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Digitalization and Good Governance: A Citizen-Based Study of the Surat Municipal Corporation

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Abstract

The proposed study investigates the strained citizen-level evidence of the relationship between digital service quality and the governance outcomes in municipal governments in the developing countries. Considering the example of the Surat Municipal Corporation, digitalization can be considered as system usability and technical reliability with information openness and its impacts are evaluated on good governance-accountability, participation, efficiency and effectiveness and rule of law-and on citizen satisfaction. The research uses factor analysis and mediation and moderation test by using survey data of 232 customers utilizing online municipal services. The findings indicate that good governance ($\beta = 0.337$, $p < .001$) and citizen satisfaction ($\beta = 0.235$, $p < .001$) are most likely predicted with the digital service quality. When a mediator (good governance) is added, the direct impact on the level of satisfaction no longer remains significant ($p = .164$), whereas the impact of the mediator ($B = 0.631$, 95% CI 0.422, 0.853) is significant, thus the complete mediation. There is no significant moderation in digital skills or digital access to these relationships. The results indicate that digital reforms enhance citizen satisfaction by enhancing the better performance of governance but rather independently.

Keywords: Digitalization, Good Governance, Citizen Satisfaction, Municipal Governance, Digital Skills and Digital Access

1. Introduction

It is a well-known fact that digital technologies can be used as effective means of enhancing governance in urban local bodies due to increased transparency, traceability and responsiveness in administrative processes. E-government and public administration studies indicate that properly designed online systems will decrease transaction costs, paperwork, and enhance information flow between citizens and government, which consequently enhance trust, accountability, and service satisfaction (Parasuraman et al.,

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2005; Welch et al., 2005). Policy frameworks also highlight that these benefits are most evident in the local government where the citizens experience the state directly in the form of regular services but not national programs (Organisation for Economic Co-operation and Development, 2014). Governance wise, the principles expressed by the United Nations Economic and Social Commission of Asia and the Pacific (2009) accountability, participation, efficiency and effectiveness, and rule of law are quantifiable parameters of measuring whether digital reforms have indeed enhanced the way in which the institutions of the state operate. There is, however, empirical evidence at the municipal level that is sparse, that connects particular aspects of digital service quality with these tangible governance outcomes in the cities of the developing countries, specifically through citizen-level data.

This is specifically applicable to the Surat Municipal Corporation (SMC), in which numerous civic operations such as payment of property tax, issuance of birth and death certificates, grievance redressal, permits, and other service request attendance are being provided through online portals and digital platforms. In this operation environment, principles of governance are visible in terms of day to day service experiences and not on abstract norms. Accountability is demonstrated where they have some means of registering complaints, status of application and being provided with documented response to such complaints which forms a traceability of administrative action. The engagement is expressed through application of digital grievance systems and feedback mechanisms through which citizens are able to share their needs and affect municipal decisions. There is efficiency and effectiveness in terms of reduced processing time, physical visits made and faster service delivery. The rule of law is encouraged as the standardized processes, the existence of eligibility regulations, and the uniformity of enforcement are integrated within the digital workflows and paperwork. The previous research demonstrates that such service features are credible and user-friendly which correlates with increased satisfaction and more trust in the performance of the government (Carter and Bélanger, 2005; Welch et al., 2005; Grimmelikhuijsen and Welch, 2012), thus revealing that citizen satisfaction is not independent of the government but a pragmatic consequence of good governance principles being practiced (Virtual Civic Center, n.d).

At the Surat Municipal Corporation, digitalization has been applied to the main principles of governance by creating a Virtual Civic Centre portal and the Citizen connect mobile app where all the property taxes, certificates, utility bills, and grievance redressal are accessible online. The platforms provide time-stamped electronic documentation of requests and responses, improving accountability by making it traceable on the administration actions; allowing citizens participation by allowing them to submit complaints and feedback remotely; and improving efficiency and effectiveness by decreasing paperwork, transaction costs,

and processing time. Integrating standardized practices and eligibility requirements into digital workflows is another element that would facilitate the rule of law in that administering services will be uniform and non-discretionary. These attributes of service quality have been mostly linked to increased trust, satisfaction, and repeat use of e-government systems which demonstrates that digital municipal services transform the principles of governance into improvements in the experience of the citizen (Carter and Bélanger, 2005; Bertot, Jaeger, and Grimes, 2010; Dawes, Vidiasova and Parkhimovich, 2019),.

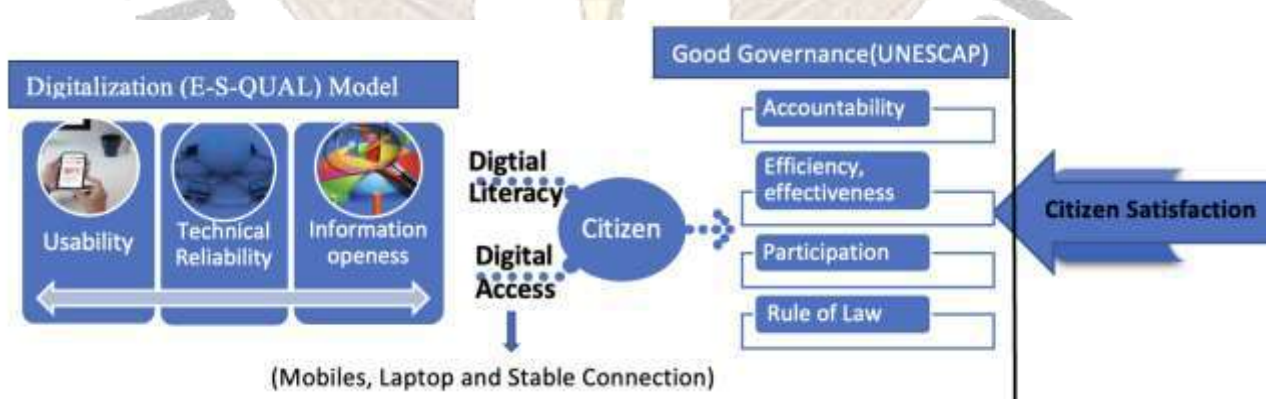
This empirical gap is bridged in this study by examining whether and how quality of digital public service impacts performance of governance and satisfaction of the citizens in SMC. The E-S-QUAL dimensions of the system usability and technical reliability and information openness are taken as the independent variable of digitalization (Parasuraman et al., 2005). Measures of good governance include the citizen perceptions of accountability, participation, efficiency and effectiveness, and the rule of law, whereas citizen satisfaction is also analysed as one of the end results that indicate a cumulative outcome of the governance improvements. Citizen digital skill and digital access are used as a moderation variable that can precondition the intensity of these associations. Based on a designed survey of users of the municipal services, and through the statistical analysis of the outcomes, the research presents the empirical and citizen-driven evidence of whether the enhancement of the quality of digital services has any quantifiable outcomes in terms of governance and satisfaction in the day-to-day urban administration.

2. Literature Review

Digital technologies are becoming more widely regarded as tools of enhancing the performance of governance by increasing the quality of the offered services, transparency, and interaction with citizens in the government. The digital service performance measurement is usually based on the E-S-QUAL model, which operationalizes the electronic services in relation to system usability, reliability/fulfilment, and information quality and is the most popular tool to measure the quality of online services (Parasuraman et al., 2005). Recent empirical research indicates that these service-level attributes are positively related to trust, satisfaction levels and follow-up use of government platforms (Carter & Bélanger, 2005; Welch, Hinnant, & Moon, 2005), and more recent studies on municipal and local-government service delivery indicate that dependable and user-friendly digital services are positively correlated with enhanced perceptions of service delivery and citizen trust (Criado and Gil-Garcia, 2019; Gil-Garcia, Dawes, and Pardo 2018). In addition to personal attitudes, online platforms are said to transform the nature of governance making it more transparent, accountable, and participative where information is easily available and administration is traceable (Bannister and Connolly, 2012; Meijer, Curtin and Hillebrandt, 2012). Other

experimental and survey results also suggest that perceived governmental worthiness and legitimacy are enhanced by disclosure made online and transparency (Grimmelikhuijsen and Welch, 2012). Included in the governance principles of United Nations Economic and Social Commission for Asia and the Pacific of accountability, participation, efficiency and effectiveness, and rule of law, as articulated by the organization, serve as operational principles upon which it can be determined whether the administrative reforms are translated into better institutional performance and that such impacts are most apparent at the local government, which is the level at which people directly experience routine public services. In spite of these theoretical and empirical developments, municipal research rarely provides discrete dimensions of digital service quality to act as predictors of particular governance outcomes based on data at the citizen level, and instead bases such predictions based on aggregate measures of satisfaction or administrative indicators. Besides, the research on digital inequality also indicates that unequal digital skills and access systematically mediate the advantages of adopting e-governments and moderate the effectiveness with which individuals can follow online services and can have better trust and service outcomes (van Dijk, 2020; Helsper, 2021). As a result, there is an evident demand on the citizen-level empirical tests which will interrelate the dimensions of service quality to quantifiable governance results in particular urban governments like Surat Municipal Corporation. Adding to the reviewed research, there is an anticipation that high quality digital public services can enhance governance process by increasing transparency, accountability participation and efficiency of service which will increase citizen satisfaction. At the same time, variances in citizens' digital skills and access may determine how well they can take advantage of online services.

Figure 1 **Proposed Conceptual Model**



Based on my conceptual model Digitalization which has three dimension (Usability, Technical Reliability and information openness) is my composite single independent variable and I study its effect on good governance (specifically above 4 dimensions) a dependent variable and citizen satisfaction as a second

dependent variable which comes after the first dependent variable and it is the last outcome. Citizen digital literacy and digital access are two moderators to study do they moderate the effect of digitalization on that dependent variable or not. Consequently, good governance also plays role of mediator between digitalization and citizen satisfaction.

Thus, the following hypotheses are formulated:

H1: Digital service quality (online services) positively influences good governance dimension namely (accountability, participation, efficiency & effectiveness and rule of law).

H2: Digital service quality positively influences citizen satisfaction.

H3: Good governance mediates the relationship between digitalization and citizen satisfaction.

H4: Citizen digital literacy and digital access moderate the relationships between digitalization and good governance outcomes and citizen satisfaction.

3. Research methodology

This study used a quantitative explanatory design to study the association between E-S-QUAL model, UNESCAP good governance outcomes framework, and citizen satisfaction in Surat Municipal Corporation. A structured questionnaire was used for data collection applied to 232 citizens who previously have some experience with Virtual Civic Center of SMC. Convenience non-probability sampling was used. The tool was comprised in large part of five-point Likert scale questions drawn from validated questionnaires on digital service quality, dimensions of good governance such as accountability, efficiency & effectiveness, participation and rule of law), and citizen satisfaction as well as supplemented with a handful of open-ended questions to sample any additional qualitative understandings. Reliability was examined by internal consistency (Cronbach's alpha coefficient) and construct validity by factor analysis (EFA) and CFA was performed to examine the underlying structure and confirmatory indexes of goodness of fit of the measurement model. Descriptive statistics were then calculated to present the demographic features of the data, and a simple regression model, moderation and mediation analysis were done with Jamovi Software in order to analyze and verify the proposed relationships between the study constructs and test the hypothesis.

1. Data Analysis and Results

Table 1

Demographic Characteristics of Respondents (N = 232)

Characteristic	Category	n (%)
Age	18-25	86 (37.1)
	26-35	48 (20.7)
	36-45	49 (21.1)
	46-55	26 (11.2)
	≥ 56	23 (9.0)
Gender	Male	100 (43.1)
	Female	127 (54.1)
	Other	5 (2.2)
Education	School Level	47 (20.3)
	Graduation	69 (29.7)
	Master	100 (43.1)
	PhD	16 (6.9)
Service Use Frequency	Daily	91 (39.2)
	Weekly	16 (6.9)
	Monthly	59 (25.4)
	Occasionally	32 (13.8)
	Rarely	34 (14.7)
Primary Device	Mobile	142 (61.2)
	Laptop	22 (9.50)
	Both Device	68 (29.3)
Internet Type	Mobile Data	128 (55.2)
	Wi-Fi/LAN	35 (15.1)
	Both Type	69 (29.7)
Platform Used	Mobile Apps	128 (55.2)
	Website/Portal	62(26.7)
	Other/Both	42 (18.1)

Note. N = total number of respondents; n = frequency; % = percentage.

The Demographic Data indicates that the bulk of respondents were young-to-middle-aged, with 37.1% (18–25 years) and 20.7% (26–35 years). The sample was female-biased (54.1%) and a relatively large proportion of individuals in the sample were highly educated, i.e., had attained an advanced degree (43.1% held a master's degree). With regard to service utilization, 39.2% reported using SMC services every day. Mobile phones were the primary access point (61.2%), mostly 55.2% responded based on mobile data for browsing, while 55.2% used the mobile application most frequently used platform to answer questions.

Table 2

Use of Online Services and Challenges (Multiple Responses, N = 232)

Item		Item	
Services Used	**n (%)**	**Challenges Faced**	**n (%)**
Tax payment	50 (21.6)	Technical problems	67 (28.9)
Waste management	42 (18.1)	Not user-friendly	29 (12.5)
Water services	57 (24.6)	Payment issues	23 (9.9)
Birth/Death certificate	28 (12.1)	Slow internet/system	33 (14.2)
Grievance services	30 (12.9)	Other challenges	12 (5.2)
Marriage certificate	24 (10.3)		
Building permission	12 (5.2)		
Other services	12 (5.2)		

Respondents used a variety of e-municipal services, but the most frequently used were water 24.6% and tax payment services 21.6%. In terms of challenges, technical problems were found to be the most prevalent (28.9%), followed by slow internet or system (14.2%) while least respondents had encountered payment related issue and user-skill related issues.

Reliability Test

Table 3

Simple Linear Regression

Construct	Dimension	Items	Cronbach's α
Digitalization	System Usability	4	0.75
	Technical Reliability	3	0.68
	Information Openness	3	0.70
Good Governance	Accountability	3	0.90
	Participation	2	0.82
	Efficiency & Effe	3	0.89
	Rule of Law	2	0.90
Citizen satisfaction	-	3	0.95
Digital Skill	-	3	0.88
Digital Access	-	3	0.73

Evidence of reliability measures, tested for internal consistency (Cronbach's alpha) to examine the one-dimensionality of each construct, denotes good-to-excellent and acceptable for all constructs that range from 0.68 to 0.95. These findings support the measurement scales as being reliable enough to be tested further.

Table 4

EFA Results

No.	Statistic	Value
1	KMO Measurement	0.832
2	Bartlett's χ^2 (df)	4424 (378)
3	Bartlett's p-value	< .001
3	Extraction Method	Minimum Residual (or Principal Axis Factoring)
4	Rotation	Oblimin
5	Number of Factors Extracted	7
6	Factor Loading Range	0.44 – 0.99

The exploratory factor analysis verified that the data was suitable to factor analysis as the data had a KMO of 0.832 and a significant Bartlett test ($p < .001$) value. Minimum residual extraction with oblimin rotation was done to extract seven factors. Factor loadings were 0.55 to 0.95, and this means that there were enough

to high item loadings and the construct validity. The items of digitalization were drawn together into one factor whereas the other items fit their respective constructs.

Table 5

CFA model fit

No.	Statistic	Value	No.	Statistic	Value
1	χ^2 (df)	758 (305)	6	RMSEA	0.080
2	χ^2/df	2.49	7	RMSEA 90% CI	0.0729–0.0872
3	p-value	< .001	8	SRMR	0.061
4	CFI	0.894	9	TLI	0.868

The confirmatory factor analysis revealed that there was a acceptable model fit. Much as the chi-square was significant the X 2/df value (2.49) was acceptable. The SRMR (0.061) was good fit and the RMSEA (0.080) was acceptable approximation error. The CFI (0.894) and TLI (0.868) were moderate. On the whole, the findings are in favor of a satisfactory measurement model. Thus, the measured model was hypothesized as to be analyzed structurally later.

Table 6

CFA standardized factor loadings

No.	Construct	Loading Range	Construct	Loading R
1	System Usability	0.574–0.812	Effectiveness	0.815–0.897
2	Technical Reliability	0.558–0.847	Rule of Law	0.910–0.914
3	Information Openness	0.570–0.828	Citizen Satisfaction	0.915–0.952
4	Accessibility	0.865–0.885	Digital Skill	0.856–0.937
5	Participation	0.832–0.849	Digital Access	0.654–0.70

All of the standardized factor loadings across constructs tended to be robust and most of them were over and above the recommended values, which points to good convergent validity and sufficient support of their respective latent variables. Altogether, the findings confirm the sufficiency of the measurement model.

Table 7

Descriptive Statistics of Study Variables

Variable	Mean	SD
System Usability	3.71	0.66
Technical Reliability	3.82	0.67
Information Openness	3.89	0.64
Accessibility	3.51	0.93
Participation	3.74	0.87
Efficiency & Effectiveness	3.58	0.93
Rule of Law	3.61	1.01
Citizen Satisfaction	3.55	0.95
Digital Skill	3.61	0.98
Digital Access	3.88	0.68

Descriptive statistics show that the respondents mostly recorded moderate to high ratings of all constructs. The mean scores were between 3.51 and 3.89 on a five-point scale, which indicated that the digitalization, good governance, and service outcomes have been generally positively rated. Standard deviations show mediocre variation in responses.

Table 8

Pearson Correlations Among Composite Variables (N = 232)

Variable	1	2	3	4	5
1. Digitalization	-				
2. Good Governance	.337***	-			
3. Citizen Satisfaction	.235***	.854***	-		
4. C. Digital Skills	.224***	.186**	.151*	-	
5. C. Digital Access	.407***	.307***	.331***	.163*	

Note: *p < .05, **p < .01, ***p < .001.

Table 1 shows the Pearson correlation of the study constructs. Good governance had a positive relationship with digitalization (r = 0.33) and also digitalization and citizen satisfaction (r = 0.23) and good governance was strongly positively correlated with citizen satisfaction (r = 0.85). These initial relationships are in line with the theoretical expectations and confirm that regression analysis should be used to further investigate the hypothesized relationship. Because digitalization was considered one composite predictor, there were no issues of multicollinearity.

Table 9

Simple Linear Regression

Dependent Variable	Predictor	B	β	t	F	P	R^2
Good Governance	Digitalization	0.52	0.33	5.42	29.4	<.001	0.113
Citizen Satisfaction	Digitalization	0.50	0.23	3.67	13.4	<.001	0.051

Simple linear regression analysis revealed that the analysis of good governance was significantly predicted by digitalization, β = 0.337, t (230) = 5.42, p <.001, and the analysis demonstrated 11.3% of the variance. The overall model was significant, F (1, 230) = 29.4, p < .001. On the same note, digitalization also made a significant prediction to citizen satisfaction, β = 0.235, t (230) = 3.67, p <.001 with 5.1% variance with model fit measurement of the overall model was significant, F (1, 230) = 13.4, p < .001.

Table 10

Moderation Effects of Digital Access and Digital Skill on Good Governance

Predictor	B	SE	P
Digitalization	0.3986	0.0946	<.001
Digital Access	0.2107	0.0613	<.001
Digitalization × Digital Access	0.0862	0.1151	.454
Digitalization	0.4792	0.0960	<.001
Digital Skill	0.0771	0.0429	.072
Digitalization × Digital Skill	0.0628	0.1027	.541

To determine how digitalization and good governance are dependent on digital access and digital skill, moderation analysis was conducted. An effect of digitalization on both models was statistically significant and positive ($p < .001$). The direct correlation between digital access and good governance was also found to be significant ($p < .001$), but digital skill was not significant ($p = .072$). The digitalization × digital access ($p = .454$) and digitalization × digital skill ($p = .541$) interaction terms were not significant. The findings suggest that both digital access and digital skill do not moderate the interaction between digitalization and good governance. The impact of digitalization on good governance also does not change depending on the level of digital access and level of digital skill.

Table 11

Moderation Effects of Digital Access and Digital Skill on Citizen Satisfaction

Predictor	B	SE	P
Digitalization	0.2605	0.1325	.049
Digital Access	0.3968	0.0858	<.001
Digitalization × Digital Access	0.0652	0.1613	.686
Digitalization	0.4474	0.1368	<.001
Digital Skill	0.0932	0.0611	.0127
Digitalization × Digital Skill	0.1006	0.1464	.492

The moderation analysis has been utilized in order to identify whether the relationship between digitalization and citizen satisfaction is conditioned by digital access and digital skill. Digitalization was statistically significantly positive affect on both models ($p = .049$; $p < .001$). The digital access also directly correlated with citizen satisfaction ($p < .001$) and digital skill was also a significant statistic ($p = .0127$). Nonetheless, the terms of interaction between digitalization and digital access ($p = .686$) and between digitalization and digital skill ($p = .492$) were not significant. These results suggest that digital access does not moderate the association between digitalization and citizen satisfaction and neither does digital skill. The impact of digitalization on citizen satisfaction is consistent whether there is low level of digital access and digital skill.

Table 12

Mediation Analysis Effect of Digitalization on Citizen Satisfaction through Good Governance

Effect	B	SE	95% CI Lower	95% CI Upper	P
Indirect	0.631	0.1079	0.422	0.8527	<.001
Direct	-0.127	0.0914	-0.312	0.0524	.164
Total	0.504	0.1311	0.244	0.7682	<.001

The indirect effect of digitalization on citizen satisfaction through good governance was positive and statistically significant (p <. 001), suggesting a significant mediating effect. The overall impact of digitalization on citizen satisfaction was also significant (p <. 001), yet the direct effect was attenuated and non-significant following good governance in model (p = . 164). Digitalization was a strong predictor of good governance (p <. 001), as well good governance were strong predictors of citizen satisfaction (p <. 001). These results infer that the impact of digitalisation on citizen satisfaction is via good governance improvements. The indirect effect of the bootstrap (5000) was significant (95% CI 0.422, 0.853, p < .001)

Hypothesis Testing Result

H1 and H2 were supported by the fact that good governance (β =0.337, p < .001) and citizen satisfaction (β = 0.235, p < .001) were predicted by digital service quality. The mediation analysis showed that there was a great impact of good governance on the dependent variable (B = 0.631, 95% CI 0.422, 0.853) although the direct effect was found to be not significant (p =.164) which supported H3 it mean there is full mediation. The interaction effects of digital service quality and digital access (p =.454/.686) and digital skill (p =.541/.492) did not prove significant; therefore, H4 was not proven.

2. Conclusion and Discussion

The results show that digital quality of service (simply digitalization or online services) has a positive impact on good governance and citizen satisfaction. This suggests that increases in digital public service delivery directly increase good governance performance (UNESCAP model dimension) name accessibility, effectiveness & efficiency, participation and rule of law and lead to more positive citizen perceptions. Yet, the variance explained by digital service quality is modest which indicates that additional institutional and contextual elements affect these outcomes.

The results of the mediation contribute with more evidence by indicating that good governance completely mediates digital service quality in its impact on satisfaction of citizens. This implies that, as effective digital reforms raise citizen satisfaction mainly through enhancing good governance. Application of digital technologies can have a significant impact on the quality and workability of public practices in terms efforts, such as accountability, efficiency and responsiveness. Yet the moderating analysis demonstrates that digital literacy and digital access have little effect in altering these relationships, so that the quality of digital services has a similar impact across different levels of citizens digitalskills. In general, the analysis suggests good governance quality as a key mediator for the effect of E-Government upon citizen satisfaction.

On the other hand, this study has certain limitations. First, the samples are only obtained by the citizens themselves and the opinions of municipal functionaries are not involved. Therefore, the results report citizens views rather than institutional perceptions in relation to quality of digital services and governance. Nevertheless, the study offers empirical evidence that digital service quality contributes to citizen satisfaction, mostly via improved governance effects. Hence, the results add to the increasing evidence on digital governance by explaining how digital transformation creates public value in municipal service provision. Further research need to be done to capture comparative or functionaries' perception as well.

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