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User Commitment towards Open Government Data (OGD) adoption and use: Influence of Trust and Quality dimensions

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Abstract. User Commitment (UC) assumes significance for ensuring re-use and adoption of Open Government Data (OGD) given the impetus upon value derivation and innovation pursuits of the stakeholders concerned. The present study seeks to empirically validate a research model for determining

the impinging variables, i.e. trust, information quality, data quality, system quality, for furthering UC. Drawing inferences from the responses secured from the university students in India, the impinging role of trust, system quality and data quality stand attested with the gender differentials in terms of system quality and data quality for user commitment. The study closes with social, academic and practical implications. As the first study seeking to understand the determinants of OGD UC, it contributes to the existing OGD literature apart from understanding the OGD UC propensities.

Keywords: User Commitment, Open Government Data, India, gender, trust, system quality, data quality, information quality

1 Introduction

Open Government Data (OGD) initiatives are the culmination of the e-government initiatives such that the machine-processable datasets regarding the structural and functional aspects of the government are being provisioned on the dedicated web portals with the overarching aims of furthering transparency and trust of the citizens apart from providing them a conduit to engage in value derivation and innovation pursuits by re-using the datasets [1] [2]. In the OGD ecosystem, the users typically comprise of the citizens, professionals, businesses, voluntary sector, software app developers, and the like [3]. Given the specific impetus upon value derivation and innovation by the stakeholders, extant OGD research has underlined the importance of OGD adoption and usage with the empirical assessment of variables like perceived risk, age, gender, internet efficacy, etc. [4] [5] [6]. Concomitantly, there is a need for understanding how the stakeholders deploy resources for value derivation and innovation pursuits [7] and this calls for understanding the role of commitment of the user towards OGD. In this vein, the present study seeks to empirically estimate the role of users' penchant for trustworthy and qualitatively advanced OGD [2] for furthering their commitment towards OGD re-use with an added dimension of the possible gender differences in the estimated relationships. To draw empirical inferences, the research model is being estimated with a representative sample drawn from university graduate and postgraduate students (n~397) hailing from a prominent private university based in India. Ipso facto, apart from contributing towards the OGD literature in general, the study is a significant contribution towards understanding technology adoption propensity from the perspective of a developing country.

2 Related research

2.1 Determinants of OGD adoption and usage

OGD research has underlined the significance of a diverse set of variables as far as the adoption and usage is concerned. For instance, the role of social media usage,

ease of availability, users' skills, sense of urgency were found to be significant predictors of OGD adoption [8]. Lıkewise, it has been attested that perceived risk inclusive of the financial, technological, competitive, etc. has a negative bearing on OGD adoption especially with regard to the value derivation aspect [9]. OGD usage propensity has been found to be influenced by factors like intrinsic motivation, internet competency, ease of use and usefulness [10]. In addition, variables such as ease of use, usefulness, intrinsic motivation, political satisfaction, trust in government and the intensity of internet use have been considered as significant determinants of OGD engagement among the users in the Brazilian context [11]. In the case of UK, it was empirically attested that the variables such as functional value, compatability, security concerns and the stereotypical perceptions are influential in determining OGD adoption [12]. Drawing upon the acclaimed Unified Theory of Acceptance and Use of Technology (UTAUT) model of the Information Systems (IS) frame, it was attested that dimensions such as Performance Expectancy, Effort Expectancy, Facilitating Conditions, Social Influence, Voluntariness of Use as also the variables like Trust, Data Quality and Information Quality were also the significant determinants of OGD adoption as fat as the Indian, Czech Republic and Latvian contexts were concerned [13]. In another context of a developing country, viz. Bangladesh, it was attested that the propensity of continued engagement with OGD was a factor of the conventional UTAUT constructs apart from User Satisfaction [14]. Likewise, in the case of Taiwan, it was empirically validated that the OGD usage is a function of aspects such as computer self-efficnacy and governmenr support [15]. In yet another study, it was found that the dimensions of accessibility, discoverability and accuracy were significant determinants of OGD adoption and usage [16].

2.2 User Commitment (UC) and technology adoption

As such, commitment has been defined in terms of the "force" that impels the individual to abide or follow a course of action in line with the targets to be attained [17: 301 and has been conceptualized in the behavioral research in terms of being affective, normative and continuance [18]. In the specific context of technologies, it was attested that the user commitment holds pertinence for furthering the user loyalty-case in point being the usage of Digital Assistant technologies given the fact such loyalty results in positive word-of-mouth intentions [19]. In another case of ERP adoption and usage among the employees, it was attested that the user commitment variable was important for ensuring the sustained usage of the employees in the concerned organization [20]. Likewise, in the case of the social media adoption and usage, viz. Twitter, it was attested that User Commitment played a significant role in the adoption and usage propensities especially given the role of the time spent on the platform [21] and the same is also suggestive of the resources being deployed by the user for engaging with the

same. Finally, in the case of the enterprise system adoption, it was attested that User Commitment is important for the Information Systems (IS) diffusion as well [22].

2.4 Research question

It may be derived from the aforesaid that User Commitment influences technology adoption and usage with the resultant implications for loyalty and relationship-building with the service provider in return for the accrued benefits from the use of the said technology. Additionally, it may be pointed out that in line with the assertion of furthering "improved relations between citizens and the open data portal development team" [23: 99], the role of User Commitment in terms of users' perception of trustworthy and qualitatively robust OGD holds pertinence for understanding users' attitudinal disposition towards OGD. Also, it may be relevant to ascertain if there is any gender difference as far as the implications for User Commitment are concerned. Therefore, the research question for the study is: "What is the role of users' gender as far as their trust and quality dimensions on their commitment towards OGD is concerned?"

3 Research methodology

3.1 Research model and hypotheses

Fıgure 1 and Table 1 summarize the research model for the study. As may be inferred from the model, the four constructs of Trust, Information Quality, Data Quality and System Quality are being incorporated as the antecedents of User Commitment with the moderating role of Gender. As such, extant OGD research has attested the impinging role of trust for OGD adoption and usage [24] [25] [26] [27] with the negative results being attested in terms of trust on data and system in another study [28]. Furthermore, Data Quality has been attested to have been influenced by the data acquisition methods wherein the 'help' functionality has been provisioned alongside the FAQs and other means of online support [29]. In the case of Sysrem Quality and Information Quality, it has been attested that both are important determinants of OGD adoption and usage [30]. In yet another case, it has been attested that whereas System Quality has a significant and direct impact on OGD adoption and usage, Information Quality does not impact the behavioral propensity towards OGD adoption and usage [31] [32].

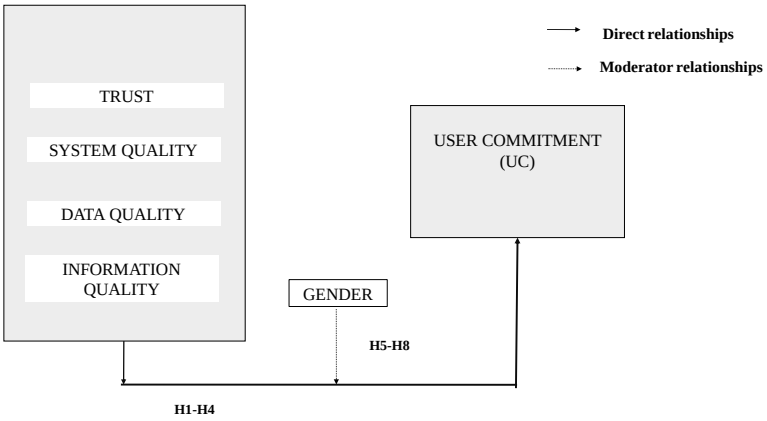

Figure 1: Research model

Table 1: Hypotheses for the study

Construct	Definition	Reference	Hypothesis
Trust (T)	The extent to which OGD is considered to be trustworthy, credible and reliable by the users.	[13]	H1: Trust has a positive effect on UC
Information quality (IQ)	The extent to which the characteristics of the output offered by the information system are accurate, timely and complete	[8] IS-Success model	H2: Information Quality has a positive effect on UC
Data quality (DQ)	The extent to which OGD are free from errors, complete, accurate, appropriately formatted as per standards and ready for reuse	[8] IS-Success model	H3: Data Quality has a positive effect on UC
System quality (SQ)	The extent to which the performance of the information system are reliable, convenient, easy to use and equipped with the requisite functionality and other system metrics	[8] IS-Success model	H4: System Quality has a positive effect on UC
User Commitment	The propelling factor that binds one to a particular object/service contingent upon the possible gains resulting from the usage and adoption of the same from the service or good thereby furthering loyalty to the service provider.		
Moderating variable	Definition		Hypothesis
Gender (Gender)	The extent to which the gender of the user impacts the UC vis-a-vis OGD.		H5-H8: Gender has a moderating impact on the Trust, Information Quality, Data Quality, System Quality constructs-UC relationships such that they are positively strengthened for the males in comparison with the females.

3.2 Data collection

For the empirical study, responses were solicited from the graduate and postgraduate students hailing from a prominent private Indian university after

ascertaining their being actual OGD users. Data collection phase ran between December, 2022 and March, 2023. Google Form was shared with the respondents (n~397) via email, WhatsApp or SMS. Likert scale (1-Strongly Agree and 5-Strongly Disagree) was used for the survey questionnaire apart from a few demographic questions wherein categorical responses were registered. Statistical analysis was conducted via Warp PLS 8.0 software [33] and Partial Least Squares-Structural Equation Modelling (PLS-SEM) method [34] was deployed for estimating the empirical relationships.

Table 2: Summary of demographic characteristics

Characteristic	Frequency	%	Characteristic	Frequency	%
			Gender		
Male	197	49.62	Female	200	50.37
			Age		
16-20 years	265	66.75	21-25 years	122	30.73
26-30 years	3	0.007	Above 30 years	7	0.017
			Education		
Bachelor's	368	92.69	Master's/PhD's/PostDoc's	27	0.073
			Field of Study		
Engineering	146	36.77	Humanities and Social Sciences	149	37.53
Law	12	3.02	Management/Commerce	35	8.81
Nursing/Medical	10	2.51	Hospitality/Hotel Management	24	6.62
Other	41	10.57			
			Year of Study		
1st year	121	30.47	2nd year	108	27.20
3rd year	135	34.00	4th year	24	0.060
5th year	1	0.002	Other	8	0.020
			Perceived Importance of OGD		
Very Important	80	20.15	Important	189	47.60
Neutral	122	30.73	Unimportant	3	0.007
Very unimportant	3	0.007			
			Usage Experience		
Daily or multiple times a day	46	11.58	Weekly or a few times in a week	134	33.75
Monthly or a few times in a month	99	24.93	Yearly or a few times in a year	43	10.83
Do not know	75	18.89			

4 Results

4.1 Measurement model

The research model's (R^2=50.2%) reliability estimates were returned as per the Cronbach's alphs (α) and Composite reliability (CR) values [34] whilst the

Average Variance Extracted (AVE) was assessed for determining the convergent validity [34]. In all the three estimates, the threshold criteria was fulfilled, i.e. 0.9>α>0.778; 0.955>CR>0.711 and AVE>0.50 (Table 3). Furthermore, no multicollinearity was registered among the constructs which is clinched given the VIF (Variance Inflation Factor) values being below 5 [34].

Table 3: Reliability validation for latent constructs.

Construct	Cronbach's alpha (α) [a]	Composite Reliability (CR) [b]	Average Variance Extracted (AVE) [c]	Variance Inflation Factor (VIF)	Construct	Cronbach's alpha (α) [a]	Composite Reliability (CR) [b]	Average Variance Extracted (AVE) [c]	Variance Inflation Factor (VIF)
Trust	0.899	0.937	0.833	2.428	Information Quality	0.826	0.896	0.742	2.856
Data Quality	0.861	0.906	0.706	3.844	System Quality	0.873	0.908	0.666	2.775
User Commitment	0.909	0.933	0.734	2.185					

a. Cronbach's alpha should exceed 0.60

b. Composite Reliabilities should exceed 0.60 but below 0.90

c. Average Variance Extracted values should exceed 0.50

4.2 Structural model

A summary of the path coefficients, effect sizes, T-statistics and the p-values vis-à-vis the hypothesized relationships is presented in Table 4. As far as the direct relationships are concerned, TR-UC, DQ-UC and SQ-UC were found to be significant in the positive direction. Furthermore, the moderaing impact of gender was attested vis-a-vis DQ-UC and SQ-UC relationships.

Table 5: Hypotheses′decision summary

Constructs/Hypotheses	Path coefficients	Effect Size	p-value	Decision
TR-UC (H1)	0.074	0.044	0.364	**Supported**
IQ-UC (H2)	0.005	0.003	0.461	Not supported
DQ-UC (H3)	0.407	0.289	<0.001	**Supported**
SQ-UC (H4)	0.344	0.236	<0.001	**Supported**
GEN*TR-UC (H5)	-0.017	0.003	0.364	Not supported
GEN*IQ-UC (H6)	0.064	0.013	0.100	Not supported
GEN*DQ-UC (H7)	0.140	0.040	0.002*	**Supported**
GEN*SQ-UC (H8)	0.083	0.022	0.047*	**Supported**

Sig. *p<0.05

3.3.3 Multi-Group Analysis (MGA) for ascertaining the moderating impact of Gender

Given the affirmatively significant role of gender in the original research model, a nuanced understanding of the gender differentials was attempted via MGA wherein the pooled standard error method was invoked for drawing inferences. Table 6 summarizes the MGA findings.

Table 6: MGA summary

				Group pair results (Males=0; Females=1)		
Constructs/ Hypotheses	Path coefficients (Males)	Path coefficients (Females)	Absolute path coefficient differences	p-values	T-statistic	Inference
SQ-UC	0.228	0.417	0.188	0.023*	2.002	Females-in comparison with males- seek OGD′s system quality which furthers their UC towards OGD reuse
IQ-UC	-0.030	0.117	0.146	0.069	1.482	x
DQ-UC	0.510	0.218	0.291	<0.001	3.120	Males-in comparison with females-seek OGD's data quality which furthers their UC towards OGD reuse
TR-UC	0.065	0.109	0.044	0.326	0.450	x

a. Sig. *p<0.05

x Non-significant difference in males/females

5 Discussion

Findings from the study vis-a-vis the direct relationships, for instance, are in line with the previous OGD literature-case in point being the students' penchant for quicker solutions to complete their academic assignments or projects, and, this is reflected in the students' looking for error-free and credible OGD in different domains [35]. This assumes importance on account of the fact that value derivation and innovation pursuits mandate quick results wherein credible and trustworthy OGD is mandated [8] [9] [36] and failure to provide homogenous, complete and updated OGD results in bottlenecks for the prospective users for reference and re-use [37] thereby adversely impacting user commitment. User Commitment is also a factor of System Quality and Data Quality and both of these

variables have been considered as significant predictors of OGD adoption and usage in extant literature [4] [13] [32] [38] thereby bolstering the present study's findings regarding user commitment.

Regarding the moderating impact of gender with the specific MGA results, females are more concerned about system quality and in the case of data quality, males are found to be more calibrated and particular about the OGD data quality. This finding is bolstered by the fact that females regard effortless technological use as important for their engagement with the same [39] [40] which also speds up their nuanced decision-making propensity [41] which is much needed for value derivation and innovation pursuits. Furthermore, males' penchant for robust OGD quality was attested in prior research [4].

6 Conclusion

Complementing the OGD literature, the present study sought to understand the influence of Trust and quality dimensions, viz. Data Quality, Information Quality and System Quality as far as User Commitment is concerned. Contextualized in a developing country, i.e. India, the empirical validation of the research model was done across the responses garnered from the university's undergraduate and postgraduate students (n~397). Findings attest the significant relationships for Trust-UC, System Quality-UC and Data Quality-UC. Furthermore, gender differences were attested across the System Quality-UC and Data Quality-UC relationships with the females scoring higher in the former and males scoring higher in the latter relationships.

The study's contribution towards the OGD literature, in specifics, and, technology adoption, in general, is attested. Whilst the limitations of the study may be submitted in terms of the sample design of the study wherein university students are not considered a representative sample [42], however, keeping in mind the role of the academic community as potential OGD users, the limitation is overcome. Further research is, therefore, warranted to replicate the study's model from a comparative perspective drawing samples from other countries. Finally, stakeholders' perspectives-both from the OGD publishers' and OGD users' sides-should be taken in further research for attempting a triangulation of research findings.

Social and practical implications of the study's findings are attested as well. For one, users' commitment for OGD is reflective of their belief in OGD and its sources, and, this would culminate in bolstering their value derivation and innovation penchant. Likewise, politicians and policy-makers ought to understand the implications of credible and qualitatively robust OGD for furthering user engagement and commitment, eventually.

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