicate that it is not useful; it may simply indicate that the potential users have other tasks to perform (Seddon, 1997; Seddon and Kiew, 1996). Therefore, we also consider using perceived usefulness construct in our proposed model, which is specific to the individual analysis of user's intention and is not essentially related only with the used system. The design of the proposed model is presented below in Figure 1.

## 3.5    Hypotheses Development

Under the proposed research model, we have formulated seven hypotheses based on relationships between five constructs adopted. A brief summary of the definitions for the core constructs used in the proposed research model is presented in Table 1.

| Variable/Construct | Definition |
|---|---|
| System Quality | System quality is concerned with whether or not there are 'bugs' in the system, the consistency of the user interface, ease of use, quality of documentation, and sometimes, quality and maintainability of the program code (Seddon, 1997). |
| Information Quality | Information quality is concerned with the issues such as the relevance, timeliness, and accuracy of information generated by an information system. Not all applications of IT involve the production of information for decision-making (e.g., a word processor does not produce any information) so information quality is not a measure that can be applied to all systems (Seddon, 1997). |
| Perceived Usefulness | The degree to which a person believes that using a particular system would enhance his or her job performance (Davis, 1989). |

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

**Information Quality**

This construct is measured using features linked to actual information that is disseminated by information systems and the level to which it matches with the user's expectations in terms of its correctness, trustworthiness, significance, comprehensiveness, and conciseness (Bailey and Pearson, 1983; Rai et al., 2002; Wang and Strong, 1996). DeLone and McLean (2003) characterized information quality as relevant, complete, easy to understand, personalized, and secure precursor for measuring e-commerce systems success. DeLone and McLean (2003) updated IS model has hypothesised and supported the link of information quality on intention to use. Moreover, Petter and McLean (2009) performed a meta-analysis of this relationship and found a strong link between these variables. Therefore, we hypothesize:

**H1**: *Information quality will have a positive and significant influence on intentions to use the e-District system.*

A number of studies on IS and e-government success have supported influence of information quality on user satisfaction (Dwivedi et al., 2013; Floropoulos et al., 2010; Rai et al., 2002; Seddon, 1997; Seddon and Kiew, 1996; Wang and Liao, 2008). For example, Wang and Liao (2008) validated e-government system success using DeLone and McLean (2003) IS success model and found the relationship between information quality and user satisfaction significant. In context Greek taxation system, Floropoulos et al. (2010) found the similar results between these two variables. The meta-analysis of information quality on user's satisfaction also demonstrated a significant relationship between them in context of e-government research (Rana et al., 2012a, 2012b, 2013d). Therefore, we hypothesise:

**H2**: *Information quality will have a positive and significant impact on user's satisfaction.*

The relationship between information quality and perceived usefulness has been supported by Seddon (1997) IS success model, where they substituted 'IS use' of DeLone and McLean (1992) success model by perceived usefulness. In context of e-government, Floropoulos et al. (2010) also found this relationship significant. Therefore, we hypothesise:

**H3**: *Information quality will have a positive and significant impact on perceived usefulness.*

**System Quality**

Irrespective of whatever knowledge the system holds, the characteristics of the system deriving from the literature are its flexibility, consistence, trustworthiness, usefulness of its particular functions, user-friendly interface, ease of use, and response time (Bailey and Pearson, 1983; Rai et al., 2002). DeLone and McLean (1992, 2003) described system quality as the required trait of the information systems itself. Petter and McLean (2009) performed a meta-analysis of DeLone and McLean (2003) updated IS model and found a significant outcome for the relationship between system quality and intentions to use. This research also believes that higher levels of system quality in terms of various characteristics outlined above would allow users to intend more to adopt the intended e-government system. Therefore, we hypothesise:

**H4**: *System quality will have a positive and significant influence on intentions to use the e-District system.*

The prior empirical findings (Dwivedi et al., 2013; Rai et al., 2002; Seddon, 1997; Seddon and Kiew, 1996; Wang and Liao, 2008) have supported the positive and significant impact of system quality on user satisfaction as discussed in DeLone and McLean's model. That indicates that the higher levels of system quality are positively associated to higher levels of user satisfaction. Analysing the e-government system success, Wang and Liao (2008) found a significant impact of system quality on user's satisfaction. Rana et al. (2012a, 2012b) performed a meta-analysis this relationship in context of the e-government research and found the cumulative relationship significant. Therefore, we hypothesise:

**H5**: *System quality will have a positive and significant impact on user's satisfaction.*

Seddon and Kiew (1994) analysed a portion of DeLone and McLean (1992) IS success model by replacing 'use' with 'usefulness' and their results partially supported DeLone and McLean's (1992) IS success model. After replacing 'use' by 'usefulness', the influence of system quality on perceived usefulness was found very significant. Later, Fraser and Salter (1995) also obtained a very similar result after replicating Seddon and Kiew's (1994) study. In context of e-government adoption, Floropoulos et al. (2010) also found a strong link of system quality on perceived usefulness. Therefore, we hypothesise:

**H6**: *System quality will have a positive and significant effect on perceived usefulness.*

**Perceived Usefulness**

A number of researchers have shown that perceived usefulness is a strongest predictor of intention to use a new system in both voluntary and mandatory settings (Davis et al., 1989; Taylor and Todd, 1995; Venkatesh and Davis, 2000). Studies (e.g. Hu et al., 2011; Lean et al., 2009; Sambasivan et al., 2010) on e-government adoption have also quite significantly endorsed this relationship. For example, analysing factors influencing e-government adoption among citizens in Malaysia, Lean et al. (2009) found the relationship between perceived usefulness and intentions to use significant. The weight- and meta-analysis of studies concerning adoption of e-government services also demonstrated that the cumulative impact of perceived usefulness on intention to use as significant (Rana et al., 2012b, 2012c, 2013a, 2014a). This research assumes that citizen's intentions to use e-District system will increase if they perceive the system to be useful. Therefore, we posit the following hypothesis:

**H7**: *Perceived usefulness will have a positive and significant effect on intentions to use e-District system.*

## 4.0 Research Methodology

For the purpose of examining the intentions to use and satisfaction with the e-District system, we considered survey as an appropriate research method (Cornford and Smithson, 1996; Choudrie and Dwivedi, 2005). There are various ways to capture the data, however, a self-administered questionnaire was found to be suitable as a primary survey instrument of data collection in this research. This is because of the fact that this method takes care of the issue of reliability of information by reducing and eliminating the way the questions are asked and presented (Conford and Smithson, 1996). Moreover, collecting data from the majority of respondents within a short and specific period of time was a critical issue of this research (Fowler, 2002). Therefore, only closed and multiple-choice questions were included in the questionnaire. The final questionnaire consisted of total 25 questions including 10 questions from respondents' demographic characteristics (see Appendix A for constructs related items). 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 based questions.

The data regarding adoption of e-District system was gathered from four districts (i.e. Madhubani, Gaya, Nalanda, and Aurangabad) of Bihar, therefore, the sample frame constituted the selected users who were part of this trial. The rationale behind selection of these four districts is motivated by the fact that the initial implementation of the system as a pilot test had started from these places only. Of the overall 1,000 questionnaires distributed to the respondents, they either had to return them after they had completed it on the spot or in maximum two days of time from the day of distribution of questionnaires.

The distribution of questionnaires took place in phases, which continued for about two months' time covering different locations from four above-mentioned districts. All the users of this system were potential adopters as this system is implemented for the first time in the state of Bihar. A total of 389 questionnaires were returned to the researchers within the specified time span. The further scrutiny of questionnaires indicated that 85 of them were incomplete. Hence, we were left out with 304 usable responses, which made the basis for our empirical analysis. The overall response rate was found to be 38.9% with 30.4% valid questionnaires.

## 5.0 Research Findings

### 5.1 Respondents' Demographic Profile

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, 72.6% respondents belonged to an age group of 20-34 years. As far as the occupation of the respondents is concerned, the largest 39.1% of the total sample were students followed by 18.4% and 17.4% represented by the private-sector and public-sector employees. The education qualification for more than 84% of the overall population was found to be graduation and above. The computer and Internet literacy and awareness of the respondents can be judged from their very high computer and Internet experience percentage ($\approx$ 98%).

### 5.2 Descriptive Statistics and Measurement Model

The high overall as well as individual items' mean (see Table 2) for most of the constructs indicate that respondents react favorably to the all the measures directly or indirectly related to behavioral intention.

| Measure | Mean | S.D. |
|---|---|---|
| Information Quality (IQ) | 4.99 | 1.08 |
| System Quality (SQ) | 5.03 | 1.16 |
| Perceived Usefulness (PU) | 5.16 | 1.05 |
| Intention to Use (IU) | 4.95 | 1.25 |
| User Satisfaction (US) | 5.00 | 1.11 |

**Table 2.        Descriptive statistics**

**[Legend: N = Sample Size, S.D. = Standard Deviation]**

The value for overall minimum mean for intention to use as '4.95' on the Likert scale [1-7] indicates that users have responded favorably to all items of constructs.

Convergent and discriminant validity of the scales were verified with confirmatory factor analysis. Convergent validity is measured using three ad hoc tests recommended by Anderson and Gerbing (1988). Table 3 lists the standardised factor loadings, composite reliabilities, and variance extracted estimates. Standardised factor loadings are indicative of the degree of association between scale items and a single latent variable. The loadings are highly significant in all the cases except for one in perceived useful, system quality, and user satisfaction where loading factors were found to be marginally less than the prescribed minimum value of 0.70.

Because of relatively small number of items, Cronbach's alpha for system quality (i.e. 0.654) and user satisfaction (i.e. 0.674) was probably fractionally less than 0.70. A Cronbach alpha of more than 0.70 is considered good (Hair et al., 1992; Nunnaly, 1978). Composite reliabilities, similar to Cronbach's alpha, for IQ (i.e. 0.750), PU (i.e. 0.818), and IU (0.800) were found well beyond the minimum limit of 0.70. However, it was relatively low for SQ (i.e. 0.627) and US (i.e. 633).

Variance-extracted estimates are measures of the variation explained by the latent variable to random measurement error (Netemeyer et al., 1990) and ranged from 0.599 to 0.700 for all constructs except system quality (i.e. 0.435) and user satisfaction (i.e. 0.445). Again, this relatively lower value is probably due to lower factor loading items in these constructs. These estimates should exceed the recommended lower limit of 0.50 (Fornell and Larcker, 1981). Some of the items from all constructs except IU have been dropped due to their poor performance. Almost all tests supported the convergent validity of the scales.

| Measure | FL | CR | VEE |
|---|---|---|---|
| Information Quality (IQ) | | 0.750 | 0.599 |
| IQ6 | 0.70 | | |
| IQ7 | 0.70 | | |
| IQ8 | 0.72 | | |
| System Quality (SQ) | | 0.627 | 0.435 |

| | | | |
|---|---|---|---|
| SQ2 | 0.64 | | |
| SQ3 | 0.71 | | |
| Perceived Usefulness (PU) | | 0.818 | 0.681 |
| PU2 | 0.65 | | |
| PU3 | 0.68 | | |
| PU4 | 0.71 | | |
| PU5 | 0.69 | | |
| PU6 | 0.71 | | |
| Intention to Use (IU) | | 0.800 | 0.700 |
| IU1 | 0.87 | | |
| IU2 | 0.73 | | |
| IU3 | 0.66 | | |
| User Satisfaction (US) | | 0.633 | 0.445 |
| US2 | 0.64 | | |
| US4 | 0.72 | | |

**Table 3.        Results of confirmatory factor analysis**

**[Legend: CR: Composite Reliability, FL: Factor Loading, VEE: Variance Extracted Estimate]**

Discriminant validity was assessed with the test recommended by Anderson and Gerbing (1988). The squared correlation between a pair of latent variables (see Table 4) should be less than the variance-extracted estimate of each variable (see Table 3).

| Variable | IQ | SQ | PU | IU | US |
|---|---|---|---|---|---|
| IQ | 0.747[b] | | | | |
| SQ | 0.479[a] | 0.654[b] | | | |
| PU | 0.507[a] | 0.519[a] | 0.837[b] | | |
| IU | 0.477[a] | 0.450[a] | 0.521[a] | 0.811[b] | |
| US | 0.558[a] | 0.493[a] | 0.496[a] | 0.423[a] | 0.674[b] |

**Table 4.      Squared pairwise correlations and alpha internal reliabilities**

**[Legend: [a] Cronbach's Alpha are shown on the main diagonal [b] Significant at p < 0.01]**

Each combination of latent variables was tested, and each pairing (except pairing with SQ and US in certain instances) passed, providing indication of the discriminant validity of the scales.


## 5.3      Structural Model Testing

The overall model fit is acceptable, as can be seen from Table 5. The test of overall model fit resulted in a Chi-square value of 243.828 with degrees of freedom as 83 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. 2.938) is well within suggested 3 to 1 bracket (Chin and Todd, 1995; Gefen, 2000).

Typically, researchers also report a number of fit-statistics to examine the relative fit of the data to the model (see Table 5). We found the fit-indices completely in accordance with the recommended values. We also report RMSEA (Root Mean Square Error of Approximation) well within the recommended level, which measures the discrepancy per degree of freedom (Steiger and Lind, 1980).

| Fit Index | Model | Recommendation |
|---|---|---|
| Chi-Square | 243.828 | N/A |
| Degree of Freedom (DF) | 83 | N/A |
| P | 0.000 | Non-Significant |
| Chi-Square/DF | 2.938 | <3.000 (see Chin and Todd, 1995) |
| GFI (Goodness-of-Fit Index) | 0.912 | >0.90 (see Hoyle, 1995) |
| AGFI (Adjusted GFI) | 0.872 | >0.80 (see Chin and Todd, 1995) |
| CFI (Comparative Fit Index) | 0.910 | >0.90 (see Bentler and Bonnet, 1980) |
| RMSEA | 0.080 | <0.10 (see Steiger and Lind, 1980) |

**Table 5. Model fit summary for the proposed research model**

Having established the relative competence of the model's fit, it is appropriate to observe distinct path coefficients corresponding to our hypotheses. This analysis is presented in Table 6. All seven hypotheses are supported. Information quality positively influenced intention to use (H1), user satisfaction (H2), and perceived usefulness (H3). Similarly, system quality positively influenced intention to use (H4), user satisfaction (H5), and perceived usefulness (H6). And, perceived usefulness positively influenced intention to use (H7) the e-District system.

| H# | Hypothesis | Coeff. | CR | Sig. | Supported |
|---|---|---|---|---|---|
| H1 | Information Quality → Intention to Use | 0.289 | 3.296 | *** | YES |
| H2 | Information Quality → User Satisfaction | 0.648 | 6.601 | *** | YES |
| H3 | Information Quality → Perceived Usefulness | 0.464 | 5.671 | *** | YES |
| H4 | System Quality → Intention to Use | 0.258 | 2.495 | * | YES |
| H5 | System Quality → User Satisfaction | 0.503 | 4.916 | *** | YES |
| H6 | System Quality → Perceived Usefulness | 0.532 | 5.330 | *** | YES |
| H7 | Perceived Usefulness → Intention to Use | 0.308 | 2.952 | ** | YES |

**Table 6.          Path coefficients and hypotheses testing**

**[Legend: Coeff. = Coefficient, CR: Critical Ratio, H# = Hypothesis Number, Sig. = Significance]**

Figure 2 shows the path coefficients for each significant relationship using structural equation modelling technique of AMOS 20.0. The relationships of IQ with IU, US, and PU and SQ with US and PU were found significant at the levels of $p < 0.001$, whereas between PU and IU and SQ and IU were found significant at $p < 0.01$ and $p < 0.05$ levels respectively. Moreover, the variance explained by the model on PU, IU, and US was found as 50%, 41%, and 67% respectively.

## 6.0 Discussion

The hypothesis testing results indicated that there are strong relationships between the five constructs supporting hypotheses. The path coefficient results indicated that system and information quality are significant positive determinants of perceived usefulness, intention to use, and user satisfaction. Moreover, perceived usefulness is found as a significant precursor for intention to use.

It is evident from the above analysis that perceived usefulness of the system significantly influenced users' intention to use e-District system. This is due to the fact that higher degree of benefits associated with e-District system perceived by the users intends them to use the system. The state government should ensure that the e-government system is developed in such a way that it incorporates all benefits users intend to look for in any such ideal system. A number of studies (e.g. Sambasivan et al., 2010; Venkatesh and Davis, 2000) on technology and e-government adoption have endorsed this relationship. The results also revealed that information and system quality demonstrate strong path-coefficients on intention to use via perceived usefulness rather directly on intentions to adopt e-District system. This indicates that better information and system characteristics of the e-District system make the users better understand its usefulness, which eventually leads to adoption of the system.
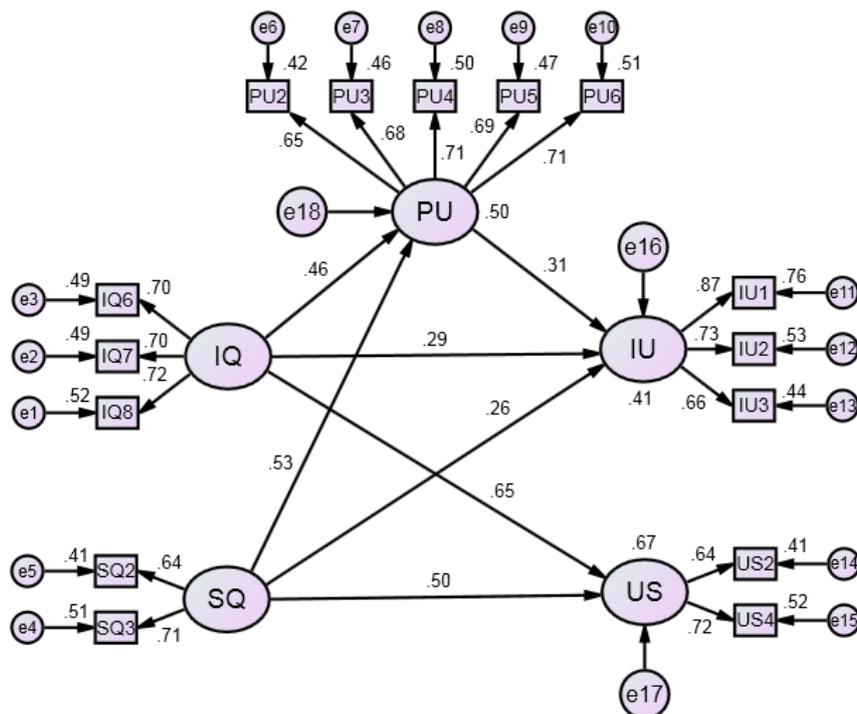


Figure 2.        Validated research model

The results obtained from the analysis indicate that the designers, developers, and managers responsible for maintaining the system should make sure the various traits related to information (including the accuracy, trustworthiness, importance, completeness, and conciseness (Bailey and Pearson, 1983; Rai et al., 2002; Wang and Strong, 1996)) and that of system (including error free and user friendly interface, easily maintainable program code, and quality of documentation and maintainability (Seddon, 1997)) are enriched to enhance the overall benefits of using the system. This would allow the users to adopt the system.

The strong and significant relationship of information quality and system quality on user's satisfaction (e.g. Rai et al., 2002; Seddon, 1997; Seddon and Kiew, 1996; Wang and Liao, 2008) indicate that the government should give priority on the quality provisions of any such e-government systems developed. The high value of path coefficients between these quality constructs and users' satisfaction although indicate that even the majority of respondents are computer and Internet literate they don't have much awareness about how to get their work done through the e-District system.

## 7.0    Conclusion

The purpose of this study is to examine intention to use with and satisfaction with e-District system using a combined model of IS success. The empirical findings of the study are step forward toward filling the research gap where validation of the proposed combined model of IS success has been tested in context of e-District system for the first time. Our findings give some insights to other Indian states where similar e-District systems are either implemented or in the process of implementation. If governments at state and central levels wish their e-District systems to be successfully adopted, they must acknowledge and understand the information and system related traits of their corresponding websites and highlight their usefulness and benefits to enhance user's adoption and satisfaction toward system.

## 8.0    Limitations and Future Research Directions

Firstly, as the e-District system was at the pilot testing phase, the exploration of a combined model of IS success has been validated only using the potential adopters from a specific geographical location in India. Hence, the caution needs to be taken while generalising its findings to adopters and users of different cultural and

geographical locations specifically from other states in India. Secondly, the model only explains 41% variance on intentions to use the e-District system. The future research might explore some more additional constructs (such as trust, risk, security, privacy etc.) in order to enhance overall variance of the model on behavioral intentions. Using such constructs stand also significant as the e-District system is a transactional form of multi-faceted e-government system where users can use their debit or credit cards to get certain job (e.g. paying electricity bill online) done. So, the proposed model for IS success can be extended further using suggested constructs.

Thirdly, the proposed research model has been validated using non-probabilistic convenience based sampling technique. The future research can consider probabilistic random sample to validate the proposed research model and verify how the behaviour of the proposed model is different from its previous context. Finally, the current research has considered a sample of size 304, which is just enough to perform structural equation modelling. The future research might collect a large sample to validate the research model.

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## Appendix A. Survey items used in this study

**Information Quality**

IQ6. Information provided by e-District system would be clear

IQ7. Information provided by e-District system would be accurate

IQ8. Information provided by e-District system would be up-to-date

**System Quality**

SQ2. I would find e-District system easy to use

SQ3. I would find it easy to get e-District system to do what I would like it to do

**Perceived Usefulness**

PU2. Using the e-District system would improve my overall performance

PU3. Using the e-District system would increase my productivity

PU4. Using the e-District system would enhance my effectiveness

PU5. Using the e-District system would make it easier to get my Birth/Marriage/ Death/Caste Certificate/Monthly Ration/Land Registry/Bill Payments/Delivery and Collection etc.

PU6. I would find the e-District system useful for obtaining my Birth/Marriage/ Death/Caste Certificate/Monthly Ration/Land Registry/Bill Payments/Delivery and Collection etc.

**User Satisfaction**

US2. The e-District system would be efficiently fulfilling my needs of interacting with the district level departments

US4. Overall, I would be satisfied with the e-District system

**Intention to Use**

IU1. I intend to use the e-District system

IU2. I predict that I would use the e-District system

IU3. I plan to use the e-District system in the near future