

Analysing E-Governance Adoption in The Digital Era: A Study

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Abstract:

In the awakening of the digital revolution, governments worldwide have increasingly leveraged digital technologies to enhance service delivery through e-governance initiatives. This research endeavors to delve into the multifaceted implications of digital transformation on the adoption of e-governance services. By employing a comprehensive analysis framework encompassing technological and socio-economic dimensions, this study aims to detect the influencing factors on the adoption of e-governance services amidst digital transformation, such as effort expectancy, facilitating conditions, performance expectancy, social influence, and trust. Drawing upon a blend of quantitative methodology using a structured survey instrument, data from 80 samples were collected from citizens across the Goa, India to analyze the relationship between these factors and the adoption of e-governance services. Statistical techniques SPSS and PLS-SEM using smart PLS were employed to analyze the data. This study offers intuitions for policymakers, practitioners, and stakeholders to navigate the complexities of e-governance adoption in an increasingly digitalized world.

Keywords: Adoption, Digital Transformation, Digital Revolution, E-Governance Services, and Technology.

Introduction:

The digital Revolution undeniably influences industrial, economic, and governance paradigms. The digitalization of governance in the digital age reshapes the dynamics between government and citizens. E-governance emerges as the prevailing term to encapsulate this digital transformation. Information and Communication Technologies (ICT) lies at the nucleus of this transformative shift across all societal sectors; gradual adaptation occurs, including within

governments, governance structures, and public administrations. Prefacing with an "e-" has become the customary approach to encapsulate such transformations encompassing digitization (Dunleavy, P. 2005). E-governance is the prevailing term for denoting this digital transformation. The driving forces behind the development of e-governance encompass both pulling and pushing factors. (Moon, Welch, & Wong, 2005).

In this context, e-governance emerges as a comprehensive concept that

summarizes the relationship among citizens, government, and public and private actors, notably within digitalization and novelty in the public sector (Rahman et al.; A. E., 2016). Digital transformation in e-governance has a specific impact on factors influencing citizens' adoption of services. The digital revolution has meaningfully changed how governments interact with citizens and deliver public services. E-governance initiatives have emerged to leverage digital technologies to enhance governance processes. However, the successful adoption of e-governance

services depends on various factors, including citizens' perceptions of Effort Expectancy, Facilitating Conditions, Performance Expectancy, Social Influence, and Trust. This paper aims to quantitatively assess the impact of these determinants on adopting e-governance services amidst the digital transformation.

Literature Review

Earlier studies on e-governance adoption have mainly used models and adoption theories, as illustrated in Table 1.

Table 1

Sr. No.	Model/Theory	Factors used	Sources
1.	Technology Acceptance Model (TAM)	Perceived ease of use and Perceived usefulness,	Davis et al. (1989), Devis (1989).
2.	Extended Technology Acceptance Model (TAM2)	Image Perceived usefulness Perceived ease of use Job relevance Result demonstrability Subjective norm	Venkatesh and Davis (2000), Moore and Benbasat (1991), Rogers (1995), Davis et al. (1989), Devis (1989), Fishbein and Ajzen (1975).
3.	Theory of Planned Behavior (TPB)	Subjective Norm, Attitude, Perceived behavioral control	Fishbein and Ajzen (1975) Ajzen (1991)
4.	Diffusion of Innovation (DOI)	Compatibility, Relative advantage, Complexity, Trialability.	Moore and Benbasat (1991),Rogers (1995)
5.	Theory of Reasoned Action (TRA)	Attitude, Subjective Norm.	Fishbein and Ajzen (1975)
6.	Unified Theory of Acceptance and Use of Technology (UTAUT)	Effort Expectancy, Facilitating Conditions, Performance Expectancy, Social Influence.	Venkatesh et al. (2003) Venkatesh et al. (2003).

From the existing literature, all the models /theories have been used to examine the e-governance adoption. Moreover, only a few studies, such as (Carter & Schaupp, 2009; Yeow & Loo, 2009; Schaupp et al., 2010), have validated the UTAUT model in the e-governance area. Though earlier studies have used specific constructs, the proposed model was formulated by selecting the most suitable measures from the UTAUT measures originally introduced by Venkatesh et al. in 2003. These have been utilized in prior research and were adapted to incorporate trust as a variable in the current study.

Hypothesis Formulation

Effort Expectancy-Adoption

Effort Expectancy (EE) is the simplicity of using a system (Davis et al., 1989). It is an individual’s comfort level in adopting technology, and the perceived ease of use of e-governance platforms has been found to influence adoption behavior (Venkatesh et al.,2003). This concept encompasses user-friendliness and complexity (Venkatesh et al., 2012). Thus, the hypothesis is proposed as:

H1: Effort Expectancy has a significant effect on the adoption of e-governance services.

Facilitating Conditions-Adoption

Facilitating Conditions (FC) is the degree to which an individual perceives the availability of technical and organizational infrastructure to support the utilization of a system (Venkatesh et al., 2003). Additionally, the association between facilitating conditions and behavioral intention in e-governance adoption studies has been examined across a number of

studies (e.g., Carter et al., 2012; Schaupp et al., 2010), revealing a significant influence on an individual's intention to engage with a system. Thus, the hypothesis is proposed as:

H2: Facilitating Conditions has a significant effect on the adoption of e-governance services.

Performance Expectancy-Adoption

Performance expectancy (PE) is the degree to which an individual believes that using the system will assist in accomplishing improvements in job performance (Venkatesh et al., 2003). It is an individual's perception of how much a system would enhance work efficiency (Venkatesh et al., 2012). Several studies have shown that performance expectancy significantly influences adopting e-governance services (Lallmahomed et al., 2017). Hence, the hypothesis proposed is:

H3: Performance Expectancy has a significant effect on the adoption of e-governance services.

Social Influence-Adoption

Social influence (SI) is the degree to which an individual perceives that he or she should use a system (Venkatesh et al., 2003). It encompassing the outcome of peers, family, and community on adoption behavior, has been acknowledged as a key determinant (Venkatesh et al., 2003). Chiu et al. 2012 identified that it was a significant element of users' attitudes across varied levels of internet experience and different age groups. Thus, the hypothesis proposed is:

H4: Social Influence has significant effect on the adoption of e-governance services.

Trust-Adoption

Trust, representing citizens' confidence in the reliability and security of e-governance systems which plays a crucial part in shaping adoption decisions (Rana et al., 2019). Thus, the hypothesis proposed is:

H5: Trust has a significant effect on the adoption of e-governance services

Research Methodology

The study used a quantitative research design, utilizing a structured questionnaire comprised of six constructs with 36 items, as indicated in Table 2. As stated, the measurements for the constructs were adapted from scales that have already validated and then modified for present study. A 7-point Likert scale is used to capture respondents' perceptions towards each factor, with 1 denoting 'strongly disagree' and 7 denoting 'strongly agree.'

The study focuses on items to measure Effort Expectancy, Facilitating Conditions, Performance Expectancy, Social Influence, Trust, and the adoption of e-governance services. Data were collected from 80 participants across the Goa, India. The data are analyzed using statistical techniques such as SPSS.26 and SEM-PLS using smart PLS.4 to assess the relationship between these factors and e-governance adoption.

Proposed Research Model

The study employs the research methodology recommended by Y.K. Dwivedi et al. 2017 to examine and validate the association between dependent and independent variables. Figure 1 presents the proposed associations between the constructs of the model.

Figure 1 Proposed Research Model

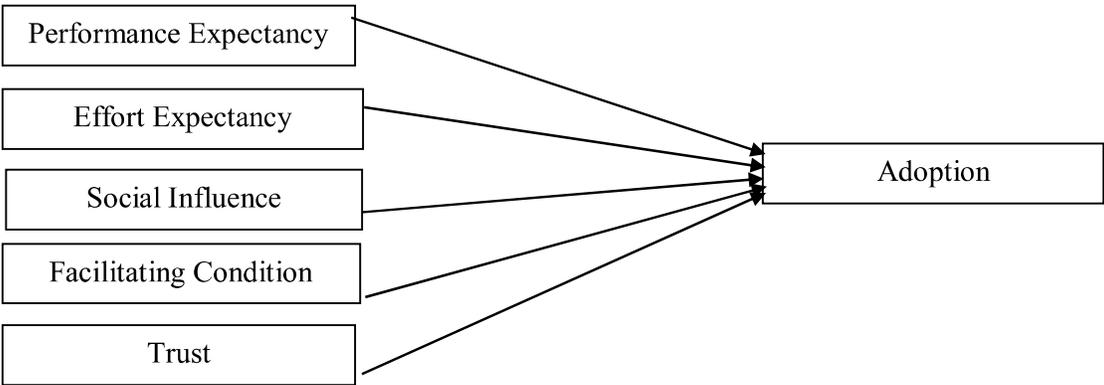


Table 2 Measurement Items

Constructs	Code	Items	Source
Performance Expectancy (PE)	PE 1	1. E-governance services allows me to accomplish tasks more quickly.	Venkatesh, Thong, & Xu. (2012). Rana, N.P., Dwivedi, Y.K., Williams, M.D. and Weerakkody, V. (2016),
	PE2	2.E-governance services help me to avoid existing bureaucracy.	
	PE3	3.E-governance services provide better citizen' satisfaction by integrating various government agencies' systems.	
	PE4	4.Using e-governance services increases my efficiency towards job.	
	PE5	5.I find e-governance services useful in daily life.	
Effort Expectancy (EE)	EE1	1.My interaction with e-governance services is clear and understandable.	Venkatesh, Thong, & Xu. (2012).
	EE2	2. I find e-governance services are easy to use.	
	EE3	3. It became skilful at using e-governance services	
	EE4	4.Learning to operate e-governance services is easy for me.	
	EE5	5. It reduces effort, cost, and time for availing services.	
Facilitating Conditions (FC)	FC1	1. E-governance website is efficient for availing e-governance services.	Venkatesh, Thong, & Xu. (2012).
	FC2	2. Instruction manuals on how to use e-governance website and its services are available.	
	FC3	3.Government departments promotes the use of e-governance services among the public.	
	FC4	4.It reduces the need for personal visits.	
	FC5	5.The facilitating centers such as banks, government organizations and common service centers are useful availing e-gov. service	
Social Influence (SI)	SI1	1.Individuals who are vital to me think I should use e-governance services.	Venkatesh, Thong, & Xu. (2012).
	SI2	2.Individuals started using e-governance service website for availing most of the e-governance services.	
	SI3	3.Individuals whose opinions I value would prefer me to use e-governance services.	
	SI4	4. Individuals who I value in my society influence me to use e-governance services.	
	SI5	5. Suggestions from other people influence me to use e-governance services.	
	SI6	6. Individuals who influence me think that I should use e-governance services.	
	T1	1. The website is more trustworthy than physical government offices in providing services.	Collier and Bienstock
	T2	2. The government takes complete responsibility	

Trust(T)		for any insecurity during interaction/transaction at the website.	(2006), Kim (2010), Shareef et al. (2009), Shareef et al. (2011)
	T3	3. The legal and technological policies of the site adequately protect me from problems I faced while availing the services	
	T4	4. The Government can be reliable in carrying out online transactions faithfully.	
	T5	5. I trust our government to keep my best interests in mind.	
	T6	6. Own data provided for confirmation is used only for its purposes.	
Adoption	AD1	1. I would use the e-governance service website for any information related to e-governance services in future.	Venkatesh, Thong, & Xu. (2012). Sharma, S. K. (2015).
	AD2	2. I would use the e-governance service website to avail all the e-governance services.	
	AD3	3. I would use the e-governance service website to interact with the government officials.	
	AD4	4. I would use the e-governance service website to register my complaints/grievances.	

Table 3. Demographic Profile

Sr. No.	Demographic	Variables	Frequency	Percentage	Cumulative Percentage
1	Location	Municipal	49	61.3	61.3
		Panchayat	31	38.8	100.0
		Total	80	100.0	
2	Age	15-30 years	15	18.8	18.8
		31-45 years	27	33.8	52.5
		46-60 years	33	41.3	93.8
		Above 61 years	5	6.3	100.0
		Total	80	100.0	
3	Gender	Male	36	45	45
		Female	44	55	100
		Other	Nil	--	--
		Total	80	100	
4	Educational Qualification	Upto Higher Secondary	5	6.3	21.3
		Graduate	32	40	50.0
		Post Graduate	21	26.3	72.5
		Professional	22	27.5	100.0
		Total	80	100	
5.	Annual Family Income	Upto Rs 500,000	8	10	10
		Rs.500,001 - 10,00,000	19	23.8	33.8
		Rs.10,00,001- 15,00,000	32	40	73.8
		Above Rs.15,00,000	21	26.3	100.0

Table 3 reveals an analysis of the demographic profile, indicating location distribution, with 61.3% in municipal area and 38.8% in panchayat. with respect to gender distribution, 45% of the respondents are male as against this 55% were female. Additionally, most respondents fell within the age group of 41-60 years. Having 41.3%. in terms of educational qualification, professional constituted the largest group (27.5%), followed by post graduate (26.3%). In the case of annual family income, the respondents rate ranges from bracket up to Rs. 500,000 (10%) to Rs. 10,00,001 to 15,00,000 (40%).

Data Analysis and Results

Using SPSS 26.0, data analysis was performed, and the data were successfully validated for normality where the values of skewness and kurtosis were found within limits, and hence the dataset was established to be normally distributed. Furthermore, data were imported in SEM smart PLS.4 for validation of common

method bias(CMB) and multicollinearity. The dataset explained 26.07% of the variance using Herman’s single-factor test for measuring common method bias. Since the value is below 50%, the dataset was confirmed to be absence of CMB. The constructs' variance inflation factor(VIF) was between 1 and 3, indicating that the data lacks multicollinearity (Hair et al., 2019).

Internal Consistency Reliability

Table 4 indicates the internal consistency reliability of factors included in the measurement scale, which is examined with the support of Cronbach alpha. The recommended value of the Cronbach alpha for all the selected factors in the scale should be greater than 0.7 (Hair et al 2019).

Table 4 Internal Consistency Reliability

Constructs	Cronbach’s Alpha
Adoption	0.894
Effort Expectancy	0.903
Facilitating Conditions	0.892
Performance Expectancy	0.871
Social Influence	0.913
Trust	0.879

The internal consistency reliability is estimated factor wise and indicates the correlation among the items measuring the factor. The Cronbach alpha of the included factors in the scale are reported in the table:4. It is concluded that the responses received against the factors influencing the e-Governance services included in the measurement scale satisfied the criteria of internal consistency reliability.

Measurement Model

The measurement model examines two distinct forms of construct validation, namely convergent validity and discriminant validity.

The convergent validity is tested using the three criteria namely construct loadings, composite reliability and average variance extracted (AVE) estimates. The convergent validity is said to be satisfied if the construct loadings of the items and composite reliability should be greater than 0.7 and AVE should be 0.5 (Hair et al 2019). The measurement scale analysed the results depicted in table 5, which shows that the factor loadings, and the composite reliability values are more than 0.70 and the AVE values are within the threshold limit of 0.50.

TABLE 5 CONVERGENT VALIDITY

Constructs	Items	Factor Loadings	Composite Reliability (CR)	Average Variance Extracted (AVE)
Adoption (AD)	AD 1	0.866	0.894	0.679
	AD 2	0.887		
	AD 3	0.909		
	AD 4	0.839		
Effort Expectancy (EE)	EE1	0.795	0.902	0.651
	EE 2	0.930		
	EE3	0.935		
	EE4	0.927		
	EE5	0.765		
Facilitating Conditions(FC)	FC1	0.877	0.89	0.621
	FC 2	0.839		
	FC 3	0.826		
	FC4	0.721		
	FC5	0.506		
Performance Expectancy (PE)	PE1	0.629	0.873	0.583
	PE2	0.913		
	PE3	0.941		
	PE4	0.92		
	PE5	0.926		
Social Influence (SI)	SI	0.699	0.911	0.633
	SI2	0.839		
	SI3	0.79		
	SI4	0.825		
	SI5	0.813		
	SI6	0.651		
Trust (T)	T1	0.647	0.884	0.57
	T2	0.771		
	T3	0.82		
	T4	0.852		
	T5	0.848		
	T6	0.870		

The discriminant validity is examined with the help of two different criteria, namely Heterotrait- Monotrait (HTMT) ratio and Fornell Larcker criteria. The HTMT ratio is estimated for each pair of factors and indicates the ratio of the correlation between items of different constructs to the correlation between the items of the same

constructs. The HTMT ratio for each pair of constructs is likely to be less than 0.85 (Kline,2011) or it can vary up to 0.90 (Gold et al., 2001). As shown in table 5, in order to ensure the discriminant validity, the recorded values lie within the provided threshold of 0.85. Meanwhile, the Fornell larker criteria compare the AVE square root

of each factor included in the scale to its correlation with remaining constructs. It is expected that the square root of the AVE of each factor must be bigger than its correlation with the remaining factors in the measurement model. Table 6 indicates that

the AVE square root values are more significant when reading diagonally than the correlation of the constructs. Consequently, the requirements of the measurement model have been satisfied (Fornell & Larcker, 1981).

Table 6 Discriminant Validity: Heterotrait- Monotrait (HTMT) Ratio

	Adoption	Effort expectancy	Facilitating condition	Performance expectancy	Social influence
Effort expectancy	0.633				
Facilitating condition	0.586	0.416			
Performance expectancy	0.698	0.562	0.603		
Social influence	0.664	0.424	0.344	0.586	
Trust	0.653	0.449	0.291	0.573	0.752

Table 7 Discriminant Validity: Fornell Larcker Criterion

	Adoption	Effort expectancy	Facilitating condition	Performance expectancy	Social influence	Trust
Adoption	0.824					
Effort Expectancy	0.638	0.807				
facilitating Conditions	0.591	0.418	0.788			
Performance Expectancy	0.697	0.56	0.605	0.761		
Social Influence	0.669	0.801	0.345	0.585	0.796	
Trust	0.651	0.456	0.285	0.751	0.751	0.755

Structural Model

The structural model involves analysing the coefficient of determination (R^2) and path coefficient results of structural model which is considered to the most significant

criteria for the model’s validation. The R^2 is the total variance that which the change in the dependent variable brought on by the independent variable. In the present study the R^2 percentage is 77 percent.

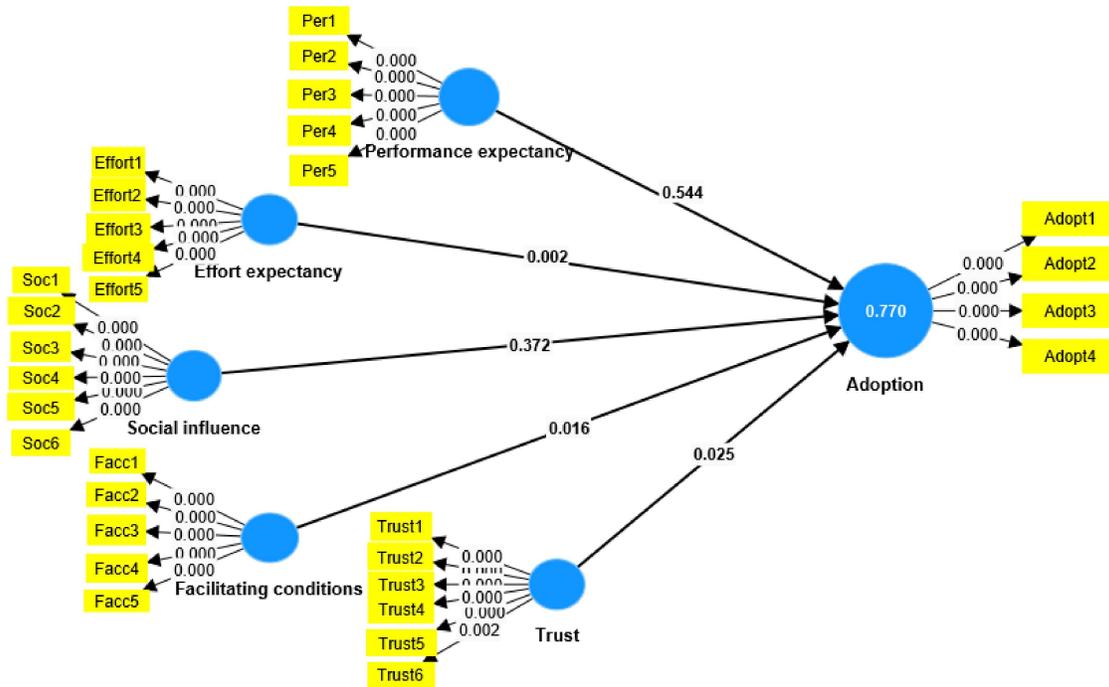


Table 8 Hypotheses Testing

	Path Coefficient	Standard deviation (STDEV)	T statistics	P values	2.5%	97.5%
Effort Expectancy -> Adoption	0.339	0.109	3.094	0.002	0.116	0.546
Facilitating conditions -> Adoption	0.253	0.105	2.400	0.016	0.043	0.456
Performance expectancy -> Adoption	0.061	0.1	0.606	0.544	-0.144	0.252
Social influence -> Adoption	0.089	0.1	0.894	0.372	-0.113	0.279
Trust -> Adoption	0.239	0.107	2.242	0.025	0.02	0.44

Results

The findings of the SEM analysis supported the hypothesis that H1: *Effort Expectancy significantly influences the Adoption of e-governance services*” (path coefficient=0.339, t stats=3.094), H2 *Facilitating Conditions significantly influences the Adoption of e-governance services*” (path coefficient=0.253, t stats=2.400), H5: *Trust significantly*

influences the Adoption of e-governance services” (path coefficient=0.239, t stats=2.242), The path coefficient indicating the impact of effort expectancy on the adoption of e-governance services is found positive and statistically significant, thereby indicating the significant positive influence of effort expectancy on adoption of e-governance services. Whereas, H3:

Performance Expectancy has no significant impact on the Adoption of e-governance services (path coefficient=0.061, t stats=0.606) as well as H4: Social Influence has no significant impact on the Adoption of e-governance services (path coefficient=0.061, t stats=0.606).

Discussion

Preliminary analysis (Measurement model) reveals significant correlations between Effort Expectancy, Facilitating Conditions, Performance Expectancy, Social Influence, and Trust, with the adoption of e-governance services. Regression analysis (Structural model) demonstrates that these determinants collectively explain the proportion of the variance in e-governance adoption. Specifically, Effort Expectancy, Facilitating Conditions and Trust emerge as the most influential factors, whereas, Performance Expectancy and Social Influence does not have significant impact on adoption of e-governance services. These findings underscore the importance of addressing these determinants to promote the adoption of e-governance services. By improving Effort Expectancy, Performance Expectancy, Trust, Social Influence, and Facilitating Conditions, governments can foster the adoption of e-governance services and realize the transformative potential of the digital revolution in governance.

Conclusion

This study quantitatively assesses the impact of Effort Expectancy, Facilitating Conditions, Performance Expectancy, Social Influence and Trust on the adoption of e-governance services amidst the digital transformation. By elucidating the relationship between these factors and e-governance adoption, this research

contributes to the factors shaping citizen engagement with digital governance platforms. The outcomes provide valuable visions for policymakers and practitioners to inform evidence-based strategies for promoting e-governance adoption and enhancing governance outcomes in the digital age.

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