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Citizen Adoption and Transparency in E-Government Services: Institutional Implementation Challenges in NADRA and FBR Perspective in Pakistan

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Abstract

This research examines the reasons behind Pakistan's slowness to fully adopt e-government services, focusing on two important federal organizations: NADRA and the FBR. In addition to surveying 250 residents, researchers conducted 20 in-depth interviews with employees of these regional offices in Hyderabad and Bahawalpur. They found that the most important variables influencing the adoption of e-government are institutional capability and digital literacy, but people's desire to use these services is only somewhat influenced by transparency and citizen adoption trust. The study also demonstrates how bureaucratic roadblocks, inadequate staff training, and privacy issues undermine public adoption trust and hinder the full implementation of e-government services. The citizens' adoption is further restricted by cultural and awareness concerns, particularly in urban areas like the Hyderabad region. The results highlight the need for improved digital education, improved ICT infrastructure, more transparent regulations, and strong institutional collaboration in all perspectives in order to overcome regional divides and gaps to increase the efficacy and reliability of the trustworthiness of the e-government services system for these particular regions and for all Pakistanis.

Key Words: E-Government Adoption, Digital Literacy, Institutional Transparency, Privacy Concerns, NADRA, FBR

Introduction

E-government plays a vital role in enhancing transparency and public service delivery, yet its adoption in Pakistan remains uneven due to institutional weaknesses, regional disparities, and persistent concerns about privacy and trust. This study, therefore, investigates both institutional and citizen-level factors to identify the enablers and barriers influencing the successful implementation of e-government services. (Saleh & Alyaseen, 2021). E-government has globally transformed public service delivery by promoting transparency, efficiency, and citizen engagement, yet its adoption in Pakistan remains uneven across regions. Addressing infrastructure gaps, enhancing digital literacy, and building citizen trust are crucial for ensuring inclusive and sustainable digital governance. Pakistan’s adoption of e-government services remains inconsistent due to regional disparities, institutional inefficiencies, and citizen-level challenges. By comparing Hyderabad and Bahawalpur, this

The study addresses the overlooked city-specific dynamics and highlights how transparency and trust mediate adoption intentions.

Literature Review

Research area Theme(s)	Key Points / Findings
E-Government Adoption Theories	Discusses the manner in which models that project citizen adoption behavior, such as the Diffusion of Innovation (DOI), the Unified Theory of Acceptance & Use of Technology (UTAUT), & the Technology Acceptance Model (TAM), functi*on.,(Venkatesh Morris & Davis, 2003).*

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Institutional Factors: Transparency, Trust, and Policy Enforcement	Adoption of e-services has benefited from increased citizen trust, which has been strengthened through robust institutional openness and uniform policy enforcement (Bento, Bento & White, 2014).
Citizen Factors: Digital Literacy, Privacy Concerns, and ICT Skills	Citizens with higher digital literacy and ICT skills are more likely to adopt e-government services, while privacy concerns negatively affect trust and adoption (Carter & Bélanger, 2005).
Regional & Comparative Studies in Pakistan	Few studies compare city-level adoption; existing research shows disparities between regions like Bahawalpur and Hyderabad due to infrastructure, literacy, and institutional responsiveness. (Alomari, Woods & Sandhu, 2012).
Gaps Identified from Literature	Limited city-level analyses, the underexplored mediating role of trust and transparency, and insufficient integration of privacy concerns as barriers; comparative studies across cities are rare. (Radzi & Lee, 2018).

Limited city-level studies in Pakistan

In Pakistan, almost all of the research on electronic government overlooks variations on grassroots levels in preference for focusing on national adoption rates. That limits our understanding of the various ways that organizational procedures, citizen skills, and especially local infrastructure influence adoption. As a result, possibilities as well as challenges particular to communities are still not fully understood. (Ali & Shah, 2019).

Underexplored institutional mediators (Transparency, Trust)

Transparency and trust are two essential institutional mediators that impact individuals' adoption of e-government services, though these remain inadequately recognized in Pakistan. Very few investigations have taken a look at how customer engagement and their perceptions of accountability and trustworthiness have been affected through institutional trustworthiness and clarity. To identify impediments while enhancing effective implementation tactics, or tactics, it is crucial that could be which has been understand these mediators (Bannister & Connolly, 2011)

Privacy Concerns as a Barrier

The adoption of e-government has been significantly impeded by privacy concerns, because people might be hesitant to engage with online services out of concern that their private data could be used improperly or hacked. These kinds of problems have the potential to reduce broad-term participation using online communities through undermining trust in institutions. (Bélanger & Carter, 2008).

Missing comparative analyses across cities (Bahawalpur vs Hyderabad)

A significant amount of the present study avoids comparison on the level of local administration (municipalities), in preference for concentrating upon national adoption trends. Accordingly, according to existing literature, nothing has been discovered concerning exactly what differences exist in e-government adoption between Hyderabad and Bahawalpur. (Manoharan & Ingrams, 2018)

Research Questions and Objectives

Research Questions		
Q-1	What institutional and citizen-level factors shape e-government adoption in NADRA and FBR services?	
Q-2	How do transparency and citizens' adoption trust mediate the adoption process?	
Q-3	What regional differences exist between Bahawalpur and Hyderabad in terms of citizens' adoption, transparency, and trust?	
	Research Objectives	**Justification**
R-1	**Examine the impact of digital literacy, institutional**	To attempt to discover the variables that most significantly drive or interfere with acceptance in NADRA and FBR services, this purpose

	transparency, ICT infrastructure, policy enforcement, and privacy concerns on adoption	requires examining the methods through which legislation implementation, digital literacy, institutional transparency, ICT infrastructure, as well as privacy concerns influence citizens' adoption of e-government services
R-2	**Assess the mediating role of transparency and trust**	For the purpose of establishing the extent to which institutional procedures influence citizen involvement, this research investigation investigates the way trust and transparency operate as intermediaries in the implementation of electronic government services. Through explaining these relationships, research pinpoints the various ways that adoption outcomes can be affected by proficiency in digital technologies, ICT infrastructure, implementation of policies, and privacy concerns. (Alomari M Woods P. &., 2012)
R-3	**Compare adoption levels and barriers between Bahawalpur and Hyderabad**	Increased digital literacy, enhanced ICT infrastructure, and more open-minded governance have significantly contributed to Bahawalpur's higher adoption rates. Hyderabad, on the other together, possesses a lower adoption percentage, primarily due to deficiencies in citizen trust, worries about privacy, and a less responsive system. (Alomari M Woods P. &., 2012)
R-4	**Propose Policy and institutional reforms to strengthen adoption**	In order to assist citizens, recognize e-government services more easily, recommended reforms to institutions and policies ought to concentrate on upgrading ICT infrastructure, increasing open communication, and improving digital literacy. In addition, establishing strong security measures for privacy, consistent regulations enforcement, and communication mechanisms will encourage trust and ongoing participation. (Alateyah, 2013).

Conceptual Framework

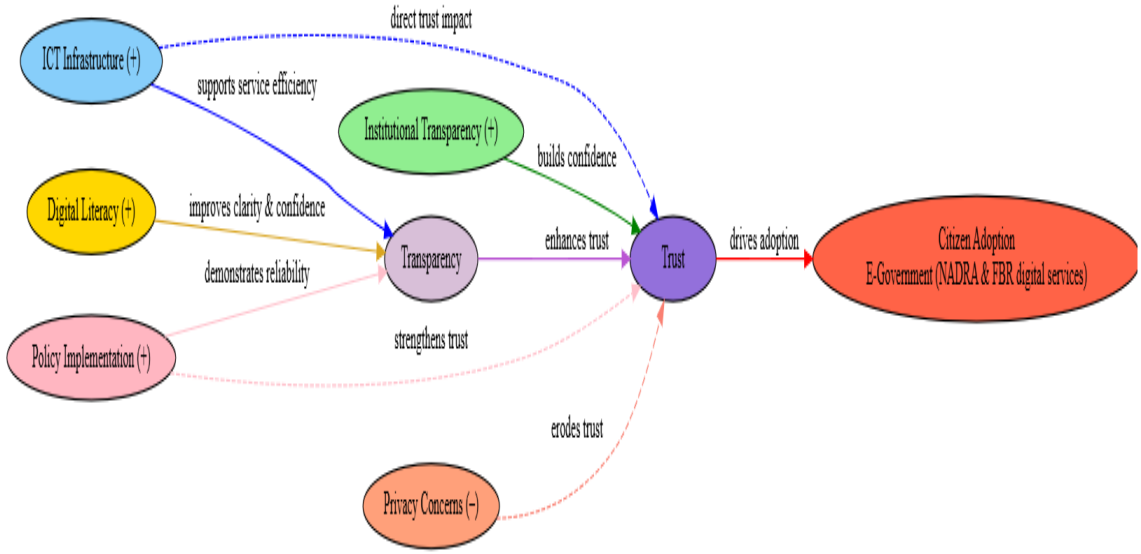

Figure 1 "Conceptual Model of E-Government Adoption: Hypothesized Relationships among Independent, Mediating, and Dependent Variables"

The dependent variable for the present investigation relates to the willingness to use NADRA and FBR services through citizens, which has been impacted by an assortment of independent variables. Though privacy concerns have been projected to have an adverse effect on adoption, digital literacy, institutional transparency, ICT infrastructure, and policy implementation will probably have a beneficial impact. Trust and transparency act as mediators, tying adoption results to institutional procedures.

Table 1
Conceptual Framework of Factors Influencing Citizen Adoption of NADRA & FBR E-Government Services

Variable Type	Variable Name	Expected Effect	Notes / Key Flows
• **Independent Variable (IV)**	Digital Literacy	+	Enhances citizen adoption

• **Independent Variable (IV)**	Institutional Transparency	**+**	Directly and indirectly (via trust) increases adoption
• **Independent Variable (IV)**	ICT Infrastructure	**+**	Supports adoption through reliable systems
• **Independent Variable (IV)**	Policy Implementation	**+**	Builds credibility and supports adoption
• **Independent Variable (IV)**	Privacy Concerns	**–**	Reduces trust, which lowers adoption
• **Mediator (MV)**	Transparency	**+**	Mediates between IVs and adoption
• **Mediator (MV)**	Citizen Trust	**+**	Key mediator: Transparency → Trust → Adoption
• **Dependent Variable (DV)**	Citizen Adoption of NADRA & FBR Services	**–**	Outcome variable affected by IVs and MVs
• **Key Flow**	Transparency → Trust → Adoption	**+**	Positive mediated pathway
• **Key Flow**	Transparency → Adoption (direct)	**+**	Direct positive effect
• **Key Flow**	Privacy Concerns → Trust → Adoption	**–**	Negative mediated effect

Material and Methods

Research Design: Mixed-methods comparative case study

This study adopted a convergent mixed-methods approach, integrating qualitative interviews with NADRA and FBR officials and quantitative surveys from citizens in Bahawalpur and Hyderabad. By triangulating institutional and civilian perspectives, the research ensured a comprehensive and scientifically rigorous understanding of e-government adoption in regional contexts. (Creswell J. W & Clark, 2017).

Population and Sample

The study employed a purposive random sampling approach for citizens and purposive sampling for institutional staff, ensuring inclusion of both service users and providers. By engaging 250 citizens and 20 staff members across Bahawalpur and Hyderabad, the sampling strategy achieved a balanced representation of perspectives on e-government adoption. (Molina & Fetters, 2022)

Results and Discussion

Table 2
Descriptive Statistics

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
➢ Respondent ID	250	249	1	250	125.50	72.313
➢ Age	250	16	16	32	22.23	4.365
➢ Digital Literacy	250	6	1	7	3.98	1.961
➢ Institutional Transparency	250	6	1	7	3.95	2.069
➢ ICT Infrastructure	250	6	1	7	3.81	2.068
➢ Policy Enforcement	250	6	1	7	3.88	1.992
➢ Privacy Concerns	250	6	1	7	4.10	2.042
➢ Trust	250	6	1	7	3.97	1.985
➢ Adoption Intention	250	6	1	7	3.87	1.922
➢ City Comparison	250	1	1	2	1.50	.501
➢ Gender Comparison	250	1	1	2	1.54	.500
➢ Age Comparison	250	16	1	17	7.23	4.365
➢ Education Level	250	4	1	5	2.97	1.429
➢ Digital Literacy	250	6	1	7	3.98	1.961
➢ Institutional Transparency	250	6	1	7	3.95	2.069
➢ ICT Infrastructure	250	6	1	7	3.81	2.068

➢ Policy Enforcement	250	6	1	7	3.88	1.992
➢ Privacy Concerns	250	6	1	7	4.10	2.042
➢ Trust in	250	6	1	7	3.97	1.985
➢ Adoption Intention	250	6	1	7	3.87	1.922
➢ Valid N (list-wise)	250					

Table 2
Descriptive Statistics

	Variance
➢ Respondent ID	5229.167
➢ Age	19.052
➢ Digital Literacy	3.847
➢ Institutional Transparency	4.279
➢ ICT Infrastructure	4.276
➢ Policy Enforcement	3.966
➢ Privacy Concerns	4.171
➢ Citizen Trust	3.939
➢ Adoption Intention	3.694
➢ City Comparison	.251
➢ Gender Comparison	.250
➢ Age Comparison	19.052
➢ Education Level	2.043
➢ Digital Literacy	3.847
➢ Institutional Transparency	4.279
➢ ICT Infrastructure	4.276
➢ Policy Enforcement	3.966
➢ Privacy Concerns	4.171
➢ Trust in	3.939
➢ Adoption Intention	3.694
➢ Valid N (list-wise)	

Table-2 presents the descriptive statistics of the study variables based on 250 respondents, showing mean values close to the mid-point of the 7-point scale for constructs such as digital literacy, transparency, ICT infrastructure, policy enforcement, trust, and adoption intention. The variance and standard deviations indicate moderate dispersion, suggesting diverse perceptions among respondents across both cities. (Field, 2024)

Table 3
Reliability Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	250	100.0
	Excluded[a]	0	.0
	Total	250	100.0

a. List-wise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.517	.414	13

Item-Total Statistics

	Scale Mean if Item Deleted	**Scale Variance if Item Deleted**	**Corrected Item-Total Correlation**	**Squared Multiple Correlation**
▪ Age	44.67	72.334	.636	.
▪ Age Comparison	59.67	72.334	.636	.
▪ Education Level	63.93	126.083	.326	.
▪ Digital Literacy	62.92	128.416	.142	.
▪ Institutional Transparency	62.95	130.547	.080	.
▪ ICT Infrastructure	63.09	132.012	.049	.
▪ Policy Enforcement	63.02	136.377	-.038	.
▪ Privacy Concerns	62.80	138.080	-.076	.
▪ Trust in	62.93	134.011	.014	.

▪	Adoption Intention	63.03	125.979	.207	.
▪	Gender Comparison	65.36	136.803	.132	.
▪	City Comparison	65.40	138.120	.019	.
▪	Adoption Intention	63.03	125.979	.207	.

Item-Total Statistics

		Cronbach's Alpha if Item Deleted
▪	Age	.285
▪	Age comparison	.285
▪	Education Level	.481
▪	Digital Literacy	.508
▪	Institutional Transparency	.521
▪	ICT Infrastructure	.527
▪	Policy Enforcement	.543
▪	Privacy Concerns	.551
▪	Trust in	.533
▪	Adoption Intention	.495
▪	Gender Comparison	.515
▪	City Comparison	.520
▪	Adoption Intention	.495

The reliability analysis of all variables yielded a Cronbach's Alpha of 0.517, indicating moderate internal consistency across the 13 items. While some variables, such as digital literacy and education level showed acceptable correlations, others like policy enforcement and privacy concerns lowered the overall reliability, suggesting the need for refinement of measurement items in future studies.

Table 4
Correlations

Correlations

		Adoption Intention	Digital Literacy	Institutional Transparency
Pearson Correlation	Adoption Intention	1.000	.219	-.054
	Digital Literacy	.219	1.000	.048
	Institutional Transparency	-.054	.048	1.000
	ICT Infrastructure	-.028	.002	-.011
	Policy Enforcement	-.068	-.025	.088
	Privacy Concerns	.018	.058	-.001
Sig. (1-tailed)	Adoption Intention	.	<.001	.197
	Digital Literacy	.000	.	.224
	Institutional Transparency	.197	.224	.
	ICT Infrastructure	.327	.489	.434
	Policy Enforcement	.142	.345	.082
	Privacy Concerns	.391	.182	.495
N	Adoption Intention	250	250	250
	Digital Literacy	250	250	250
	Institutional Transparency	250	250	250
	ICT Infrastructure	250	250	250
	Policy Enforcement	250	250	250
	Privacy Concerns	250	250	250

Correlations

		ICT Infrastructure	Policy Enforcement	Privacy Concerns
Pearson Correlation	Adoption Intention	-.028	-.068	.018
	Digital Literacy	.002	-.025	.058
	Institutional Transparency	-.011	.088	-.001
	ICT Infrastructure	1.000	.045	.000
	Policy Enforcement	.045	1.000	.063
	Privacy Concerns	.000	.063	1.000
Sig. (1-tailed)	Adoption Intention	.327	.142	.391
	Digital Literacy	.489	.345	.182
	Institutional Transparency	.434	.082	.495
	ICT Infrastructure	.	.238	.499
	Policy Enforcement	.238	.	.160
	Privacy Concerns	.499	.160	.
N	Adoption Intention	250	250	250

	Digital Literacy	250	250	250
	Institutional Transparency	250	250	250
	ICT Infrastructure	250	250	250
	Policy Enforcement	250	250	250
	Privacy Concerns	250	250	250

Note: Curated Help is calculated based on actual cell values, not the formatted values.

Variables Entered/Removed			
Model	Variables Entered	**Variables Removed**	**Method**
1	Privacy Concerns, ICT Infrastructure, Institutional Transparency, Digital Literacy, Policy Enforcement[b]	.	Enter
a. Dependent Variable: Adoption Intention			
b. All requested variables entered.			

The correlation results indicate that adoption intention had a weak but significant positive relationship with digital literacy (r = .219, p < .001), while institutional transparency showed a slight negative but non-significant correlation (r = –.054, p = .197). Other variables, including ICT infrastructure, policy enforcement, and privacy concerns, exhibited very weak and non-significant correlations with adoption intention.

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.237[a]	.056	.037	1.887
a. Predictors: (Constant), Privacy Concerns, ICT Infrastructure, Institutional Transparency, Digital Literacy, Policy Enforcement				

ANOVA[a]						
	Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	51.521	5	10.304	2.895	.015[b]
	Residual	868.383	244	3.559		
	Total	919.904	249			
a. Dependent Variable: Adoption Intention						
b. Predictors: (Constant), Privacy Concerns, ICT Infrastructure, Institutional Transparency, Digital Literacy, Policy Enforcement						

Coefficients[a]						
	Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	3.510	.509		6.891	<.001
	Digital Literacy	.215	.061	.220	3.520	<.001
	Institutional Transparency	-.056	.058	-.060	-.959	.338
	ICT Infrastructure	-.025	.058	-.027	-.432	.666
	Policy Enforcement	-.054	.060	-.056	-.899	.370
	Privacy Concerns	.008	.059	.008	.135	.893
a. Dependent Variable: Adoption Intention						

Table 5 T-Test

- **One-Sample Statistics**

	N	***Mean***	***Std. Deviation***	***Std. Error Mean***
▪ City Comparison	250	1.50	.501	.032
▪ Gender comparison	250	1.54	.500	.032
▪ Age comparison	250	7.23	4.365	.276
▪ Education Level	250	2.97	1.429	.090
▪ Digital Literacy	250	3.98	1.961	.124
▪ Institutional Transparency	250	3.95	2.069	.131
▪ ICT Infrastructure	250	3.81	2.068	.131
▪ Policy Enforcement	250	3.88	1.992	.126
▪ Privacy Concerns	250	4.10	2.042	.129
▪ Trust in	250	3.97	1.985	.126
▪ Adoption Intention	250	3.87	1.922	.122

One-Sample Test

Test Value = 0

	t	df	Significance		Mean Difference
			One-Sided p	Two-Sided p	
▪ City Comparison	47.339	249	<.001	<.001	1.500
▪ Gender comparison	48.601	249	<.001	<.001	1.536
▪ Age comparison	26.183	249	<.001	<.001	7.228
▪ Education Level	32.873	249	<.001	<.001	2.972
▪ Digital Literacy	32.053	249	<.001	<.001	3.976
▪ Institutional Transparency	30.208	249	<.001	<.001	3.952
▪ ICT Infrastructure	29.116	249	<.001	<.001	3.808
▪ Policy Enforcement	30.835	249	<.001	<.001	3.884
▪ Privacy Concerns	31.743	249	<.001	<.001	4.100
▪ Trust in	31.644	249	<.001	<.001	3.972
▪ Adoption Intention	31.852	249	<.001	<.001	3.872

One-Sample Test

	Test Value = 0	
	95% Confidence Interval of the Difference	
	Lower	Upper
▪ City Comparison	1.44	1.56
▪ Gender comparison	1.47	1.60
▪ Age comparison	6.68	7.77
▪ Education Level	2.79	3.15
▪ Digital Literacy	3.73	4.22
▪ Institutional Transparency	3.69	4.21
▪ ICT Infrastructure	3.55	4.07
▪ Policy Enforcement	3.64	4.13
▪ Privacy Concerns	3.85	4.35
▪ Trust in	3.72	4.22
▪ Adoption Intention	3.63	4.11

One way ANOVA

		Sum of Squares	*df*	*Mean Square*	*F*
City Comparison	Between Groups	1.704	6	.284	1.135
	Within Groups	60.796	243	.250	
	Total	62.500	249		
Gender Comparison	Between Groups	1.444	6	.241	.963
	Within Groups	60.732	243	.250	
	Total	62.176	249		
Age Comparison	Between Groups	107.155	6	17.859	.936
	Within Groups	4636.849	243	19.082	
	Total	4744.004	249		
Education Level	Between Groups	3.231	6	.539	.259
	Within Groups	505.573	243	2.081	
	Total	508.804	249		
Digital Literacy	Between Groups	57.763	6	9.627	2.599
	Within Groups	900.093	243	3.704	
	Total	957.856	249		
Institutional Transparency	Between Groups	23.737	6	3.956	.923
	Within Groups	1041.687	243	4.287	
	Total	1065.424	249		
ICT Infrastructure	Between Groups	32.895	6	5.482	1.291
	Within Groups	1031.889	243	4.246	
	Total	1064.784	249		
Policy Enforcement	Between Groups	15.882	6	2.647	.662
	Within Groups	971.754	243	3.999	
	Total	987.636	249		
Privacy Concerns	Between Groups	17.241	6	2.873	.684
	Within Groups	1021.259	243	4.203	
	Total	1038.500	249		
Trust in	Between Groups	21.825	6	3.638	.922
	Within Groups	958.979	243	3.946	
	Total	980.804	249		
Adoption Intention	Between Groups	919.904	6	153.317	.
	Within Groups	.000	243	.000	
	Total	919.904	249		

ANOVA Effect Sizes[a,b]

		Point Estimate	95% Confidence Interval	
			Lower	Upper
City comparison	Eta-squared	.027	.000	.054
	Epsilon-squared	.003	-.025	.031
	Omega-squared Fixed-effect	.003	-.025	.031
	Omega-squared Random-effect	.001	-.004	.005
Gender Comparison	Eta-squared	.023	.000	.047
	Epsilon-squared	-.001	-.025	.023
	Omega-squared Fixed-effect	-.001	-.025	.023
	Omega-squared Random-effect	.000	-.004	.004
Age Comparison	Eta-squared	.023	.000	.046
	Epsilon-squared	-.002	-.025	.022
	Omega-squared Fixed-effect	-.002	-.025	.022
	Omega-squared Random-effect	.000	-.004	.004
Education Level	Eta-squared	.006	.000	.006
	Epsilon-squared	-.018	-.025	-.019
	Omega-squared Fixed-effect	-.018	-.025	-.019
	Omega-squared Random-effect	-.003	-.004	-.003
Digital Literacy	Eta-squared	.060	.001	.104
	Epsilon-squared	.037	-.023	.082
	Omega-squared Fixed-effect	.037	-.023	.082
	Omega-squared Random-effect	.006	-.004	.015
Institutional Transparency	Eta-squared	.022	.000	.045
	Epsilon-squared	-.002	-.025	.021
	Omega-squared Fixed-effect	-.002	-.025	.021
	Omega-squared Random-effect	.000	-.004	.004
ICT Infrastructure	Eta-squared	.031	.000	.060
	Epsilon-squared	.007	-.025	.037
	Omega-squared Fixed-effect	.007	-.025	.037
	Omega-squared Random-effect	.001	-.004	.006
Policy Enforcement	Eta-squared	.016	.000	.033
	Epsilon-squared	-.008	-.025	.009
	Omega-squared Fixed-effect	-.008	-.025	.009
	Omega-squared Random-effect	-.001	-.004	.001
Privacy Concerns	Eta-squared	.017	.000	.034
	Epsilon-squared	-.008	-.025	.010
	Omega-squared Fixed-effect	-.008	-.025	.010
	Omega-squared Random-effect	-.001	-.004	.002
Trust in	Eta-squared	.022	.000	.045
	Epsilon-squared	-.002	-.025	.021
	Omega-squared Fixed-effect	-.002	-.025	.021
	Omega-squared Random-effect	.000	-.004	.004
Adoption Intention	Eta-squared	.	.	.
	Epsilon-squared	.	.	.
	Omega-squared Fixed-effect	.	.	.
	Omega-squared Random-effect	.	.	.

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.

Table 6
Staff Interviews: 20 participants (10 NADRA, 10 FBR)

Descriptive Statistics					
	N	Range	Mean	Std. Deviation	Variance
CITY$	20	1	1.45	.510	.261
Position/Role	20	3	3.15	.813	.661
Years of Experience	20	9	5.60	2.981	8.884
Notes on Transparency	20	3	2.80	1.105	1.221
Notes on ICT	20	3	2.50	1.318	1.737
Notes on Policy Enforcement	20	3	2.75	1.164	1.355
Notes on Privacy & Trust	20	3	2.65	1.182	1.397
Years of Experience	20	12	9.10	3.946	15.568
Organizational	20	1	1.30	.470	.221
Valid N (list-wise)	20				

Table 7
Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Notes on Privacy & Trust, Years of Experience, Position/Role, Notes on Transparency, Notes on Policy Enforcement, CITY$, Notes on ICT[b]	.	Enter

a. Dependent Variable: Organizational

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.366[a]	.134	-.371	.551

a. Predictors: (Constant), Notes on Privacy & Trust, Years of Experience, Position/Role, Notes on Transparency, Notes on Policy Enforcement, CITY$, Notes on ICT

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.563	7	.080	.265	.956[b]
	Residual	3.637	12	.303		
	Total	4.200	19			

a. Dependent Variable: ORGANIZATIONAL

b. Predictors: (Constant), Notes on Privacy & Trust, Years of Experience, Position/Role, Notes on Transparency, Notes on Policy Enforcement, CITY$, Notes on ICT

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.746	.980		.762	.461
	CITY$	.181	.292	.196	.619	.547
	Position/Role	.080	.185	.139	.434	.672
	Years of Experience	.015	.044	.097	.350	.732
	Notes on Transparency	-.131	.134	-.308	-.981	.346
	Notes on ICT	.011	.114	.030	.095	.926
	Notes on Policy Enforcement	.013	.126	.032	.102	.921
	Notes on Privacy & Trust	.097	.136	.244	.713	.490

a. Dependent Variable: Organizational

Table 8
Reliability Scale: ALL VARIABLES

Case Processing Summary

		N	*%*
Cases	Valid	20	100.0
	Excluded[a]	0	.0
	Total	20	100.0

a. List-wise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha[a]	*Cronbach's Alpha Based on Standardized Items*	*N of Items*
-.023	.021	8

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.

Inter-Item Correlation Matrix

	Organizational	*CITY$*	*Position/Role*	*Years of Experience*	*Notes on Transparency*
Organizational	1.000	.066	.014	.128	-.182
CITY$	.066	1.000	-.298	-.152	.355
Position/Role	.014	-.298	1.000	-.061	.152
Years of Experience	.128	-.152	-.061	1.000	-.137
Notes on Transparency	-.182	.355	.152	-.137	1.000
Notes on ICT	-.085	-.196	.074	.013	-.145

Notes on Policy Enforcement	.144	-.155	.320	.106	-.082
Notes on Privacy & Trust	.199	.188	-.107	.093	.226

Inter-Item Correlation Matrix

	Notes on ICT	*Notes on Policy Enforcement*	*Notes on Privacy & Trust*
Organizational	-.085	.144	.199
CITY$	-.196	-.155	.188
Position/Role	.074	.320	-.107
Years of Experience	.013	.106	.093
Notes on Transparency	-.145	-.082	.226
Notes on ICT	1.000	-.154	-.524
Notes on Policy Enforcement	-.154	1.000	.277
Notes on Privacy & Trust	-.524	.277	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	*Scale Variance if Item Deleted*	*Corrected Item-Total Correlation*	*Squared Multiple Correlation*
Organizational	20.90	14.726	.134	.134
CITY$	20.75	15.671	-.124	.303
Position/Role	19.05	14.471	.049	.306
Years of Experience	16.60	6.358	.013	.074
Notes on Transparency	19.40	14.674	-.055	.322
Notes on ICT	19.70	16.326	-.247	.288
Notes on Policy Enforcement	19.45	12.682	.168	.254
Notes on Privacy & Trust	19.55	13.418	.071	.411

Item-Total Statistics

	Cronbach's Alpha if Item Deleted
Organizational	-.063[a]
CITY$	.014
Position/Role	-.049[a]
Years of Experience	-.091[a]
Notes on Transparency	.013
Notes on ICT	.166
Notes on Policy Enforcement	-.156[a]
Notes on Privacy & Trust	-.080[a]

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.

ANOVA with Cochran's Test

		Sum of Squares	**df**	**Mean Square**	**Cochran's Q**	**Sig**
Between People		36.650	19	1.929		
Within People	Between Items	242.900	7	34.700	67.305	<.001
	Residual	262.350	133	1.973		
	Total	505.250	140	3.609		
Total		541.900	159	3.408		

Grand Mean = 2.78

Correlations

		Organizational	**CITY$**	**Position/Role**
✓ Organizational	Pearson Correlation	1	.066	.014
	Sig. (2-tailed)		.783	.954
	N	20	20	20
✓ CITY$	Pearson Correlation	.066	1	-.298
	Sig. (2-tailed)	.783		.202
	N	20	20	20
✓ Position/Role	Pearson Correlation	.014	-.298	1
	Sig. (2-tailed)	.954	.202	
	N	20	20	20

✓ Years of Experience	Pearson Correlation	.128	-.152	-.061
	Sig. (2-tailed)	.592	.522	.799
	N	20	20	20
✓ Notes on Transparency	Pearson Correlation	-.182	.355	.152
	Sig. (2-tailed)	.442	.125	.521
	N	20	20	20
✓ Notes on ICT	Pearson Correlation	-.085	-.196	.074
	Sig. (2-tailed)	.722	.409	.757
	N	20	20	20
✓ Notes on Policy Enforcement	Pearson Correlation	.144	-.155	.320
	Sig. (2-tailed)	.544	.514	.169
	N	20	20	20
✓ Notes on Privacy & Trust	Pearson Correlation	.199	.188	-.107
	Sig. (2-tailed)	.401	.428	.654
	N	20	20	20

Correlations

		Years of Experience	*Notes on Transparency*	*Notes on ICT*
✓ Organizational	Pearson Correlation	.128	-.182	-.085
	Sig. (2-tailed)	.592	.442	.722
	N	20	20	20
✓ CITY$	Pearson Correlation	-.152	.355	-.196
	Sig. (2-tailed)	.522	.125	.409
	N	20	20	20
✓ Position/Role	Pearson Correlation	-.061	.152	.074
	Sig. (2-tailed)	.799	.521	.757
	N	20	20	20
✓ Years of Experience	Pearson Correlation	1	-.137	.013
	Sig. (2-tailed)		.563	.955
	N	20	20	20
✓ Notes on Transparency	Pearson Correlation	-.137	1	-.145
	Sig. (2-tailed)	.563		.543
	N	20	20	20
✓ Notes on ICT	Pearson Correlation	.013	-.145	1
	Sig. (2-tailed)	.955	.543	
	N	20	20	20
✓ Notes on Policy Enforcement	Pearson Correlation	.106	-.082	-.154
	Sig. (2-tailed)	.656	.732	.516
	N	20	20	20
✓ Notes on Privacy & Trust	Pearson Correlation	.093	.226	-.524*
	Sig. (2-tailed)	.698	.339	.018
	N	20	20	20

Correlations

		Notes on Policy Enforcement	**Notes on Privacy & Trust**
✓ Organizational	Pearson Correlation	.144	.199
	Sig. (2-tailed)	.544	.401
	N	20	20
✓ CITY$	Pearson Correlation	-.155	.188
	Sig. (2-tailed)	.514	.428
	N	20	20
✓ Position/Role	Pearson Correlation	.320	-.107
	Sig. (2-tailed)	.169	.654
	N	20	20
✓ Years of Experience	Pearson Correlation	.106	.093
	Sig. (2-tailed)	.656	.698
	N	20	20
✓ Notes on Transparency	Pearson Correlation	-.082	.226
	Sig. (2-tailed)	.732	.339
	N	20	20

✓ Notes on ICT	Pearson Correlation	-.154	-.524*
	Sig. (2-tailed)	.516	.018
	N	20	20
✓ Notes on Policy Enforcement	Pearson Correlation	1	.277
	Sig. (2-tailed)		.237
	N	20	20
✓ Notes on Privacy & Trust	Pearson Correlation	.277	1
	Sig. (2-tailed)	.237	
	N	20	20

*. Correlation is significant at the 0.05 level (2-tailed).

Pearson Correlations ■■ Highly Positive: *(None)* **■■ Positive:** *(ORGANIZATIONAL <---> CITY$), (ORGANIZATIONAL <---> Position/Role), (ORGANIZATIONAL <---> Years of Experience), (ORGANIZATIONAL <---> Notes on Policy Enforcement), (ORGANIZATIONAL <---> Notes on Privacy & Trust), (CITY$ <---> Notes on Transparency), (CITY$ <---> Notes on Privacy & Trust), (Position/Role <---> Notes on Transparency), (Position/Role <---> Notes on ICT), (Position/Role <---> Notes on Policy Enforcement), (Years of Experience <---> Notes on ICT), (Years of Experience <---> Notes on Policy Enforcement), (Years of Experience <---> Notes on Privacy & Trust), (Notes on Transparency <---> Notes on Privacy & Trust), (Notes on Policy Enforcement <---> Notes on Privacy & Trust)* **■■ No Linear Correlation:** *(None)* **■■ Negative:** *(ORGANIZATIONAL <---> Notes on Transparency), (ORGANIZATIONAL <---> Notes on ICT), (CITY$ <---> Position/Role), (CITY$ <---> Years of Experience), (CITY$ <---> Notes on ICT), (CITY$ <---> Notes on Policy Enforcement), (Position/Role <---> Years of Experience), (Position/Role <---> Notes on Privacy & Trust), (Years of Experience <---> Notes on Transparency), (Notes on Transparency <---> Notes on ICT), (Notes on Transparency <---> Notes on Policy Enforcement), (Notes on ICT <---> Notes on Policy Enforcement), (Notes on ICT <---> Notes on Privacy & Trust)* **■■ Highly Negative:** *(None)Note: Curated Help is calculated based on actual cell values, not the formatted values.*

Findings

Survey: 250 Respondents (125 Bahawalpur, 125 Hyderabad)

The survey collected responses from 250 participants, equally divided between Bahawalpur and Hyderabad, ensuring balanced representation. Descriptive statistics revealed an average age of 22.23 years, highlighting a predominantly young respondent base. Digital literacy (M=3.98), institutional transparency (M=3.95), and trust (M=3.97) scored moderately, while privacy concerns (M=4.10) appeared slightly higher. Adoption intention (M=3.87) was also moderate, indicating cautious but positive willingness toward e-government services. Reliability analysis (Cronbach's Alpha=.517) showed moderate internal consistency, while regression results identified digital literacy as a significant predictor of adoption. These findings suggest that improving digital skills and institutional credibility could enhance adoption. (Sharma, Bidari & Bidari, 2023)

Staff Interviews: 20 Participants (10 NADRA, 10 FBR)

The qualitative insights from 20 staff members 10 from NADRA and 10 from FBR—provided an institutional perspective on e-government adoption challenges. Participants represented varied positions and experience levels, averaging 5.6 years of service. Key themes highlighted gaps in ICT infrastructure, limited policy enforcement, and persistent concerns around privacy and trust. While staff recognized gradual improvements in transparency, they emphasized the need for better coordination between technology and governance frameworks. Regression analysis, however, showed weak associations among organizational variables, indicating inconsistency across institutional practices. Overall, staff perspectives underscored structural, technological, and trust-related barriers that significantly affect e-government effectiveness. (Anjum & Ahmed, 2025).

Quantitative Findings

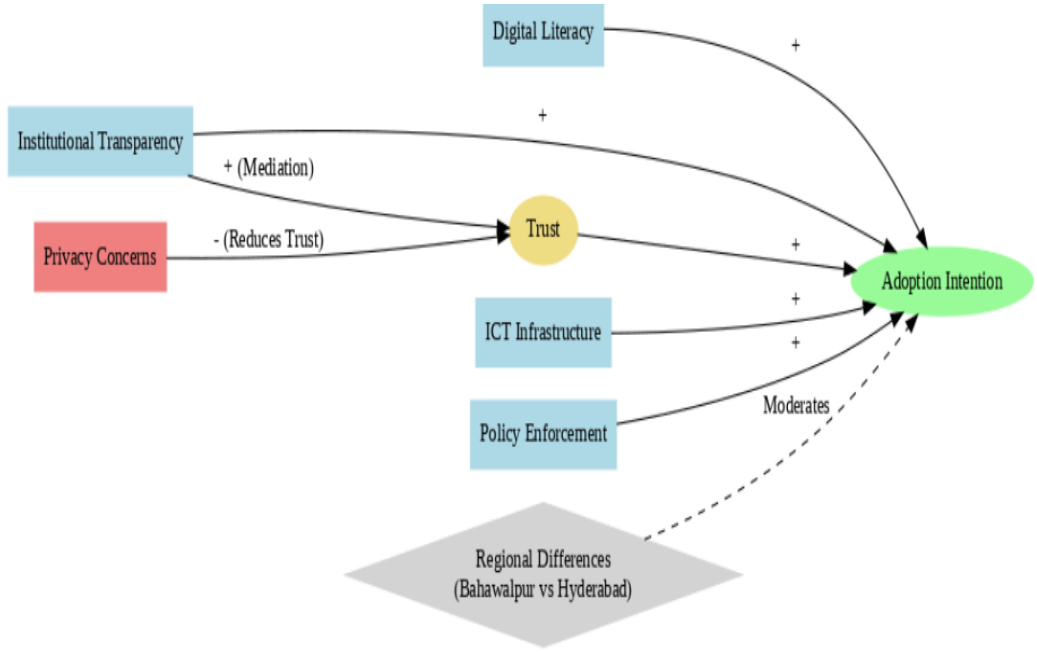

Figure 2 "Drivers, Barriers, Mediation, and Regional Variations in E-Government

"Citizen Adoption Intention"

The positive drivers such as digital literacy, institutional transparency, ICT infrastructure, and policy enforcement significantly enhance citizens' intention to adopt e-government services. Conversely, privacy concerns reduce trust, acting as a negative driver, with mediation effects of trust and regional differences between Bahawalpur and Hyderabad shaping adoption outcomes. (Ngongo, 2024)

Qualitative Findings (Staff Interviews)

Transparency gaps

Transparency gaps in public institutions often hinder citizens' trust and reduce the effectiveness of e-government initiatives. These gaps arise from limited information sharing, inconsistent policies, and lack of accountability in service delivery. (Manenji & Marufu, 2016)

ICT issues

ICT issues often arise due to inadequate infrastructure, limited resources, and outdated systems that hinder smooth digital service delivery. These challenges reduce efficiency, create delays, and weaken citizens' trust in adopting e-government platforms. (Heeks, 2005)

Weak enforcement and staff training

Weak enforcement of policies limits consistency in implementing e-government initiatives. In addition, inadequate staff training reduces efficiency and hampers effective service delivery. (Howard M, 2001)

Cyber-security risks

Cyber-security risks refer to potential threats that compromise the confidentiality, integrity, and availability of digital systems, data, and networks. These risks include hacking,

phishing, malware, data breaches, and insider threats, which can disrupt operations and undermine trust. (Backman, 2023)

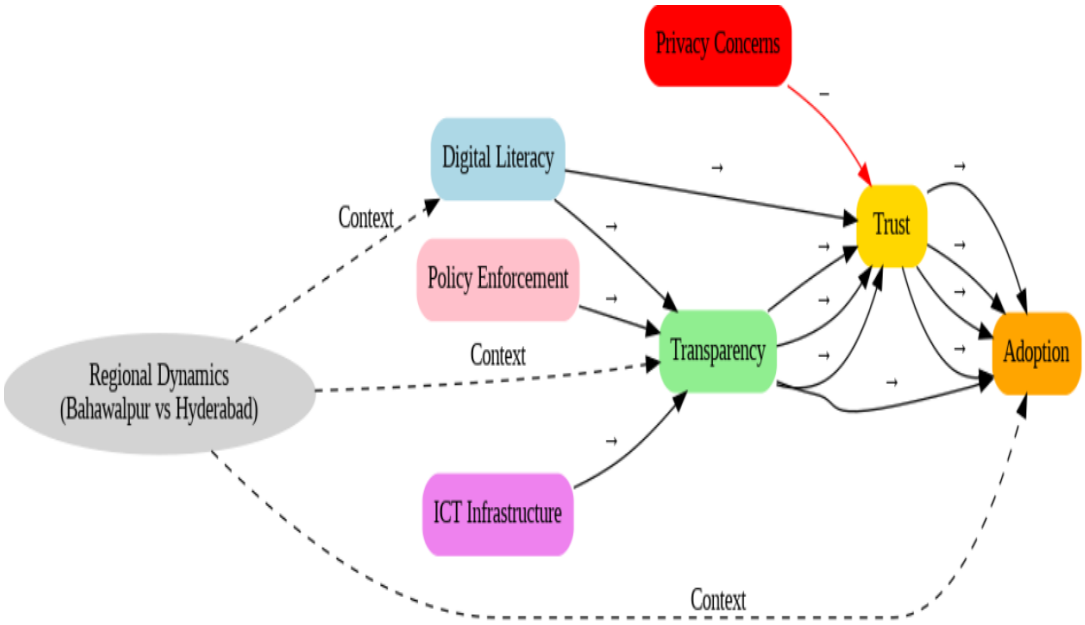

Figure No. 3: Regional Dynamics toward Citizen Adoption

The discussion highlights how digital literacy emerged as a critical driver of e-government adoption, while institutional transparency, policy enforcement, and ICT infrastructure showed weaker influences. Staff interviews further revealed that organizational gaps, privacy concerns, and limited trust remain significant barriers, aligning with survey findings and emphasizing the need for holistic reforms. (Al Hujran O Aloudat, 2013)

Conclusion

This study concludes that e-government adoption in Pakistan is shaped by multi-layered factors, encompassing citizen-level attributes such as digital literacy and institutional-level determinants like policy enforcement and ICT infrastructure. Among these, transparency and trust emerged as central elements, directly influencing citizens' willingness to engage with digital services. The findings also highlight regional inequalities, as participants from Bahawalpur and Hyderabad reflected differing levels of access, digital readiness, and perceptions of government performance. These disparities underscore the need for context-specific strategies, where improving institutional credibility, ensuring data privacy, and reducing the urban–regional digital divide are essential for sustainable adoption.

Policy Recommendations

To strengthen e-government adoption, three levels of policy recommendations are proposed. At the policy level, governments should design local strategies, enforce strong privacy protection laws, and invest in continuous capacity-building to ensure sustainability. At the institutional level, NADRA and FBR must prioritize transparency, upgrade ICT infrastructure, enhance cyber-security measures, and establish effective citizen feedback systems to improve service quality. At the citizen level, digital literacy programs should be expanded alongside trust-building campaigns and community engagement initiatives, ensuring inclusivity. Collectively, these measures can reduce barriers, build confidence, and promote wider acceptance of digital governance in Pakistan.

Limitations

This study is subject to several limitations that must be acknowledged. First, the geographic scope was restricted to only two cities, Bahawalpur and Hyderabad, which limits the generalizability of findings to other regions of Pakistan. Second, the cross-sectional design captures perceptions at a single point in time, preventing insights into changes or trends over time. Third, reliance on self-reported survey data may introduce biases such as social desirability or inaccurate recall. Additionally, the institutional scope was limited to NADRA and FBR, excluding other key public agencies. Finally, qualitative insights lacked depth due to a relatively small interview sample.

Future Research

Future research on e-government adoption should broaden its scope by including rural and metropolitan contexts to capture diverse socio-economic and infrastructural variations. Longitudinal studies are essential to track adoption patterns and behavioral changes over time. Combining survey-based perceptions with actual usage logs would provide richer insights into citizen behavior and institutional performance. Beyond tax and registration services, future work should examine adoption in health, education, and municipal governance sectors. Advanced statistical techniques such as Structural Equation Modeling (SEM).

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