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An Extended DeLone and McLean's Information System (IS) Model for Examining Success of Online Public Grievance Redressal System in Indian Context

Abstract

The purpose of this paper is to examine the success factors of the online public grievance redressal systems (OPGRS) in the Indian context. This e-government initiative is based on the government's long term strategic policy that aims to reform and overhaul the Indian bureaucracy. The model developed includes the constructs such as *system quality, information quality, social influence, self-efficacy, perceived trust, user satisfaction*, and *intention to use*. The empirical outcomes provided the positive significant connections between all 13 hypothesized relationships among seven constructs. The empirical evidence and discussion presented in the study can help the Indian government to improve upon and fully utilize the potential of OPGRS as a useful tool for transparent and corruption free country.

Keywords: Online public grievance redressal systems (OPGRS), success factors, e-government, DeLone and McLean, India

Introduction

Starting from the early 1990s, the revolution of information and communication and technologies (ICTs) has made major and brisk changes in the day-to-day life of people and governments (Floropoulos et al., 2010). Realizing this, many governments across the world are transforming into new forms of government called electronic government or e-government (Akman et al., 2005) to reinforce and maintain their positions in the global competition (Sharifi and Zarei, 2004). Though e-government provides obvious benefits to governments, professionals, and organizations, it is citizens who actually receive the broadest range of benefits (Jaeger, 2003). The OPGRS is one of such systems that serve the citizens by catering them for their grievances. As governments develop e-government systems to deliver services to the people, there is a need for evaluation efforts that could examine their effectiveness (Wang and Liao, 2008) and success. Online public grievance redressal system is one such e-government system which is primarily meant for addressing the grievances, issues, and problems of citizen's everyday life and get them resolved online by the high-level government officials designated for it. It provides a huge benefit to the citizens by solving their problems without much hassle.

Grievance redress mechanism is a part and parcel of the machinery of any administration. No administration can claim to be answerable, responsive, and user-friendly unless it has established a proficient and effectual grievance redress mechanism. In fact, the grievance redress mechanism of a firm is an estimate to examine its efficiency and effectiveness as it provides significant feedback on the working of the administration. The grievances from public are accepted at various points in the Government of India. There are mainly two

designated agencies in the central government handling these grievances namely Department of Administrative Reforms and Public Grievances (under Ministry of Personnel, Public Grievances and Pensions) and Directorate of Public Grievances (under Cabinet Secretariat). The public grievance redress mechanism in India functions on a decentralized basis. An officer of the level of Joint Secretary is designated as Director of Grievances of the Ministry/Department/Organization.

The major reasons of grievances are mainly due to the socio-economic reasons such as prevalent corruption in the ministries, government organizations, and bureaucratic systems, which are ubiquitous in the current society. The people feel themselves helpless against it and are bound to tolerate it in their day-to-day lives. But, the factors such as lack of awareness and lack of relevant information about whom to complain make this process even more tedious. Therefore, the significance of such e-government systems is felt even more for smooth, transparent and impartial running of the governments. The success of this system can be measured only when a large section of the society adopts this system to lodge the complaints and the government responds properly to their problems leading to the people's satisfaction.

Due to the above reasons, it is quite logical to explore the analysis of success of the OPGRS systems to understand its role for the citizens of India. Hence, the aim of this study is to measure the success of the online public grievance redressal systems by knowing citizens' intention to use and their satisfaction toward it. To achieve the overall aim of this study, the following research objectives can be undertaken: i) To undertake extensive review of e-government literature based on IS success model, ii) To explore the theoretical background of DeLone and McLean's (2003) IS success model, iii) To explain the overview of the proposed research model, iv) To validate the proposed research model with the primary data.

Literature Review

As far as e-government adoption research is concerned, some studies (Chai et al., 2006; Chen, 2010; Floropoulos et al., 2010; Gotoh, 2009; Hsu and Chen, 2007; Hu et al., 2009; Sambasivan et al., 2010; Scott et al., 2009; Teo et al., 2008) have used IS Success Models to analyse the intention to use and satisfaction toward adopting such systems. In recent years, many citizens have claimed more and enhanced services through the Internet. As government develops the systems to offer such services to the citizens, assessment efforts are required to measure the effectiveness of the e-government systems. Such evaluation efforts would allow government agencies to determine whether they are capable to deliver what citizens require and provide expected services accordingly (Gupta and Jana, 2003; Wang and Liao, 2008).

From the analysis of the research findings of the various literature studies, Chai et al. (2006) implied that success of e-government depends on how governments offer high quality and user-oriented e-government services to the citizens. Palmer (2002) discussed that quality of a website can be measured by its connection speed, navigability, interactivity, responsiveness, and quality substance. On the other hand, it was found that website quality is supposed to have positively linked toward developing trusting intention on e-commerce website (McKnight et al., 2000). Therefore, website service quality can be considered as one of the

strong interpreters of e-government success and user's intention to constantly use an e-government website (Chai et al., 2006).

Hsu and Chen (2007) provided an alternative conceptualization of the IS success model for examining the IS use behaviour of e-government in Taiwanese context. Their analysis indicated that user intention to use IS in e-government is governed by social (i.e. normative pressure) and functional value (i.e. information and system quality) rather than conditional value (i.e. service quality) and satisfaction. Teo et al. (2008) explored the influence of trust on the specific e-government systems on the quality constructs (i.e. information, system, and service quality) of the IS success model. It was argued that higher level of citizen's trust was 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.

Gotoh (2009) undertook a similar analysis of the online tax declaration services for the Japanese government and examined it quantitatively to elucidate the factors that enhance user's satisfaction with such services. The paper used IS success models with two amendments where *preparation quality* and *result quality* were the constructs used apart from *system quality*, which was directly driven from the IS success model. Hu et al. (2009) examined the determinants of service quality and continuance intention on the eTax system in context of Hong Kong. The data analysis supported both service traits (i.e. security and convenience) and one technology trait (i.e. perceived ease of use) as the key determinants of the service quality. They also observed that perceived usefulness was not found as the strongest predictor of continuance intention but service quality was.

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. Chen (2010) discussed taxpayer's satisfaction with the online system for filing the individual income tax returns in context of Taiwan. The system under discussion covered its information, system, and service qualities, which are the precursors of the user's satisfaction with any system. By the use of DeLone and McLean's IS success model, the author intended to demonstrate how the use of the system could be enhanced by the increasing software satisfaction with it. The research also found that information and system quality are significant factors toward achieving this goal (Chen, 2010).

Floropoulos et al. (2010) measured the success of the Greek taxation information system from the perspective of expert employees. The analysis revealed that all the links from the quality constructs on the perceived usefulness and user satisfaction were significant except for the effect of system quality on user satisfaction was non-significant. Sambasivan et al. (2010) used DeLone and McLean (2003) extended IS success model to examine the factors that influence the intention to use and actual use of the electronic procurement system by various ministries in the Malaysian government. They extended IS success model by with the factors including trust, facilitating conditions, and web-design quality and found them strongly associated with intention to use.

Research Model Development and Hypotheses

Theoretical Background - IS Success Models

There are primarily three theories given in the area of IS success. The first IS success model was given by DeLone and McLean (1992) with six factors namely system quality, information quality, use, user's satisfaction, individual impact, and organizational impact (DeLone and McLean, 1992). 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 and 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, perceived usefulness was introduced in the model as an IS measure. Latter in the year 2003, DeLone and McLean discussed many of the significant IS research efforts that have applied, validated, challenged, and offered enrichments to their original model and came up with the DeLone and McLean's (2003) updated model of IS success. While IS success models have gained considerable attention among researchers, little research has been undertaken to examine the success of e-government systems. Hence, there is a need to measure whether the traditional IS success models can be broadened to examine e-government systems success (Wang and Liao, 2008). Realizing the need of such model in the area of e-government adoption research, we proposed an overview of a research model to measure the system's success of OPGRS.

Overview of Research Model

Our theoretical development will follow up and emerge from the IS success model of DeLone and McLean (2003). The decision for not considering certain constructs of this model to design and develop a proposed research model for this study is based on certain logical facts. At the outset, so far as the arguments for service quality is concerned it mainly measures the service quality of the IT departments as opposed to the specific IT applications. More specifically, it primarily examines user's beliefs and their insight of IT department (Petter et al., 2008).

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. They were rather shown the working of the system and its benefits and are expected to use this system in the future. Therefore, measuring their use behaviour is beyond the scope of this paper. The construct 'net benefits' is most commonly measured using perceived usefulness or job impact at the individual level of analysis (Petter et al., 2008). As we are not incorporating perceived usefulness in our proposed model, it would not be feasible to measure net benefits here. Further, we believe that measuring *net benefits* in our context is not relevant to measure the systems success. However, we have used the external constructs such as *self-efficacy*, *social influence*, and *perceived trust* along with our base model i.e., DeLone and McLean (2003) IS success model. The reason for considering these external

variables is induced from several reasons such as *trust* and *social influence* are such factors that can expedite the use of the system which eventually will describe its success story. Moreover, as most of our respondents were computer literate, we feel that *self-efficacy* can enhance confidence to them toward using the system independently and therefore will ensure the success of the system.

Considering the above facts and arguments, we have decided to consider the constructs including *perceived information quality, perceived system quality, social influence, self-efficacy, perceived trust, user satisfaction*, and *intention to use* to measure the success of the online public grievance redressal systems. The design for the proposed model and the corresponding hypotheses are formulated as under:
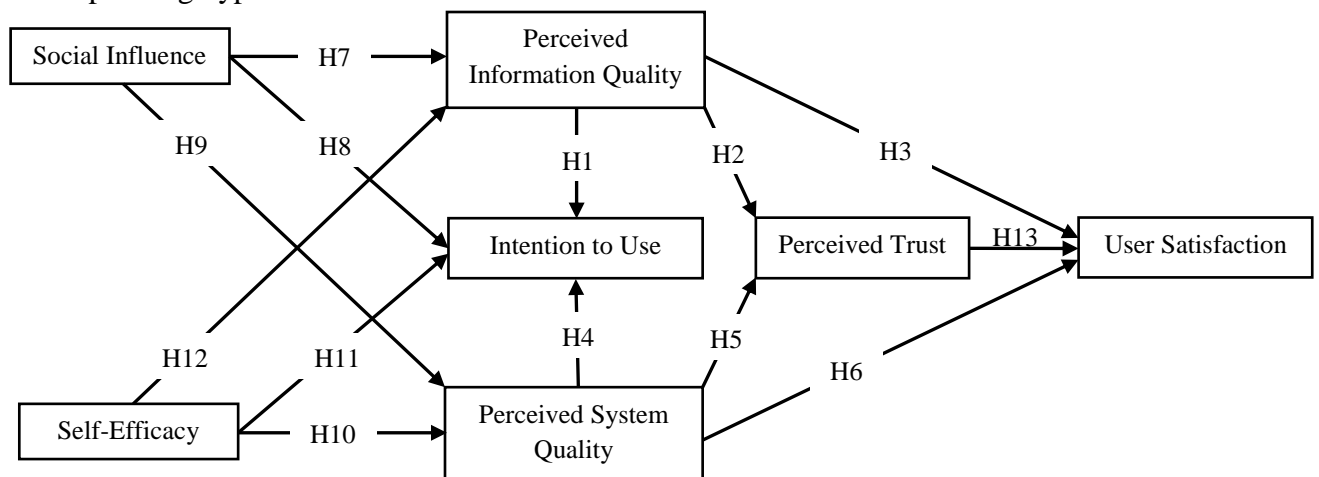

Figure 1: Proposed Research Model

Hypotheses Development

Under the proposed research model, we have formulated 13 hypotheses based on the relationships between seven constructs adopted. A brief summary of the definitions for the constructs used in the proposed research model is presented in Table 1.

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

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).
Trust	Trust is defined as the belief that the trustee (i.e., government) will act cooperatively to fulfil the trustor's (i.e., users of the government websites) expectations without exploiting their vulnerabilities (Pavlou and Fygenson, 2006).
Social Influence	Social influence is defined as the degree to which an individual perceives that important others believe he or she should use the new system (Venkatesh et al., 2013).
Self-Efficacy	Self-efficacy is the judgement of one's ability to use a technology (e.g., computer) to accomplish a particular job or task (Bandura, 1986).

Information Quality

This variable is measured in terms of features related to actual information that is disseminated by information systems and the degree to which it matches with the user's expectations in terms of its accuracy, trustworthiness, significance, comprehensiveness, and succinctness (Bailey and Pearson, 1983; Rai et al., 2002). DeLone and McLean (2003) characterized information quality as relevant, complete, easy to understand, personalized, and secure determinant for assessing e-commerce systems success. DeLone and McLean (2003) IS updated model has hypothesized and supported the link of information quality on intention to use. Moreover, the effects of information quality on intention to use is also strongly supported by the meta-analytic outcomes of DeLone and McLean IS success model, which showed the strong relationship strength of these variables even for the least overall sample size obtained to perform the meta-analysis (Petter and McLean, 2009). It has also been established that the quality of information usually influences the trust (Kim et al., 2011; Lee et al., 2009) and satisfaction (Bharati and Chaudhuri, 2004; Chae and Kim, 2001; Floropoulos et al., 2010; Iavari, 2005; Lee et al., 2009; McGill and Hobbs, 2003; Rai et al., 2002; Seddon, 1997; Seddon and Kiew, 1996; Wang and Liao, 2008; Zhang et al., 2005). Therefore we hypothesize:

H1: *Perceived information quality has a positive and significant impact on the intention to use the OPGRS systems*.

H2: *Perceived information quality has a positive and significant impact on the perceived trust of the OPGRS systems*.

H3: *Perceived information quality has a positive and significant impact on the user's satisfaction of the OPGRS systems*.

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 traits of the information systems itself. The prior empirical findings (Iavari, 2005; 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. Moreover, it has been found to influence trust (Lee and Chung, 2009) significantly as well. The relationship between the perceived site quality and trust has been supported in the web-based information system environment (McKnight et al., 2002). Also, the individual meta-analyses results of DeLone and McLean (2003) IS success model supported and indicated a positive and a highly significant relationship of system quality on intention to use (Petter and McLean, 2009).

H4: *Perceived system quality has a positive and significant impact on the intention to use the OPGRS systems*.

H5: *Perceived system quality has a positive and significant impact on the perceived trust of the OPGRS systems*.

H6: *Perceived system quality has a positive and significant impact on the user's satisfaction of the OPGRS systems*.

Social Influence

This construct brings in the major change in the overall structure in the IS success model. Schaupp et al. (2009) argued that original model did not explicitly include any social variables and subjective norm was important in the website settings because it reflects the possibility of *social influence* on the individual decisions influenced by referent others. We have considered *social influence* as the external variable which consists of the items considered from subjective norm and social factor and truly represents the societal influence on the individual's decision making process. Schaupp et al. (2009) further argued that when others around an individual use a specific website and enjoys benefits it is more likely that an individual will use the website to achieve the similar effects as others when similar needs arise. Influenced from the referent others, we believe that the construct *social influence* will have the similar or even higher impact on the user's enhanced perception toward the information and system qualities of the OPGRS systems. As far as the impact of *social influence* on user's behavioral intention is concerned, it is already established by a number of prior studies (Carter et al., 2011; Schaupp et al., 2010; Venkatesh et al., 2003; Yeow and Loo, 2009). Therefore, we hypothesize:

H7: *Social influence has a positive and significant influence on the perceived information quality of the OPGRS systems.*

H8: *Social influence has a positive and significant influence on the intention to use the OPGRS systems.*

H9: *Social influence has a positive and significant influence on the perceived system quality of the OPGRS systems.*

Self-Efficacy

Self-efficacy deals with an individual's perception of his or her ability to use the system on his or her own (Bandura, 1986). This factor is considered important as it deals with the level of comfort a person has in working with the e-government system (Sahu and Gupta, 2007). Some studies (e.g., Fu et al., 2006; Sahu and Gupta, 2007) on e-government adoption have also acknowledged that it is one such factor which can significantly influence user's intention to use the system. Moreover, we believe that higher computer and Internet-based knowledge and capabilities and enhanced level of comfort on the computer system can help the users to better understand the information and system quality of the OPGRS systems. In the other words, we argue that perception of information and system quality of the system in question would largely depend on individual's computer and Internet-based prior knowledge and capabilities and can be visualized more clearly with elevated self-efficacy. Therefore, we hypothesize:

H10: *Self-efficacy has a positive and significant influence on the perceived system quality of the OPGRS systems*.

H11: *Self-efficacy has a positive and significant influence on the intention to use the OPGRS systems*.

H12: *Self-efficacy has a positive and significant influence on the perceived information quality of the OPGRS systems*.

Perceived Trust

Trust is a set of beliefs that tasks will be accomplished reliably (Sitkin and Roth, 1993). The success of an e-government website is influenced by the citizen's trust in the government

entity. An e-government website is an alternative for the government services provided to the citizens through the offline channels. Therefore, if the government takes an utmost care of its citizens and efficiently performs its services, the citizens would most likely to believe that the electronic services developed by the government will be able to cater their needs (Teo et al., 2008). Lee and Chung (2009) also established that high level of trust in the mobile banking has positively contributed to customer's satisfaction. So, we believe that a high degree of trust in the OPGRS systems can augment citizens' satisfaction. Therefore, we hypothesize:

H13: *Perceived trust has a positive and significant influence on the user's satisfaction on the OPGRS systems.*

A brief summary of hypotheses is presented in Table 2 as follows:

Table 2: A brief summary of hypotheses for the proposed research model

H#	Hypothesis
H1	Information quality has a positive and significant relationship with intention to use
H2	Information quality has a positive and significant relationship with perceived trust
H3	Information quality has a positive and significant relationship with user satisfaction
H4	System quality has a positive and significant relationship with intention to use
H5	System quality has a positive and significant relationship with perceived trust
H6	System quality has a positive and significant relationship with user satisfaction
H7	Social influence has a positive and significant relationship with information quality
H8	Social influence has a positive and significant relationship with intention to use
H9	Social influence has a positive and significant relationship with system quality
H10	Self-efficacy has a positive and significant relationship with system quality
H11	Self-efficacy has a positive and significant relationship with intention to use
H12	Self-efficacy has a positive and significant relationship with information quality
H13	Trust has a positive and significant relationship with user satisfaction

Research Methodology

The sample of the study consists of wide array of respondents from different cities of India including New Delhi, Pune, Mumbai, Bangalore, Patna, Siliguri, and Gangtok. Out of total 1500 questionnaires distributed through one-to-one and group interaction. The respondents were briefed and demonstrated about the functioning of the online public grievance redressal system and in some cases they were given maximum two days of time to complete the questionnaire. However, some of the questionnaires were made to respond on spot. A total of 485 completed survey questionnaires were returned to us. The further scrutiny of questionnaires revealed that 66 of them were partially completed and so rejected from the subsequent analysis. Hence, we were left out with 419 usable responses, which made the basis for our empirical analysis for measuring the success of the OPGRS system. The overall response rate was found to be 32.3% with 27.9% valid questionnaires.

Research Findings

Respondents' Demographic Profile

This section analyses demographic data (in Table 3) obtained from the respondents. As per the questionnaire results, the average respondent's age ranges from 20 to 34, with males accounting for 67.8% of the sample and 32.2% were female. The majority of the population (56.1%) belongs to student community with a fair representation from public- and private-

sector employees (29.3%). As far as the educational qualifications are concerned, 82% of the total population are having a minimum degree of graduation. The computer and Internet literacy and awareness of the respondents can be judged from their very high computer and Internet experience percentage ($\approx$ 96%). This higher frequency is also supported by their computer and Internet access at various places and Internet use frequency, which is very high. Therefore, it is argued that the sample of respondents could be the best-fit potential users and adopters of the systems such as online public grievance redressal system.

Table 3: Demographic characteristics of respondents

Characteristics	Frequency	Percentage (%)
Age		
20-24 Years	228	54.4
25-29 Years	70	16.7
30-34 Years	52	12.4
35-39 Years	27	6.4
40-44 Years	11	2.6
45-49 Years	13	3.1
50-54 Years	7	1.7
55-59 Years	1	0.2
>= 60 Years	10	2.4
Gender		
Male	284	67.8
Female	135	32.2
Education		
Non-Matriculation	7	1.7
Matriculation	13	3.1
10+2/Intermediate	55	13.1
Graduate	161	38.4
Post-Graduate	169	40.3
Post-Graduate Research	14	3.3
Occupation		
Student	235	56.1
Unemployed	18	4.3
Pensioner	7	1.7
Employee-Public Sector	29	6.9
Employee-Private Sector	94	22.4
Self-Employed	36	8.6
Computer Access		
Home	273	46.4
Office	107	18.2
Internet Cafe	83	14.1
College/University	100	17.0
Common Service Centre	12	2.0
No Access	13	2.2
Computer Experience (in Years)		
No Experience	17	4.1
1-3 Years	99	23.6
4-6 Years	98	23.4
7-9 Years	91	21.7
>= 10 Years	114	27.2
Internet Access		
Home	246	42.6
Office	104	18.0
Internet Cafe	109	18.9
College/University	103	17.8
Common Service Centre	10	1.7

No Access	6	1.0
Internet Experience (in Years)		
No Experience	16	3.8
1-3 Years	132	31.5
4-6 Years	122	29.1
7-9 Years	80	19.1
>= 10 Years	69	16.5
Internet Use Frequency		
Never	12	2.9
Very Rarely	21	5.0
Rarely	39	9.3
Occasionally	77	18.4
Very Frequently	137	32.7
Always	133	31.7

Reliability Analysis - Cronbach's Alpha (α)

Reliability analysis was performed using Cronbach's alpha. 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 all the constructs except system quality is in the range 0.645-0.902, which is quite good. A Chronbach alpha (α) of greater than 0.70 is considered to be good (Nunnaly, 1978; Hair et al., 1992). Therefore, alphas imply relatively strong reliability for majority of constructs, but *system quality* which is found at the lower moderate level. This might be due to the fact that only three questions were included in the questionnaire for this construct. However, both *intention to use* and *perceived trust* with only three questions have performed quite satisfactorily. Moreover, the constructs such as *social influence* and *self-efficacy* have shown higher moderate values.

Table 4: Cronbach's alpha (α) of constructs

Constructs	Sample Size	# of Items	Cronbach's Alpha (α)	Reliability Type
Perceived System Quality (SQ)	419	3	0.548	Moderate
Perceived Information Quality (IQ)	419	9	0.902	Excellent
Social Influence (SI)	419	4	0.675	Moderate
Self-Efficacy (SE)	419	3	0.645	Moderate
Intention to Use (IU)	419	3	0.796	High
User Satisfaction (US)	419	4	0.881	High
Perceived Trust (PT)	419	3	0.854	High

Descriptive Statistics

Table 5 presents the mean and standard deviation (S.D.) for all the seven constructs. The high overall mean for most of the constructs, except *perceived trust*, indicate that respondents react favourably to the IS success measures examined.

Table 5: Descriptive statistics of the constructs

Constructs	#	N	Mean	S.D.
Perceived System Quality (SQ)	419	3	5.19	0.97
Perceived Information Quality (IQ)	419	9	5.03	0.99
Social Influence (SI)	419	4	4.75	1.11
Self-Efficacy (SE)	419	3	4.98	1.15
Intention to Use (IU)	419	3	5.59	1.11
User Satisfaction (US)	419	4	5.26	1.23

Perceived Trust (PT)	419	3	4.15	0.95

Hypotheses Testing

Table 6, 7, 8, 9, and 10 present output of linear regression model analysed using SPSS 19.0. The analysis presented in Table 6 supported all the hypotheses (i.e. H1, H4, H8, and H11) on intention to use as positive and significant. The constructs IQ, SQ, SI, and SE explain 24.8% (adjusted R^2) of the variance in respondents' intention to use the OPGRS systems. Since, the overall model is significant (F=35.510, p=0.000), the significance of the independent variable was further examined. All independent variables were found significant with maximum 5% significance level specifically with SE found with 0.1%, IQ and SQ with 1%, and SI with 5% significance level. Therefore, all the four hypotheses H1, H4, H8, and H11 are supported.

Table 6: Effect of information quality, system quality, social influence, and self-efficacy on intention to use

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Result
	B	Std. Error	Beta			
(Constant)	1.413	0.332		4.259	0.000	
IQ	0.186	0.069	0.150**	2.699	0.007	Supported (H1)
SQ	0.232	0.075	0.184**	3.080	0.002	Supported (H4)
SI	0.118	0.054	0.107*	2.175	0.030	Supported (H8)
SE	0.231	0.056	0.216***	4.105	0.000	Supported (H11)
Model R^2	0.255					
Adjusted R^2	0.248					
F	35.510					
Significance	0.000					

[Note: *: p<0.05, **: p<0.01; ***: p<0.001][Dependent Variable: Intention to Use]

Table 7 presents the β-value of independent variables such as IQ, SQ, and PT on US. The analysis exhibits a stronger effect of IQ (β=0.343) and SQ (β=0.239) on US than IU. This indicates that higher the information and system quality, respondents tend to be more satisfied with the system than to intend to use it. That means OPGRS enhances the overall satisfaction of the respondents by providing accurate, reliable, consistent, updated information to name a few in the bureaucratic government system in a country like India. Moreover, higher trust level in the system leads to the better satisfaction level for the respondents with a minimal standard error.

Table 7: Effect of information quality, system quality, and perceived trust on user satisfaction

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Result
	B	Std. Error	Beta			
(Constant)	0.206	0.252		0.816	0.415	
IQ	0.412	0.056	0.343***	7.398	0.000	Supported (H3)
SQ	0.292	0.054	0.239***	5.405	0.000	Supported (H6)
PT	0.273	0.044	0.265***	6.263	0.000	Supported (H13)
Model R^2	0.498					
Adjusted R^2	0.494					
F	137.179					
Significance	0.000					

All the three hypotheses H3, H6, and H13 have been found positive and significant on user satisfaction. The independent constructs (i.e. IQ, SQ, and PT) explains 49.4% (adjusted R^2) of the variance in the respondents' user satisfaction on the system. The overall model was found significant (F=137.098, p=0.000), and the significance of the individual independent variables was further verified. It was found that all three constructs (i.e. IQ, SQ, and PT) were found significant on US with 0.001 significant levels.

Table 8 summarizes the results of the hypotheses testing the dependent variable perceived trust. This model explains 31.9% (Adjusted R^2) of variance of the system OPGRS on respondent's perceived trust. Again, the overall model was found significant (F=98.922, p=0.000) with the individual independent variables IQ and SQ are significant determinants of respondent's perceived trust with a significance level of 0.001. More precisely, the hypotheses H2 and H5 are supported. This time, IQ exhibits stronger effect (β=0.398) on perceived trust than SQ (β=0.233). That indicates, enhanced information quality of the system leads to its improved trust as perceived by the users.

Table 8: Effect of information quality and system quality on perceived trust

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Result
	B	Std. Error	Beta			
(Constant)	1.332	0.276		4.831	0.000	
IQ	0.463	0.058	0.398***	7.945	0.000	Supported (H2)
SQ	0.276	0.059	0.233***	4.659	0.000	Supported (H5)
Model R^2	0.322					
Adjusted R^2	0.319					
F	98.922					
Significance	0.000					

Table 9 summarizes the results of the hypotheses testing the dependent variable perceived information quality. This model explains only 20.9% (Adjusted R^2) of variance of the system OPGRS on respondent's perceived information quality. Again, the overall model was found significant (F=56.163, p=0.000) with the individual independent variables SI and SE are significant determinants of respondent's perceived information quality with a significance level of 0.001. More precisely, the hypotheses H7 and H12 are supported.

Table 9: Effect of social influence and self-efficacy on perceived information quality

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Result
	B	Std. Error	Beta			
(Constant)	2.748	0.226		12.133	0.000	
SI	0.323	0.042	0.365***	7.735	0.000	Supported (H7)
SE	0.151	0.041	0.175***	3.716	0.000	Supported (H12)
Model R^2	0.213					
Adjusted R^2	0.209					
F	56.163					
Significance	0.000					

Table 10 summarizes the outcomes of the hypotheses testing the dependent variable perceived system quality. This model explains only 31.7% (Adjusted R^2) of variance of the system OPGRS on respondent's perceived system quality. Again, the overall model was found significant (F=97.796, p=0.000) with the individual independent variables SI and SE are significant determinants of respondent's perceived system quality with a significance level of 0.001. More precisely, the hypotheses H9 and H10 are supported. The comparison of SI and SE with regard to the perceived information and system quality reveals that where SI more strongly influences perceived information quality, SE does it for perceived system quality.

Table 10: Effect of social influence and self-efficacy on perceived system quality

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Result
	B	Std. Error	Beta			
(Constant)	2.484	0.207		11.991	0.000	
SI	0.135	0.038	0.155***	3.528	0.000	Supported (H9)
SE	0.414	0.037	0.488***	11.138	0.000	Supported (H10)
Model R^2	0.320					
Adjusted R^2	0.317					
F	97.796					
Significance	0.000					

[Note: *: $p<0.05$, **: $p<0.01$; ***: $p<0.001$][Dependent Variable: Perceived System Quality]

Table 11 presents the correlation between all seven pair of constructs. The findings indicated that all variables were positively correlated with one another with a correlation ranging from 0.214 to 0.626. The most important of all were the correlations between IQ and US (0.626), IQ and SQ (0.592), SQ and US (0.566), SI and US (0.560), SE and SQ (0.547), and IQ and PT (0.536). All the variables have positive correlations at the 1% significance level. The relatively high correlations between the IS success constructs were expected and confirm the prior research on the relationships between the IS success variables (Hussein et al., 2007; Rai et al., 2002; Seddon and Kiew, 1996).

Table 11: Correlations and AVE

VAR	IQ	SQ	PT	SE	SI	US	BI
IQ	1.000						
SQ	0.592**	1.000					
SE	0.315**	0.547**	1.000				
SI	0.432**	0.342**	0.384**	1.000			
PT	0.536**	0.468**	0.283**	0.301**	1.000		
US	0.626**	0.566**	0.318**	0.322**	0.560**	1.000	
BI	0.373**	0.427**	0.405**	0.317**	0.214**	0.287**	1.000

[Notes: VAR: Variables, **: Correlation is significance at the 1% level (2-tailed), Diagonal elements (in bold) are the square root of the Average Variance Extracted (AVE), off-diagonal elements are the correlations among constructs]

The hypothesis testing results of linear regression analysis with the coefficient values (i.e. β-value), p-value, and R^2-value are presented along the research model in figure 2.
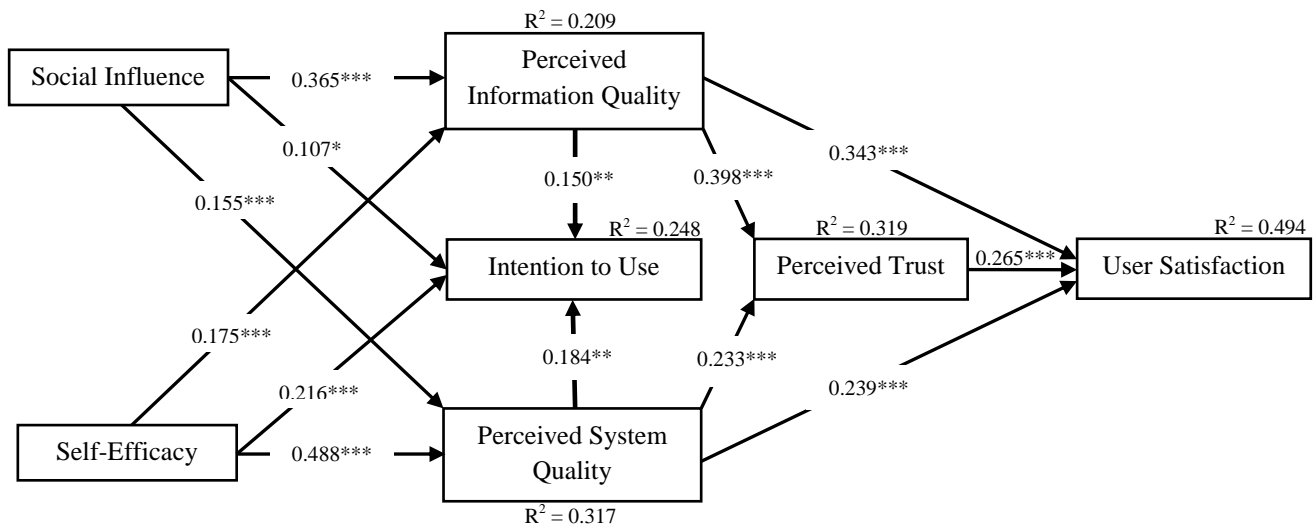
Figure 2: Validated research model to measure intention to use, perceived trust, and user satisfaction

Discussion

We gained substantiation that there are strong links between the seven constructs supporting the hypotheses. The regression coefficient outcomes indicated that *perceived information* and *system quality* are significant positive predictors of *intention to use*, *perceived trust*, and *user satisfaction*. However, their effect on *perceived trust* and *user satisfaction* was found stronger than on *intention to use* the system. Furthermore, *self-efficacy* was seen as a more prominent factor to drive the intention to use the system than *social influence*. Finally, the findings also revealed that SI more strongly influences *perceived information quality* whereas SE does it for *perceived system quality*.

It is evident from the above analysis that perceived information and system quality are nicely balanced in determining the promising success measures of the OPGRS systems. At one hand where the perceived information quality overweighs the perceived system quality in establishing promising trust and satisfaction among the respondents, on the other hand, this is the perceived system quality that determines their intention to use the system more strongly. This might be due to the fact that users are although computer literate but not much acquainted with the system in question and so the information quality such as preciseness, completeness, accuracy, consistency, and format of information can impress them more than precisely its flexibility, response time, currency, or even the language used for the system. This outcome is in line with the results of Lee and Chung (2009) where the authors measured the effect of information and system quality of the mobile banking customers on their trust and satisfaction factors. However, Iivari (2005) found the larger impact of system quality of a mandatory IS on trust and satisfaction than its corresponding information quality. The study reveals that data were collected from the respondents after half a year of experience with the system (Iivari, 2005). Based on these arguments, we also believe that as the data collected for the systems from the potential adopters of the OPGRS systems, information quality could be the better determinant of the success factors (i.e., trust and satisfaction) of the system than its system quality even though both the predictors were found positive and significant.

Another point of interest in this study is how the *social influence* and the *self-efficacy* affects the perceived information and system quality of the OPGRS systems. The analysis indicates

that *social influence* determines the perceived information quality more strongly than the perceived system quality. This might be due to the fact that influenced by the referent others the potential adopters are more concerned about the accuracy, consistency, and preciseness of the information rather than the whole system. On the contrary, *self-efficacy* seems to determine the perceived system quality more strongly than the perceived information quality. As it has been argued that *self-efficacy* indicates the degree of ease with which the e-government system is dealt with (Sahu and Gupta, 2007), it seems that higher the *self-efficacy*, easier is the overall perception about the system quality than merely the information quality. Similar is the influence for *self-efficacy* determining the intention to use the system than being impacted by *social influence*, though both were found significant. Carter et al. (2011) obtained a similar proportion of β-values of *social influence* and *self-efficacy* on intention to use the online tax filing system for the US tax-payers. It was seen that user's belief about what they can do with their technical abilities could significant influence their intention to use the system.

Finally, the constructs system and information quality significantly determines the intention to use the system. This is due to the simple reason that the overview of the flexibility, conciseness, ease of use, faster response time, user-friendly interface, accuracy, completeness, currency, and significance of the system can make it a suitable candidate for being intended to use. This strong empirical evidence is also supported by many studies (e.g., Lin, 2007; Teo et al., 2008; Wixom and Todd, 2005). Moreover, it was also sensed that there are strong correlations between the seven constructs. We gained support that there are quite acceptable levels of correlations between the seven success constructs, supporting the hypothesized relationships. The similar strong correlations have also been shown by the prior studies (e.g., Floropoulos et al., 2010; Roca et al., 2006; Teo et al., 2008) on IS success models.

Conclusions

This research is a response to a call for the continuous challenge and validation of IS success models in different contexts (DeLone and McLean, 2003, Rai et al., 2002). The purpose of this study is to examine the success of OPGRS through an e-government oriented IS success model, which is developed considering the DeLone and McLean's (2003) IS success model as a base model. Therefore, we have integrated the external constructs such as social influence, self-efficacy, and perceived trust that hold a considerable significance as far as the success of the OPGRS systems is concerned. All the 13 hypotheses performed significantly as per the expectations of the IS success models.

Therefore, it is quite evident from the empirical findings that the implementation of OPGRS seems to be quite successful even though it is relatively a newer system. However, it was sensed that the government should take more initiatives to enhance the overall system quality of the OPGRS systems to optimize the levels of system's trust and satisfaction as perceived by the users. This is due to the fact that this is system's perceived trust and satisfaction that can ensure its success in the long run. Moreover, there should be an emphasis to highlight the

prevalence of the system as a whole to make more users aware, prompted, and inclined to use the system in the future.

Limitations and Future Research Directions

Even though the thorough process has allowed us to develop and validate the e-government based system success model, this study has a number of limitations that can be taken care of in the future research. Firstly, the exploration of IS system success model in context of e-government system is relatively new to the e-government researchers. Therefore, the caution needs to be taken while generalizing its findings to the other categories of users (i.e. in G2B and G2G contexts) as well as applying this model in other developing country even in G2C context. Secondly, this model does not measure the concerns of net benefits as defined in the IS success model (DeLone and McLean, 2003; Seddon, 1997). Hence, measuring net benefits from the citizen's points of view can reveal some more facts about the system. However, future researchers need clearly and carefully define the stakeholders and situations under which the net benefits are to be examined (DeLone and McLean, 2003). Finally, this study has performed empirical investigation of e-government systems success based on the snapshot view of the sample. The longitudinal view of sample data would allow the researchers to better explore the facts about the actual use of the system and it's after effect.

Theoretical Contribution and Managerial Implications

The first contribution of this research is that this system is tested for the first time for its success measure. Secondly, we have integrated DeLone and McLean's (2003) IS success models along with some constructs such as social influence, self-efficacy, and perceived trust that are seen more useful in the context of any e-government system. As far as the empirical validation of any IS systems in general and e-government systems in particular is concerned, such combination of constructs were never examined along the DeLone and McLean's (1992, 2003) IS success model before. The empirical testing outcomes of the hypotheses linked to this model can help government and practitioners toward a better understanding of citizen's trust, satisfaction, and intention to use the system. The results will allow the e-government practitioners to realize about the factors to give more attention toward increasing the citizen's trust, satisfaction and intention to use the system. The current links of perceived information quality as well as perceived system quality with intention to use the system is although significant, it is not strong. The system designer should pay adequate interest toward enhancing the standard of information and system quality of the OPGRS systems to make sure greater users' intention toward using it.

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