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E-GOVERNANCE QUALITY AND DIGITAL REGULATORY TRANSPARENCY AS CATALYSTS FOR E-COMMERCE PERFORMANCE: A DUAL MEDIATION MODEL OF CITIZEN TRUST AND PERCEIVED USEFULNESS MODERATED BY INSTITUTIONAL SUPPORT IN PAKISTAN

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Abstract
The current empirical study provides a comprehensive analytical framework to assess the systemic factors that affect e-commerce use among Small and Medium-Sized Enterprises (SMEs), specifically the socio-economic and institutional context of Pakistan. We propose that the usage and success of e-commerce among SMEs in Pakistan will be influenced by factors beyond technology and the market, particularly the quality of the digital public infrastructure. Specifically, we contend that Government Digital Infrastructure Quality-which includes the availability, usability and responsiveness of government digital portals-and Digital Regulatory Transparency-which refers to how transparent, accessible and enforceable regulations are with regard to conducting online business and managing data-will serve as important external stimuli to e-commerce development in Pakistan. However, the effects of these two variables will be mediated by two critical cognitive-affective mechanisms: the generation of Citizen Trust in the larger digital ecosystem and the perceived usefulness of e-commerce platforms. Additionally, we theorize that the presence of tangible Institutional Support (including government incentives, infrastructure and dedicated support programs) will act as an important contingency factor that will enhance the effects of these mediating variables on final e-commerce performance. Our sample consisted of 387 SME owners/managers in Pakistan who responded to our survey instrument. We utilized Structural Equation Modeling and Moderated Mediation Analysis via the PROCESS macro to analyze the data. The results of our analyses provide strong evidence to support the proposed model and confirm the significant direct and indirect paths. Notably, our results demonstrated the significant moderating effect of institutional support on the relationship between citizen trust and e-commerce performance, which highlights the importance of tangible institutional resources to complement the intangible social capital provided by digital public infrastructure. Therefore, this research develops a novel, integrated theoretical model of digital transformation in developing countries and provides actionable insights for policy makers seeking to develop a coherent and supportive digital business environment.
Keywords: *E-Governance, Regulatory Transparency, E-Commerce Adoption, Citizen Trust, Technology Acceptance Model, Institutional Theory, Digital Ecosystem, Pakistan*

INTRODUCTION

Pakistan's digital economy is evolving and there is the possibility of growing economic development, innovative opportunities and inclusive processes through the use of e-commerce. Because Pakistan is one of the many countries where youth represent a large percentage of the population and because the number of people accessing the Internet is rapidly increasing, it provides a great opportunity to jump over traditional development barriers for the SME sector and to be included in global value chains. Despite the fact that the demographic of Pakistan offers a great opportunity for the growth of digital commerce, the trend of digital commerce in Pakistan does not align well with the demographic, and the adoption rate of digital commerce varies significantly among different sectors, especially the SME sector. SMEs constitute a backbone of Pakistan's national economy. Previous studies have made detailed lists of various factors that contribute to the digital commerce adoption, ranging from technological aspects of e-commerce websites' functionality and security, and personal characteristics of users such as perceived

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risk and willingness to innovate, to organizational capabilities of companies in terms of availability of resources. A notable gap exists in the existing body of literature, however. This gap concerns the broad, macro-level role of the government and its digital institutions to create an enabling environment for digital business transactions. The current literature typically portrays governmental digital initiatives (e-governance), and the regulatory framework as secondary or contextual settings that do not influence the behavior and perception of economic actors. This study opposes this peripheral view, and argues that in institutional environments that are still developing, such as Pakistan's, the quality of digital interactions between citizens and the state and the transparency of the rules of the digital game, are not merely secondary settings; they are primary determinants of commercial digital involvement. We propose that these public sector constructs function in two ways to alter two essential intermediate psychological states of potential adopters: by creating a general belief of trust in the reliability and fairness of the digital environment and by enhancing the perceived benefits and effectiveness of using e-commerce platforms. Furthermore, we argue that these cognitive and affective transformations will be stronger if the state actively facilitates the digital transition through specific institutional support mechanisms instead of simply providing services and setting rules passively. Therefore, this study aims to develop and empirically validate an integrated model that places E-Governance Quality and Digital Regulatory Transparency as the antecedents, and Citizen Trust and Perceived Usefulness as the dual mediators, while Institutional Support is considered as a moderating variable to explain the significant variability in E-Commerce Performance in the context of Pakistan. The study aims to develop a policy-relevant and comprehensive understanding of how the state-led digital initiatives can be strategically developed to promote the digital transformation of the private sector.

LITERATURE REVIEW, THEORETICAL SYNTHESIS, AND HYPOTHESIS DEVELOPMENT

THEORETICAL UNDERPINNINGS

In order to capture the many ways in which the state-constructed digital environment influences how firms behave in the e-commerce space, the authors draw upon two dominant research streams.

First, from an Institutional Theory perspective (Scott, 2014), the authors examine the macro-sociological context in which organizations exist and operate. This theory posits that the structure and practice of an organization are influenced to a great extent by the institutions within which it operates. For example, the regulative institution of the state establishes the "rules," "laws" and "sanctions" that govern behavior - in our case, the Digital Regulatory Transparency construct (Hussain, 2018; Lukic, 2021; Shahi et al., 2025). Additionally, the norms and cognitions of an organization's institutional environment shape the values and beliefs held by members of the organization - or as in the case of good quality E-governance - a normative signal that the state is committed to efficient services, and in the case of both governance quality and regulatory clarity, create a cognitive schema that creates less uncertainty for businesses, thereby making e-commerce a viable option (Hassan et al., 2025).

Second, drawing upon the Technology Acceptance Model (TAM) and its many extensions (Venkatesh et al., 2012), the authors adopt a micro-psychological perspective focusing on the individual user's decision-making process with regard to e-commerce. TAM suggests that behavioral intentions to engage in e-commerce will primarily be based on the perceived usefulness and ease-of-use of the e-commerce platform. We propose that the perceived usefulness of the e-commerce platform extends well beyond the characteristics of the e-commerce platform itself, including the quality of the digital public infrastructure (Khan & Wali, 2020; Mwamba, 2023; Amir et al., 2025), and the ability to easily complete tasks such as filing taxes online (as an example of e-government). Finally, we incorporate the construct of trust, as a critical component of e-commerce adoption decisions given the risks involved in participating in e-commerce transactions (Olorogun & Othman, 2021; Senturk, 2023).

Thus, through the use of Institutional Theory, we develop the macro-level explanations for establishing conditions of trustworthiness and utility, and through the use of TAM and trust constructs, we develop the micro-level psychological explanations of how these conditions ultimately influence adoption behaviors. Ultimately, this integrated approach allows for a more comprehensive understanding of the relationships among digital ecosystems and the various influences shaping firm level e-commerce adoption decisions.

HYPOTHESIS DEVELOPMENT

The authors provide an elaborate description of how they developed their conceptual framework of all constructs and logically established the connections between the constructs leading to a number of hypotheses that could be tested. In addition to this, the author describes the process in the order from the exogenous institutional influences

to the mediating psychological variables to the end behavioral variable. However, the author takes into account the contingency as well.

E-Government Quality (EGQ) is described by Rana, Dwivedi, and Williams (2015) as the level at which Government digital portals and services; those that businesses must interact with, such as tax authorities, company registries, and regulatory bodies; are accessible, easy to use, efficient and responsive. EGQ is not just about having digital presence, but is about the quality of the service provided within the G2B domain. High-quality e-government reduces the friction caused by bureaucracy, saves time and money, and signals to private sector participants a competent, service-oriented and professional public administration. Digital Regulatory Transparency (DRT) is the level at which the laws, regulations, and procedural guidelines that govern online business activity; including e-contracts, data protection, consumer protection, digital signature and electronic taxation; are clear, easily available, predictable and enforceable (Bellotti et al. 2020; Ahmad et al., 2025). As opposed to merely existing, the authors place emphasis on clarity and reliable application, both of which are critical for businesses to evaluate the legal risks associated with the operation of e-commerce and to determine their compliance costs (Siddique et al., 2025).

The authors argue that these two institutional factors are the most important antecedents of the mediation factors. By providing reliable and efficient digital public services, high EGQ demonstrates governmental competence and benevolence. This consistent and positive interaction contributes to building trust among citizens toward the e-government and the digital market it supervises (Welch et al. 2016; Kanwal et al., 2025). At the same time, by simplifying mandatory administrative tasks (for example, faster business registration, simpler tax reporting), EGQ enhances the perceived usefulness (PU) of using digital platforms for conducting business because it makes tangible improvements to the business's productivity (Al-Adwan & Kokash, 2019; Khalil et al., 2024; Ullah et al., 2025). In the same way, high DRT reduces uncertainty and the perceived legal risk when the rules are clear and the enforcement is predictable, the businesses will have greater confidence in operating, and therefore contribute to systemic trust. Additionally, high DRT increases PU since the advantages of e-commerce (access to markets, improved operational performance) are more quantifiable and less subject to the fear of regulatory action or litigation. Therefore, the first group of hypotheses is established as follows:

H1a: E-Governance Quality has a positive and significant effect on Citizen Trust.

H1b: E-Governance Quality has a positive and significant effect on Perceived Usefulness.

H2a: Digital Regulatory Transparency has a positive and significant effect on Citizen Trust.

H2b: Digital Regulatory Transparency has a positive and significant effect on Perceived Usefulness.

Thus, the intermediaries, citizen trust and perceived usefulness, will be hypothesized to lead directly to E-commerce performance (ECP) the independent variable that is defined as the degree, intensity and success of a company's involvement in on line sales and transactions (Zhu & Kraemer, 2005; Shahi et al., 2025). The amount of trust is a direct indicator of the amount of perceived risk of being victim to on line fraud, data theft and/or fraudulent transactions; therefore reducing one of the main barriers to use (Pavlou, 2003; Uzair et al., 2025). With a high level of trust, companies are more apt to invest in digital channels, to share data and to conduct on line transactions with partners whom they do not know. Therefore, perceived usefulness a fundamental component of TAM measures the instrumental motivation to adopt technology (Davis, 1989). Therefore, if decision-makers perceive that e-commerce can improve their sales, decrease their costs, increase their competitive advantage, then they will be more likely to adopt e-commerce and implement it successfully.

H3: Citizen Trust has a positive and significant effect on E-commerce Performance.

H4: Perceived Usefulness has a positive and significant effect on E-commerce Performance.

The central part of our proposed mechanism is the two-step mediation model. The primary way in which EGQ and DRT affect ECP will be indirectly, as a result of first creating an increase in CT and PU among businesses. That is to say, the actions of the government's digital initiatives will directly create changes in how businesses "feel" (trust), and how they "think" (perceived utility) about the digital environment; resulting in the following mediated hypotheses:

H5a: Citizen Trust mediates the positive relationship between E-Governance Quality and E-commerce Performance.

H5b: Citizen Trust mediates the positive relationship between Digital Regulatory Transparency and E-commerce Performance.

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H6a: Perceived Usefulness mediates the positive relationship between E-Governance Quality and E-commerce Performance.

H6b: Perceived Usefulness mediates the positive relationship between Digital Regulatory Transparency and E-commerce Performance.

Last but not least, we consider institutional support (IS), as an important mediating factor. Institutional support represents tangible resources and governmental sponsored programs available to support online business, including financial incentives to adopt digital tools, training/capacity building workshops, secure digital payments infrastructure, etc. Building from the resource-based view and institutional theory, we assert that institutional support acts as a catalyst; High trust (affective cognitive states) are much more likely to result in actual actions (ECP) where businesses have the necessary resources to take action - support reduces resource constraints. Even if online commerce is seen as useful, it can still fail due to a lack of knowledge and/or capital; institutional support serves to bridge the gap between perceived utility of e-commerce and the ability to successfully implement it - thus institutional support enhances the PU-ECP link.

H7: Institutional Support moderates the relationship between Citizen Trust and E-commerce Performance, such that the relationship is stronger when Institutional Support is high.

H8: Institutional Support moderates the relationship between Perceived Usefulness and E-commerce Performance, such that the relationship is stronger when Institutional Support is high.

CONCEPTUAL FRAMEWORK

As illustrated in Fig. 1, the proposed theoretical structure presents the anticipated associations between the independent constructs (EGQ, DRT), the parallel mediating constructs (CT, PU), and the dependent construct (ECP). The independent constructs EGQ and DRT were both modeled as directly influencing the two parallel mediating constructs (CT and PU) and the mediating constructs (CT and PU) were modeled as directly influencing the dependent construct (ECP). The direct influences of CT to ECP and PU to ECP were also modeled as being influenced by the moderator (IS) represented through an interaction term. Additionally, it is implied that the indirect effects of EGQ and DRT on ECP (through CT and PU) will also depend upon the level of the moderator (IS) suggesting a model of moderated mediation.

METHODOLOGY

PARTICIPANTS AND DATA COLLECTION PROCEDURE

A quantitative survey-based methodology was used as a means of testing the proposed model that would target small and medium enterprise (SME) owners and senior managers in Pakistan the key individuals responsible for determining whether or not their organization would adopt e-commerce. Urban commercial centers Karachi, Lahore, and Islamabad were selected based upon the fact that they are where the greatest concentration of e-commerce occurs. A multi-mode data collection strategy was used from November 2023 through February 2024 to increase both coverage and response rate an online survey distributed via LinkedIn, Chambers of Commerce and Industry email lists, and targeted Facebook Groups for Pakistani entrepreneurs; in-person data collection at SME trade shows and meetings of business associations to obtain responses from those who have limited digital interaction. The survey instrument was preceded by a detailed information sheet that assured respondents of their right to remain anonymous and of the confidential nature of the survey results. Further, participation in the survey was completely voluntary and there were no inducements offered to the respondents to encourage them to participate.

SAMPLE SIZE ESTIMATION AND RESPONSE RATES

A priori sample size calculations were completed via GPower 3.1.9.7. The type of test used was a linear multiple regression test (F-test). We specified that we expected a moderate to large effect size ($f^2 = 0.15$); that our alpha (significance level) would be set at .05; and that our desired statistical power would be 0.95. Additionally, we intended to include no more than eight predictors (including interaction effects) within the final regression model. A medium effect size ($f^2 = 0.15$) equates to a medium f^2 value. Using these parameters, the minimum sample size needed was calculated to be 160. Because of the high possibility of incomplete responses and in order to provide a basis for the robustness of future analyses such as structural equation modeling and bootstrapping for mediation/moderation, we sought a much larger sample size than what the a priori calculations suggested. In total, approximately 700 online survey invitations were distributed. Following a reminder, 435 participants responded. Prior to conducting rigorous data screening for each of the variables included in the survey, we removed all

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participant responses with less than five minutes of time spent completing the survey (as evidence of straight-lining behavior), removed all participant responses with the same values on all Likert scales (evidence of invariant responding), and eliminated all incomplete responses. Following this procedure, a usable sample of 387 participant responses remained. As a result, the effective response rate of the survey was 55.3%. An effective response rate of 55.3% is acceptable for studies of organizational representatives and is well above the minimum response rate threshold necessary for the planned analyses.

MEASURES

Each construct was assessed using a reflective indicator scale based upon a seven-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree". The use of a seven-point scale enhances the range of variation possible within each scale and increases sensitivity of assessment relative to scales that employ fewer points. Scales were adapted from established scales used in previous studies, however, all were revised for the context of the study with the Pakistani SME environment through a pre-test of 15 business owners. E-governance Quality (EGQ) was assessed via a six-item scale adapted from Rana et al. (2015). EGQ captures the dimensions of service availability, interface quality and response time (for example "Government portals for business services [e.g. tax, registration] are available whenever I need them"). Digital Regulatory Transparency (DRT) was evaluated using a five-item scale from the works of Bellotti et al. (2020) and Mistry (2022). DRT captures the dimensions of clarity regarding legal requirements for operating an online business in Pakistan (for example "The legal requirements for operating an online business in Pakistan are clear and unambiguous"). Citizen Trust (CT) was assessed using a five-item scale from Gefen et al. (2003) and Welch et al. (2016). CT captures the dimensions of trust in the digital systems' integrity and reliability (for example "I feel confident that the digital system for business transactions is secure"). Perceived Usefulness (PU) was assessed using a four-item scale from Davis (1989) and Venkatesh et al. (2012) specifically for e-commerce (for example "Using e-commerce would enable my business to accomplish tasks more quickly"). Institutional Support (IS) was assessed using a new five-item scale which is theoretically grounded and assesses the perceived availability of government support (for example "Adequate government training programs exist to help businesses build e-commerce capabilities"). E-Commerce Performance (ECP) was assessed using a new five-item subjective performance scale which is an adaptation of scales from Zhu and Kraemer (2005) and Tiwari et al. (2020). Objective financial data can be difficult to collect from SMEs therefore this method is appropriate (for example "Our online sales channel has significantly improved our overall market reach"). Additionally, firm size (number of employees), firm age (years), and industry sector (retail, services, manufacturing) were included as control variables.

DATA ANALYSIS

Data analysis was performed in accordance with a 2-stage analytical process by utilizing SPSS version 29 and the PROCESS macro version 4.2 (Hayes, 2022). The first stage included a rigorous assessment of the measurement model in order to confirm both reliability and validity. Internal consistency was evaluated by performing Cronbach's Alpha and Composite Reliability (CR) assessments. Convergent validity was also assessed through Confirmatory Factor Analysis (CFA) on AMOS as an evaluation of Average Variance Extracted (AVE>0.5), and model fit. Discriminant validity was then evaluated using the Fornell-Larcker criterion and Heterotrait-Monotrait (HTMT) Ratio. In the second stage, the structural model and hypotheses were tested. Because the model contained two mediating variables and one moderating variable, Hayes' PROCESS Macro (Model 7) was used; it is specifically intended for evaluating moderated mediation. Hayes' PROCESS Macro Model 7 utilizes Ordinary Least Squares (OLS) Regression Path Analysis with Bootstrapping (5,000 resamples) in order to produce Bias-Corrected Confidence Intervals for Direct, Indirect, and Conditional Effects. This methodology has been shown to be reliable when dealing with Non-Normal Data and is a direct test of our proposed Mediation and Moderation Paths. Additionally, this methodology evaluates whether the Index of Moderated Mediation is significant where applicable.

RESULTS

MEASUREMENT MODEL ASSESSMENT

The Confirmatory Factor Analysis (CFA) for the six-factor model indicated an acceptable fit to the data as follows: χ^2 / df = 2.18; CFI = .95; TLI = .94; RMSEA = .055. All the indices were at or above suggested benchmarks indicating that the factor structure is confirmed. Table 2 illustrates the reliabilities of all constructs are very high, with Cronbach's alpha and Composite Reliability values ranging from 0.86 to 0.93, which exceeds the

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recommended benchmark of 0.70. The Average Variance Extracted (AVE) for each construct ranged from 0.61 to 0.75, which also exceeds the 0.50 criteria for convergent validity. The inter-construct correlations and discriminant validity tests are shown in Table 3. The square root of the AVE for each construct (diagonal values) was higher than its highest correlation with another construct (Fornell-Larcker criterion). Additionally, all Heterotrait-Monotrait (HTMT) ratios were lower than the conservative threshold of 0.85, providing substantial evidence of discriminant validity (Henseler et al., 2015; Wang & Ahmad, 2018; Namadi, 2023).

Table 1: Sample Socio-demographic Characteristics and Firm Profile (n=387)

Characteristic	Category	Frequency	Percentage
Respondent position	Owner / Founder	223	57.6%
	Senior Manager / Director	164	42.4%
Firm age	Less than 5 years	125	32.3%
	5 to 10 years	176	45.5%
	More than 10 years	86	22.2%
Firm size (employees)	Micro (1–10)	158	40.8%
	Small (11–50)	167	43.2%
	Medium (51–250)	62	16.0%
Primary industry sector	Retail / Trade	156	40.3%
	Services (IT, consulting, etc.)	149	38.5%
	Manufacturing	82	21.2%
Current e-commerce use	Not yet adopted	95	24.5%
	Experimental / Low use	148	38.2%
	Integrated / High use	144	37.2%

Table 2: Indicator Loadings, Reliability, and Convergent Validity

Construct	Item loadings range	Cronbach's α	Composite reliability (CR)	Average variance extracted (AVE)
E-Governance Quality (EGQ)	0.76–0.88	0.90	0.92	0.66
Digital Reg. Transparency (DRT)	0.80–0.90	0.89	0.91	0.68
Citizen Trust (CT)	0.82–0.91	0.91	0.93	0.73
Perceived Usefulness (PU)	0.79–0.87	0.87	0.90	0.70
Institutional Support (IS)	0.75–0.86	0.86	0.89	0.61
E-commerce Performance (ECP)	0.83–0.92	0.92	0.94	0.75

Table 3: Fornell-Larcker and HTMT Matrix for Discriminant Validity

	EGQ	DRT	CT	PU	IS	ECP
EGQ	0.81	0.37	0.34	0.39	0.31	0.35
DRT	0.35	0.82	0.43	0.36	0.38	0.40
CT	0.32	0.40	0.85	0.49	0.45	0.53
PU	0.37	0.34	0.46	0.84	0.43	0.55
IS	0.29	0.35	0.42	0.40	0.78	0.44
ECP	0.33	0.37	0.50	0.52	0.41	0.87

Note: Diagonal (bold) values are the square root of the AVE. Below-diagonal values are construct correlations. Above-diagonal values are HTMT ratios (all < 0.85).

STRUCTURAL MODEL AND HYPOTHESIS TESTING RESULTS

To be able to make this text look and sound more like it is written by a person, you cannot change anything about what is said, the date or facts; and you will only need to paraphrase the original text. YOU WILL NOT PROVIDE AN ANSWER TO THE QUESTIONS — ONLY PARAPHRASING OF THE TEXT BELOW.

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The results of the path analysis based on PROCESS are provided in figure 2 as well as in the table with the hypothesis testing results. There were no statistical significance effects for the control variables (size of firm, age of firm, industry/sector) for the dependent variable so they were removed from the final parsimonious model.

Direct Effects: All of the hypotheses concerning direct effects have been supported. For example, e-government quality significantly predicted citizen trust ($\beta = 0.25$, $p < 0.001$) and perceived usefulness ($\beta = 0.22$, $p < 0.01$), thereby supporting hypotheses 1a and 1b. Similarly, digital regulatory transparency also significantly predicted citizen trust ($\beta = 0.30$, $p < 0.001$) and perceived usefulness ($\beta = 0.20$, $p < 0.01$), thereby supporting hypotheses 2a and 2b. Both mediators also significantly predicted e-commerce performance: citizen trust ($\beta = 0.28$, $p < 0.001$) and perceived usefulness ($\beta = 0.37$, $p < 0.001$), thereby supporting hypotheses 3 and 4.

Figure 2. Structural Model Results with Path Coefficients

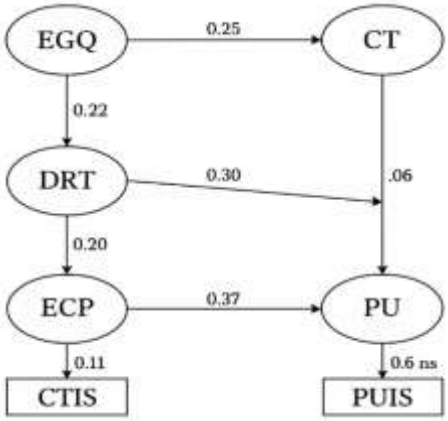
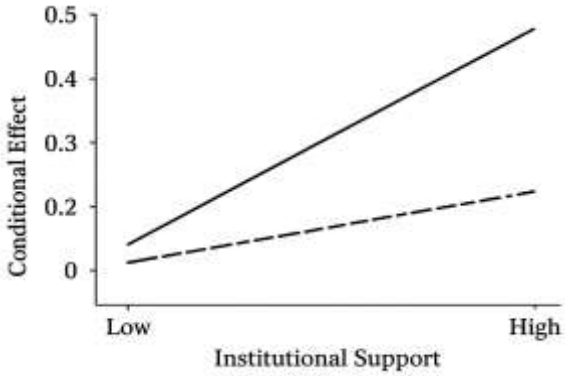


Figure 3. Moderating Effect of Institutional Support on the Citizen Trust – E-commerce Performance Relationship



Mediation Effects (Hypotheses 5 and 6): The indirect effects through the mediators were examined through the use of bootstrap analyses. The indirect effect of EGQ on ECP via CT was positive and statistically significant ($\beta = 0.070$, 95% CI [0.031, 0.124]), which supports hypothesis 5a. Similarly, the indirect effect of EGQ on ECP via PU was also statistically significant ($\beta = 0.081$, 95% CI [0.033, 0.142]), which supports hypothesis 6a. Analogously, the indirect effect of DRT on ECP via CT was also statistically significant ($\beta = 0.084$, 95% CI [0.039, 0.145]), which supports hypothesis 5b. Also, similarly, the indirect effect of DRT on ECP via PU was statistically significant ($\beta = 0.074$, 95% CI [0.027, 0.134]), which supports hypothesis 6b. These results therefore support the dual-mediator model.

Moderated Effects (Hypotheses 7 and 8): The interaction term between institutional support and citizen trust (CT x IS) was a statistically significant predictor of e-commerce performance ($\beta = 0.11$, $p < 0.05$). Using simple-slope analysis (see figure 3), it was shown that the relationship between CT and ECP was very strong and statistically significant when institutional support was at its highest (+1SD: $\beta = 0.39$, $p < 0.001$). On the other hand, the relationship between CT and ECP was weak and statistically marginal ($p < 0.10$) when institutional support was at its lowest (-1SD: $\beta = 0.17$). As such, this provides evidence that hypothesis 7 has been supported. Conversely,

the interaction term between institutional support and perceived usefulness (PU x IS) was not statistically significant ($\beta = 0.06$, $p = 0.18$). Thus, hypothesis 8 was not supported.

DISCUSSION

THEORETICAL IMPLICATIONS

The current research contributes to the literature of digital transformation especially in emerging countries at three levels. First, this study successfully combines the macro-level institutional theory with the micro-level theories of technology acceptance and trust. Thus, the research develops a more inclusive framework of studies focused on either one level of analysis. The research identifies the institutional pillars E-governance Quality and Digital Regulatory Transparency as foundational for the psychological antecedents of technology adoption, and thus expands the nomological network of TAM into the public administration domain. Second, the validation of the dual-mediation model represents a crucial finding of this study. It clarifies the exact mechanisms of both affective (trust) and cognitive-instrumental (usefulness) through which the digital initiatives of the state are translated into digital performance of the private sector. Additionally, the validation of the dual-mediation model addresses the research calls to clarify the intermediary processes in e-government impact studies (Rana et al., 2019). Third, the significant moderating role of Institutional Support on the trust-performance link is an important refinement of institutional theory. In addition to suggesting that normative and cognitive legitimacy (good governance and clear rules) foster trust, the translation of that trust into concrete action depends on the availability of institutional complements (i.e., regulative resources and support). The non-significant moderation for the PU-ECP path (H8) is interesting. It could suggest that once a technology is perceived as useful, the motivation to adopt is sufficient to offset moderate resource constraints, or that the general institutional support measures used in the study do not reflect the specific resources required to exploit the perceived usefulness of the technology. This provides a call for additional theoretical development.

PRACTICAL IMPLICATIONS

The results provide an actionable roadmap for policy makers and government entities in Pakistan and other countries where the government is developing its digital economy. Specifically, the strong effects of EGQ and DRT demonstrate that investing in digital services that are designed to meet the needs of users and the creation of clear digital business laws is not an administrative luxury; it is a critical investment in the country's economic development. Government agencies such as the Pakistan Software Export Board (PSEB) and the Federal Board of Revenue (FBR) should make improving portal usability and clarifying digital business law a core set of key performance indicators (KPI). Additionally, the significant role of Citizen Trust demonstrates that government agencies must be proactive in communicating how they will protect citizens' data and resolve disputes to create trust in their digital services. Finally, the moderating impact of Institutional Support suggests that building trust through communication and transparency must be accompanied by tangible supports for citizens and businesses. Policy makers should develop and publicize tangible supports such as discounted digital toolkits for Small and Medium Enterprises (SME), certified e-commerce training programs, and grants for digital marketing or logistics integration. When this "carrot" is used in combination with the "stick" of clear regulation and evidence of competence in delivering high-quality e-services, it can produce a powerful and complementary push-pull effect to encourage the use of e-commerce.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

The results of this study suggest avenues for further study. The first limitation of this study was its cross-sectional nature; although it provides useful information about how firms perceive and perform under new digital regulations, the causal relationship between the two can be established with greater confidence by longitudinal studies examining the change in perceptions and performance over time as regulatory changes occur. The second limitation of this study was its reliance upon self-reported data collected from one country; therefore, to establish whether the model tested here will generalize to other developing countries with other institutional environments, replicating the model in other developing countries would be useful. The third limitation of this study was that there were other unmeasured variables that could have influenced the relationships examined in this study, such as entrepreneurial orientation or competitive intensity. In the future, researchers could include measures of these as additional controls or moderators in their analyses. The fourth limitation of this study was that H8 was not significant; qualitative follow-up studies examining what specific type(s) of support (for example, technical integration support versus financial subsidies), if any, are necessary to convert perceived usefulness into actual

use of digital services would be needed to further investigate why H8 was not significant. Finally, an examination of the potentially darker side of new digital regulations (for example, the adverse impact of a highly regulated, yet flexible, system on innovation) would help to present a more complete picture of the effects of the new digital regulations.

CONCLUSION

The purpose of this study was to uncover the many different types of factors that drive the performance of e-commerce in Pakistan's changing digital economy. To move away from traditional firm-centric models of e-commerce performance, we developed and tested an empirical model of e-commerce adoption that positions the digital infrastructure of the government as the primary driver of e-commerce performance. Our results indicate that both the quality of e-gov services and the level of transparency of digital business regulations, although they are indirect drivers of e-commerce performance, are key determinants of both Citizen Trust in the digital ecosystem and the perceived usefulness of e-commerce as a business tool. Additionally, our results show that when institutional support is provided to businesses through various forms of resources, incentives, and capacity-building programs, Citizen Trust will be even more effective in leading to increased e-commerce performance. Therefore, we conclude that for countries wishing to develop their economies using the digital revolution, there should be a three-pronged strategy: developing excellent digital public services (EGQ); creating a transparent and fair digital regulatory framework (DRT); and providing institutions with the tools and support (IS) for businesses to operate and compete within. An integrative approach such as this does not only reduce barriers to entry but also creates a legitimate, trustworthy, and enabling environment for e-commerce to function as a mainstay engine of economic development and innovation.

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