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A Comparative Study of NADRA & FBR in Hyderabad and Bahawalpur: Citizens' Perceptions of Accessibility, Institutional Effectiveness, Transparency in e-Government Services in Pakistan

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Abstract

Although e-government is now recognized as an essential resource to execute public services, its effectiveness in many emerging economies is mainly determined by how accessible, effective, and democratic citizens believe their institutions to be. Pakistan has made relatively little advancement in implementing e-government when compared to nations like South Korea and Estonia. This study investigates the implications of the National Database and Registration Authority (NADRA) and the Federal Board of Revenue (FBR) upon the reliability of the people within Hyderabad (Sindh) and Bahawalpur (Punjab) districts. A combination of methods was used, which included a standardized survey (n=250) with experts, whereas structural equation modelling (SEM) assessed connections between variables (H1–H5). The results demonstrate that individuals experience big problems using institutions; however, they also show that changes might render digital platforms more trustworthy and accessible as well as enduring, thereby building trust in e-government services. The paper presents critical recommendations for policy that might improve Pakistan's electronic government systems as per world-class standards, make them more effective, and encourage the provision of services that prioritize citizens' first service digitally.

Keywords: *E-Government, NADRA, FBR, Accessibility, Institutional Effectiveness, Transparency, Reforms, Hyderabad, Bahawalpur, Pakistan.*

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Introduction

Background of e-Government in Pakistan

By adopting electronic government services (e-Government), an innovative, novel phenomenon has been developed for enhancing mass services, which has created additional accessible, efficient, and transparent facilities for all. (Ahmad S & Iqbal M, 2024) The Federal Board of Revenue (FBR) and the National Database and Registration Authority (NADRA) have been two organizations in Pakistan that have had significant effects on the way individuals use the internet service to interact with the Government to Government (G2G), Government to Citizen (G2C), Government to Business (G2B), and Government to Employee (G2E). (OmweriF S, 2024) Two medium-populous cities, Hyderabad and Bahawalpur, with disparate socio-economic and geographic conditions, are the subjects of study. (Anwar F & Rashid, 2022). The study offers valuable insights by evaluating institutional performance and public perceptions, focusing on ease of access, past reforms in transparency, and trust among various organizations, while also contextualizing the results within broader electronic government literature and policy discussions. (Hasan A Alenazy A A Habib S & Husain S, 2024).

A major shift in the way Pakistan's political system shows a will to operate is the e-government infrastructure. The government's proactive utilization of Computer-based technology, or ICTs, has become essential to boosting the effectiveness, accessibility, and transparency of government services. *(Qureshi T. & Aslam M., 2022).* Internet-based tools have been used by several organizations over the last 20 years to combat zero corruption in all public institutions, by digital supply services to each individual, and to accelerate administrative processes in the country (Aslam M & Qureshi T, 2022). In the last twenty years, numerous organizations have utilized online resources to combat corruption and render services for individuals, as well as speed up bureaucratic processes (Bhatti A & Rehman K, 2023).

However, the effectiveness of e-Govt. regulations is greatly influenced by digital literacy, institutions' competence, and public perceptions, which significantly impact. As in Hyderabad and Bahawalpur for controls. These kinds of initiatives have been utilized with various interest rates throughout various places, such as Hyderabad and Bahawalpur. For example, these sorts of digital projects have been installed with different interest rates. Having variations in socioeconomic level and ICT infrastructure challenges might be the cause of these disparities (Chaudhry M. & Farooq S, 2021).

Problem Statement and Research Gap

Over the past decade, several government departments in Pakistan have been spending considerable amounts of money on ICT to assist in real-time implementation programs designed to modernize and enhance public service delivery. Several of the above groups, like NADRA and FBR, have been very important in pushing for digital transformation while assisting with promoting sustainable development. However, there are also problems with how people perceive

digital services, how effectively institutions work, and how accessible digital services have become, particularly within locations like Hyderabad and Bahawalpur.

NADRA has been the initial organization to provide digital identity solutions; however, its biometric systems continue to experience problems, including inadequate customer service, risks related to cybersecurity, outdated facilities, and technological limitations. These problems and an increasing deficit in digital literacy make it more challenging for businesses to offer satisfactory service. The Federal Board of Revenue (FBR) additionally experiences issues with technology on its digital platforms, considering that it provides online tax systems. Due to low system efficiency, overreliance on intermediaries, and a general decline in public trust, its e-services have not been used as much as they could have been. These integration difficulties make it much harder for people to have confidence and believe in Pakistan's e-government projects.

Meanwhile, curriculum development has significantly evolved over the years. Today, curriculum developers and designers determine what should be covered in class, but they also concentrate on the best way students learn particular subjects. Their companies accomplish those goals through employing teaching methods and activities that make learning more successful.

Research Significance and Limitations

The study incorporates how citizens in Hyderabad and Bahawalpur perceived the accessibility, effectiveness, and transparency of the NADRA and FBR platforms and analyzes these core administration and research aims to inform reforms that need trust improve service delivery and support sustainable digital Pakistan. The scope is limited to the urban inhabitants in two regions of districts, whereas the provided expressively localized data can guide improvement in NADRA and FBR while offering a foundation for deeper future research context.

Literature Review and Theoretical Foundation.

This section of the paper presents a review of relevant literature that supports the objectives of the study and seeks to address the research questions raised. The literature serves as secondary data to strengthen the present investigation. The primary motivation behind e-government lies in the belief that technological advancements can enhance the accessibility, efficiency, and accountability of government services. Similarly, Puron-Cid (2022) emphasizes that technology has the potential to make government facilities more user-friendly, improve operational effectiveness, and ensure greater responsibility in public administration. (Puron-Cid, 2022).

The confidence of individuals and accessibility to government offerings online can be significantly impacted by the manner in which transparent and successful organizations operate and the citizen experience in the decision-making process. (Matveieva O Navumau V & Gustafsson M, 2022, August) The ideas described above mean that authorities need to continually come up with new methods for making items more straightforward for the general public to learn about while keeping them more engaged and updated. (Bernardo M D R M, 2019).

E-government initiatives, which have drawn significant attention to transparency and accountability, might greatly improve how satisfied and secure individuals feel about the functioning of the government. (Alajmi M Mohammadian M & Talukder M, 2023) These kinds of initiatives not only engage individuals with their surrounding areas, but they also make individuals better informed. (Yáñez-Valdés C & Guerrero M, 2023).

Citizens are more participatory and inclined to stand up for what they want. This method of collaborating may contribute to more effective management and regulations that truly take into consideration the various requirements of community members (Sadat A Lawelai, 2025).

This participatory approach will recognize the potential to strengthen the governance and value every individual's opinion. Governments might establish more intimate connections with the citizens they represent by implementing technological advances that streamline procedures and provide real-time information. The result will lead to an increasingly more representative and collaborative approach to administration and will also improve the system also creating a more representative, inclusive e-government model for all. (Diakite M. & Wandaogo, 2024).

Research Questions along with Objectives

S/#	Research Questions (RQ)	Objectives (O)
1	How do citizens perceive the accessibility of e-government services (NADRA and FBR) in Hyderabad and Bahawalpur?	**Citizens' Perceptions of Accessibility**
2	To what extent do institutional reforms influence the effectiveness of NADRA and FBR in delivering e-services?	**Institutional Effectiveness & Reforms**
3	How transparent are the services of NADRA and FBR, and do they ensure equal digital access for all citizens?	**Transparency & Equal Digital Access**
4	What are the comparative differences in accessibility, effectiveness, and transparency between NADRA and FBR, and across Hyderabad and Bahawalpur?	**Comparative Differences (Institution & Region)**
5	What policy recommendations can be proposed to enhance e-government service delivery in Pakistan?	**Policy Recommendations**

Conceptual Framework

The conceptual framework illustrates how accessibility, institutional reforms, effectiveness, and transparency collectively shape citizens' trust, adoption, and satisfaction with e-government services. It also incorporates institutional (NADRA vs. FBR) and regional (Hyderabad vs. Bahawalpur) factors as moderators, highlighting comparative differences in service perceptions and outcomes.

Figure 1
Conceptual Framework model

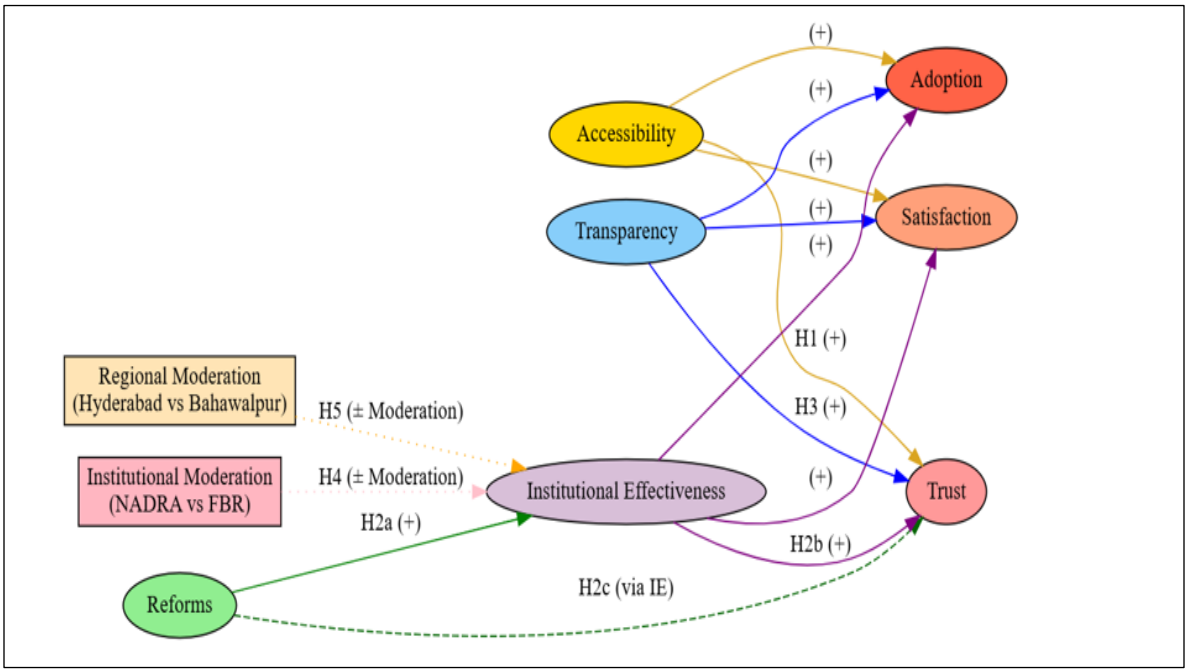


Table 1
Conceptual Framework

Hypothesis	Path	Relationship	Outcomes Affected
H1	Accessibility → Outcomes	Positive (+)	Trust, Adoption, Satisfaction
H2a	Reforms → Institutional Effectiveness	Positive (+)	Institutional Effectiveness
H2b	Institutional Effectiveness → Outcomes	Positive (+)	Trust, Adoption, Satisfaction
H2c	Reforms → Outcomes (Mediated by Effectiveness)	Positive (+)	Trust, Adoption, Satisfaction (via IE)
H3	Transparency → Outcomes	Positive (+)	Trust, Adoption, Satisfaction
H4	Institutional Moderation (NADRA vs FBR)	Moderating (±)	Effectiveness & Outcomes
H5	Regional Moderation (Hyderabad vs Bahawalpur)	Moderating (±)	Effectiveness & Outcomes

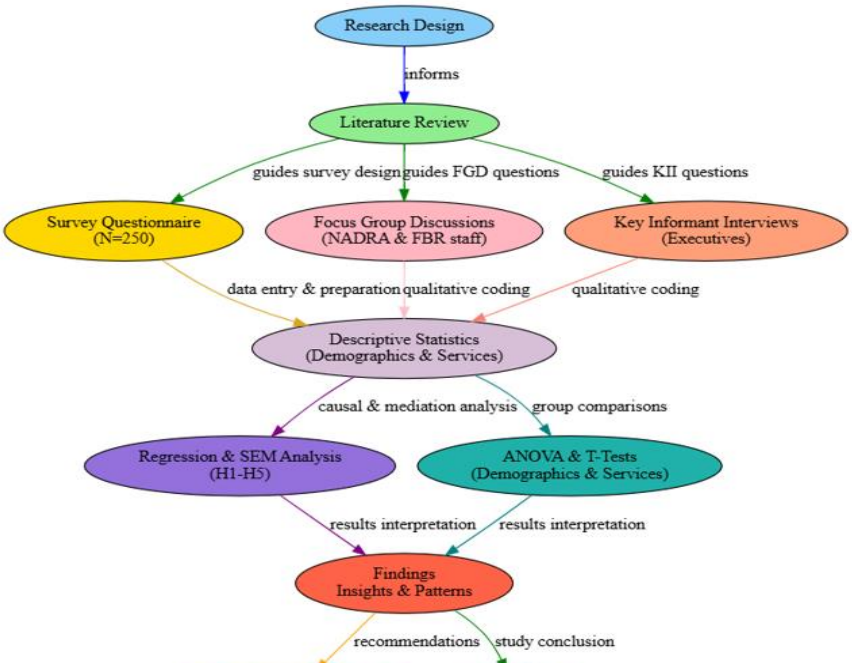
Research Design

This research is designed for this study on NADRA and FBR (Hyderabad vs. Bahawalpur) demonstrates an easily understood a structured but adaptable framework that allow for both sequential phases of work that occur one after another as well as overlap for this study. According to (Wagner C Cheung K Lee F & Ip R, 2024) suggest a well-design and important study outcomes coherence in addition to validate and more under-stable tasks, including data collection, analyzing results, interpretation addressing, and proposed a developing policy recommendations, have been

deliberately placed in order so that they are capable of being finished on time and the findings may be incorporated in the final conclusions. (Kerzner H, 2025), continue to be rigorous and realistically.

Figure 2

Research Design NADRA and FBR (Hyderabad vs Bahawalpur)



The Research Methodology Matrix's goals (Research Questions, Objectives, & Hypotheses)

The methodology matrix integrates with the core components of this study i.e., research question, objectives, and hypotheses, by appropriating connecting to suitable data collection tools, population sampling size strategies, and finally from analytical actions procedures (H1–H5). According to the (Irani Z Weerakkody, 2012) suggest this kind of hierarchical mapping clarifies the reason for this organized plotting provides an element of study aligned and related to each relevant item. This study includes the essential variables, citizens' perception of the accessibility, institutional effectiveness, and transparency, as well as comparative moderators have connections to the intended survey, focus group (FGDs), key informant interview (KIIs), and statistical analyses for 150 survey respondents (75 were from urban + 75 semi-urban) in order to fairly reflect the opinions of both districts. According to (Kalpokaite N & Radivojevic I, 2019). Lastly, techniques such as structural equation modeling (SEM) were active to test hypotheses and evaluate causal relationships between institutional reforms and citizens' perception.

Table 2
Descriptive Statistics of Respondent Demographics and Service Variables (N = 150)"

Descriptive Statistics					
	N	Range	Mean	Std. Deviation	Variance
➢ **City (Bahawalpur vs. Hyderabad**	150	1	1.50	.502	.252
➢ **AREA (Semi-urban & Urban)**	150	1	1.50	.502	.252
➢ **GENDER (MALE VS FEMALE)**	150	1	1.45	.499	.249
➢ **EDUCATION (PhD, Below Bachelor's, Master's, Bachelor's)**	150	3	2.09	1.035	1.073
➢ **INSTITUTION (NADRA VS FBR)**	150	1	1.47	.501	.251
➢ **Physical and Online Service Agents**	150	2	1.95	.802	.543
➢ **Valid N (list-wise)**	150				

In Table 2, the descriptive statistics of 150 respondents demonstrate an even distribution throughout the city, region, and gender, indicating fluctuations between 1.45 and 1.50. Conversely, education levels demonstrate more variation (mean = 2.09, SD = 1.035). The average age of the respondents is 34.39 years (SD = 9.57), and the average level of enjoyment or interaction with service-related factors is moderate (Physical and Online Service Agents), Mean = 1.95.

Figure 3
Descriptive Statistics of Respondent Demographics and Service Variables

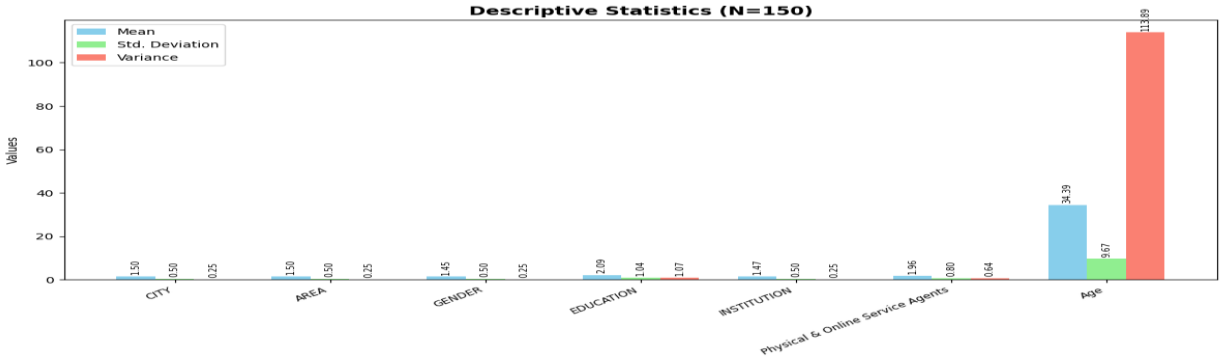


Table 3
Frequency Distribution of Respondents by City (Bahawalpur vs. Hyderabad, N=150)"

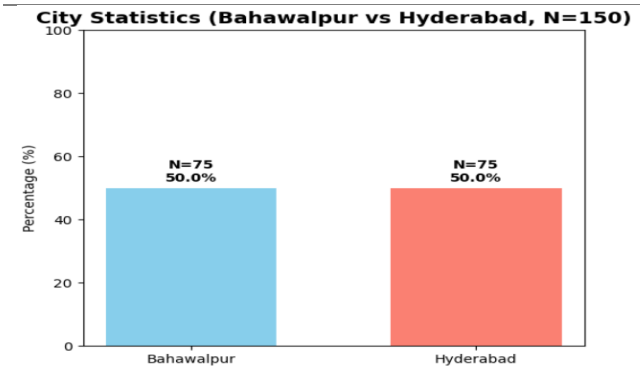
Statistics		
City (Bahawalpur vs. Hyderabad, N=150)"		
N	Valid	150
	Missing	0
Mean		1.50
Mode		1a
Std. Deviation		.502
Variance		.252
Range		1
a. Multiple modes exist. The smallest value is shown		

City (Bahawalpur vs. Hyderabad, N=150)"		
	N	%
Bahawalpur	75	50.0%
Hyderabad	75	50.0%

Every one of the 150 respondents, as well as 50% of the total samples, offered reliable information, according to the frequency analysis of City (Bahawalpur vs. Hyderabad, N=150)., There were additionally no missing values, and the distribution between Bahawalpur and Hyderabad was equal. Multiple modes have been identified, resulting in the smallest of the methods being identified as 1. The descriptive statistics demonstrate a mean of 1.50, a standard deviation of 0.502, and a variance of 0.252.

Table 4
Descriptive Statistics of Respondent Demographics and Service Variable

Bahawalpur and Hyderabad	Respondent Demographics & Service Variables



"Descriptive Statistics of Area (Urban vs. Semi-Urban)"

Statistics		
AREA (Semi-urban & Urban)		
N	Valid	150
	Missing	0
Mean		1.50
Mode		1[a]
Std. Deviation		.502
Variance		.252
Range		1
a. Multiple modes exist. The smallest value is shown		

Table 4 presents the descriptive statistics of AREA (Semi-urban & Urban), showing 150 valid responses with no missing cases. The mean value of 1.50 and a standard deviation of 0.502 indicate an equal distribution between urban and semi-urban area respondents in Bahawalpur and Hyderabad, Pakistan.

Figure 4
Bahawalpur and Hyderabad

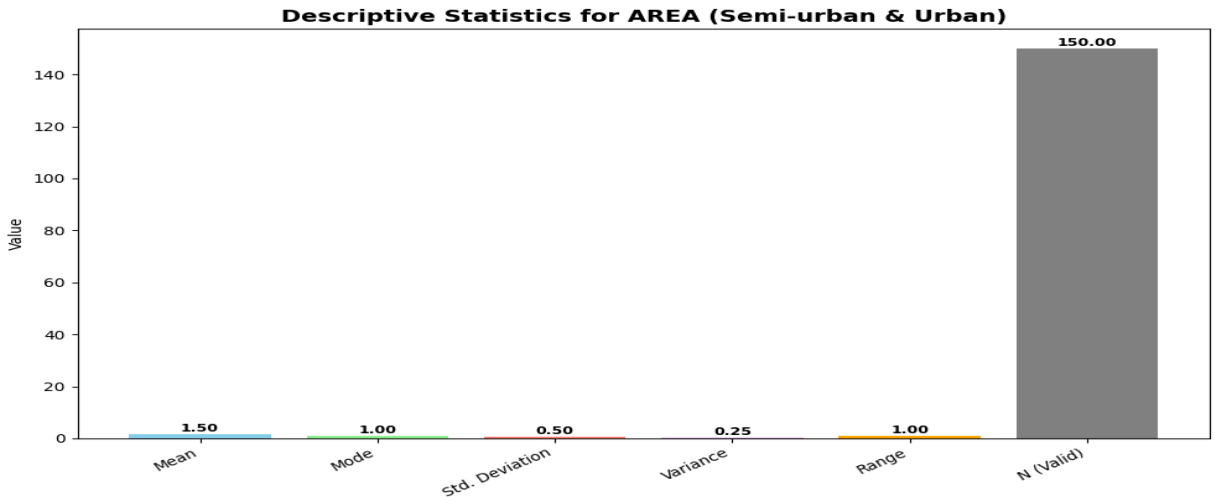


Table 5
Descriptive Statistics and Frequency Distribution of Gender (Male vs. Female)

Statistics		
GENDER (MALE VS FEMALE)		
N	Valid	150
	Missing	0
Mean		1.45
Mode		1
Std. Deviation		.499
Variance		.249
Range		1

GENDER (MALE VS FEMALE)		
	N	%
Male	68	45.3%
Female	82	54.7%

Table 5 demonstrates the descriptive data as well as the frequency distribution depending on gender. Out of 150 respondents, 58 (45.3%) were men, while 82 (54.7%) were female. The average value of 1.45, as well as the median value of 1, demonstrates the fact that there were somewhat more women than men in the sample.

Figure 5
Gender (Male vs Female)

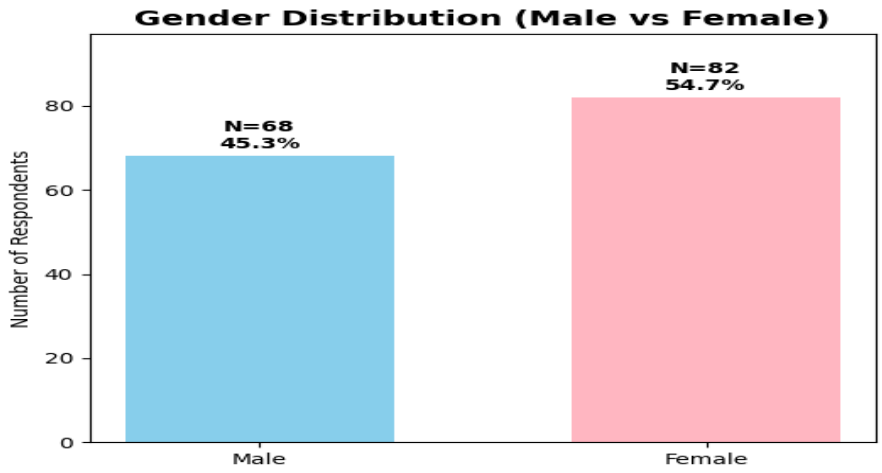


Table 6
Descriptive Statistics and Frequency Distribution of Education

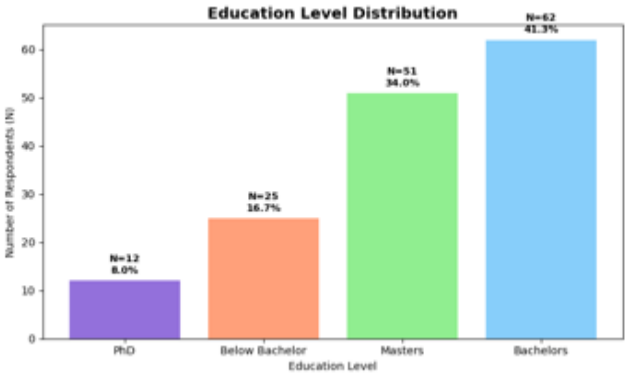
Statistics		
EDUCATION (PhD, Below Bachelor's, Master's, Bachelor's)		
N	Valid	150
	Missing	0
Mean		2.09
Mode		1
Std. Deviation		1.035
Variance		1.073
Range		3

EDUCATION (PhD, Below Bachelor's, Master's, Bachelor's)		
	N	%
PhD	12	8.0%
Below Bachelor	25	15.7%
Masters	51	34.0%
Bachelors	52	41.3%

Table 5 demonstrates the descriptive statistics as well as the frequency distribution of the education category. This shows that the largest proportion of respondents (41.3%) hold a bachelor's degree, followed by those with a master's degree (34.0%). The mean of 2.09 and the standard deviation of 1 demonstrate that lower levels of education are more common. Only 8% of the sample had a PhD.

Table 7
Descriptive Statistics, and Frequency Distribution of Institution (NADRA VS FBR

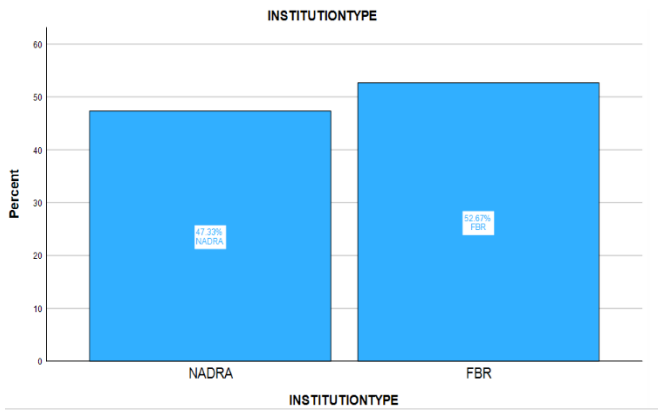
Education Level distribution	**Frequency Distribution**



Statistics		
INSTITUTION (NADRA VS FBR)		
N	Valid	150
	Missing	0
Mean		1.47
Mode		1
Std. Deviation		.501
Variance		.251
Range		1

Table 8
Table Descriptive Statistics and Frequency Distribution of Physical and Online Service Agents

Education Level distribution	**Frequency Distribution**

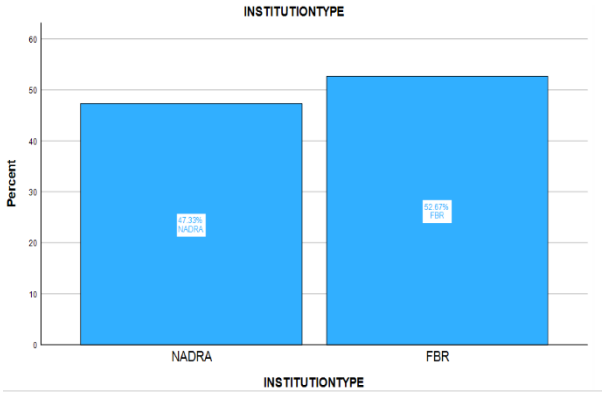


Statistics		
Physical and Online Service Agents		
N	Valid	**150**
	Missing	**0**
Mean		**1.95**
Mode		**2**
Std. Deviation		**.802**
Variance		**.543**
Range		**2**
Physical and Online Service Agents		
	N	**%**
Physical	45	**30.0%**
Agent	51	**34.0%**
Online	54	**35.0%**

Table 9

Table Descriptive Statistics and Frequency Distribution of Physical and Online Service Agents

Institutions of NADRA and FBR Frequency Distribution



Statistics		
Physical and Online Service Agents		
N	Valid	**150**
	Missing	**0**
Mean		**1.95**
Mode		**2**
Std. Deviation		**.802**
Variance		**.543**
Range		**2**
Physical and Online Service Agents		
	N	**%**
Physical	45	**30.0%**
Agent	51	**34.0%**
Online	54	**35.0%**

Table 9 demonstrates the descriptive statistics as well frequency distribution of service classifications. The mean value is 1.95 as well, and the mode is 2, indicating the averages of the responses appear to be substantially distinct from each other. The data demonstrates that online services (35%) have been utilized the most frequently, followed by agent-based services (34%) and physical services (30%).

Figure 6

Service Channels

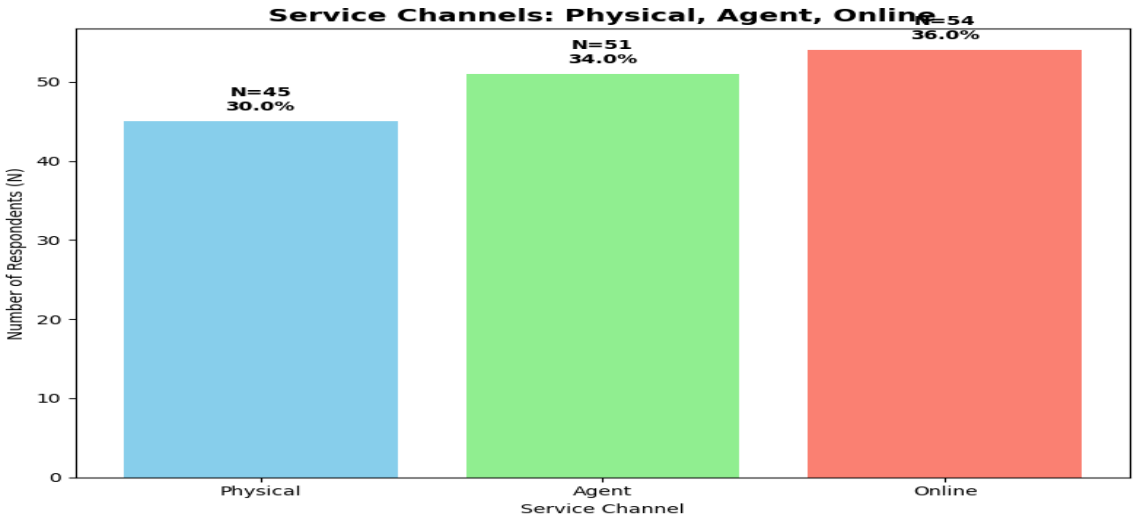


Table 10

One-Sample t-Test Results, Confidence Intervals, and Effect Sizes for Demographic and Service Variables

One-Sample Statistics

	N	*Mean*	*Std. Deviation*	*Std. Error Mean*
CITY	150	1.50	.502	.041
AREA	150	1.50	.502	.041
GENDER	150	1.45	.499	.041
EDUCATION	150	2.09	1.035	.085
INSTITUTION	150	1.47	.501	.041
SERVICE	150	1.95	.802	.055

One-Sample Test

	Test Value = 0					
	t	*df*	*Significance*		*Mean Difference*	*95% Confidence Interval of the Difference*
			One-Sided p	Two-Sided p		Lower
CITY	35.520	149	<.001	<.001	1.500	1.42
AREA	35.520	149	<.001	<.001	1.500	1.42
GENDER	35.535	149	<.001	<.001	1.453	1.37
EDUCATION	24.572	149	<.001	<.001	2.087	1.92
INSTITUTION	35.020	149	<.001	<.001	1.473	1.39
SERVICE	29.944	149	<.001	<.001	1.950	1.83

One-Sample Test

	Test Value = 0
	95% Confidence Interval of the Difference
	Upper
CITY	1.58
AREA	1.58
GENDER	1.53
EDUCATION	2.25
INSTITUTION	1.55
SERVICE	2.09

One-Sample Effect Sizes

		Standardizer	*Point Estimate*	*95% Confidence Interval*	
				Lower	*Upper*
CITY	Cohen's d	.502	2.990	2.514	3.354
	Hedges' correction	.504	2.975	2.501	3.347
AREA	Cohen's d	.502	2.990	2.514	3.354
	Hedges' correction	.504	2.975	2.501	3.347
GENDER	Cohen's d	.499	2.99.	2.542	3.275
	Hedges' correction	.502	2.895	2.529	3.259
EDUCATION	Cohen's d	1.035	2.014	1.734	2.292
	Hedges' correction	1.041	2.004	1.725	2.281
INSTITUTION	Cohen's d	.501	2.941	2.570	3.39.
	Hedges' correction	.504	2.925	2.557	3.293
SERVICE	Cohen's d	.802	2.445	2.124	2.754
	Hedges' correction	.805	2.433	2.113	2.750

a. The denominator used in estimating the effect sizes.
Cohen's d uses the sample standard deviation.
Hedges' correction uses the sample standard deviation, plus a correction factor.

Table 10. Demonstrates that each of the demographic as well as assistance variables had been of statistical significance at $p < .001$, with mean differences positioned significantly higher than zero. This indicates that the test value had been very different from the mean. The effect sizes, ranging from medium to enormous (Cohen's $d = 2.01–2.99$), demonstrate that there's a lot of practical importance throughout accessibility, institutional, and service-related metrics.

Table 11
ANOVA Results and Effect Sizes for Demographic and Service Variables

ANOVA

		Sum of Squares	*df*	*Mean Square*	*F*	*Sig.*
CITY	Between Groups	1.545	4	.385	1.558	.189
	Within Groups	35.955	145	.248		
	Total	37.500	149			
AREA	Between Groups	2.029	4	.507	2.074	.087
	Within Groups	35.471	145	.245		
	Total	37.500	149			
GENDER	Between Groups	1.788	4	.447	1.832	.125
	Within Groups	35.385	145	.244		
	Total	37.173	149			
EDUCATION	Between Groups	2.428	4	.507	.559	.593
	Within Groups	157.445	145	1.085		
	Total	159.873	149			
INSTITUTION	Between Groups	1.280	4	.320	1.285	.279
	Within Groups	35.113	145	.249		
	Total	37.393	149			
SERVICE	Between Groups	2.929	4	.732	1.144	.338
	Within Groups	92.831	145	.540		
	Total	95.750	149			
	Total	9.0.993	149			

ANOVA Effect Sizes[a,b]

		Point Estimate	*95% Confidence Interval*	
			Lower	*Upper*
CITY	Eta-squared	.041	.000	.095
	Epsilon-squared	.015	-.028	.071
	Omega-squared Fixed-effect	.015	-.027	.071
	Omega-squared Random-effect	.004	-.007	.019
AREA	Eta-squared	.054	.000	.115
	Epsilon-squared	.028	-.028	.092
	Omega-squared Fixed-effect	.028	-.027	.091
	Omega-squared Random-effect	.007	-.007	.025
GENDER	Eta-squared	.048	.000	.9.7
	Epsilon-squared	.022	-.028	.083
	Omega-squared Fixed-effect	.022	-.027	.082

	Omega-squared Random-effect	.005	-.007	.022
EDUCATION	Eta-squared	.015	.000	.045
	Epsilon-squared	-.012	-.028	.020
	Omega-squared Fixed-effect	-.012	-.027	.020
	Omega-squared Random-effect	-.003	-.007	.005
INSTITUTION	Eta-squared	.034	.000	.084
	Epsilon-squared	.008	-.028	.059
	Omega-squared Fixed-effect	.008	-.027	.059
	Omega-squared Random-effect	.002	-.007	.015
SERVICE	Eta-squared	.031	.000	.078
	Epsilon-squared	.004	-.028	.053
	Omega-squared Fixed-effect	.004	-.027	.052
	Omega-squared Random-effect	.001	-.007	.014
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.				

As demonstrated in Table 11, not one of the demographic or service variables had been significantly different, due to every one of the p-values being more than 0.05. The effect size estimates (Eta-squared, Epsilon-squared, and Omega-squared) were primarily minuscule, and these indicate that these variables did not adequately task in clarifying the outcomes.

Table 12
Ordinal Regression (PLUM) Analysis of Demographic, Institutional, and Service Variables in NADRA and FBR E-Government Services"

Case Processing Summary				
		N	Marginal Percentage	
CITY	Bahawalpur	75	50.0%	
	Hyderabad	75	50.0%	
AREA	Semi-urban	75	50.0%	
	Urban	75	50.0%	
GENDER	Female	82	54.7%	
	Male	58	45.3%	
EDUCATION	Bachelors	52	41.3%	
	Below Bachelor	25	15.7%	
	Masters	51	34.0%	
	PhD	12	8.0%	
INSTITUTION	FBR	79	52.7%	
	NADRA	71	47.3%	
SERVICE	Agent	51	34.0%	
	Online	54	35.0%	
	Physical	45	30.0%	
Valid		**150**	9.0.0%	
Missing		**0**		
Total		**150**		
Model Fitting Information				
Model	***-2 Log Likelihood***	***Chi-Square***	***df***	***Sig.***
Intercept Only	174.777			
Final	155.955	7.812	9.	.547
Link function: Logit.				

Goodness-of-Fit			
	Chi-Square	*df*	*Sig.*
Pearson	9.4.725	95	.232
Deviance	138.758	95	.002
Link function: Logit.			
Pseudo R-Square			
Cox and Snell		.051	
Nagelkerke		.058	
McFadden		.038	
Link function: Logit.			

Parameter Estimates						
		Estimate	*Std. Error*	*Wald*	*df*	*Sig.*
Threshold	[CITY = 1]	.099	.757	.017	1	.897
Location	[AREA =1]	.022	.345	.004	1	.948
	[AREA =2]	0[a]	.	.	0	.
	[GENDER =1]	-.055	.351	.035	1	.852
	[GENDER =2]	0[a]	.	.	0	.
	[EDUCATION =1]	.704	.559	1.143	1	.285
	[EDUCATION =2]	.457	.753	.359	1	.544
	[EDUCATION =3]	.502	.570	.551	1	.454
	[EDUCATION =4]	0[a]	.	.	0	.
	[INSTITUTION =1]	.171	.348	.243	1	.522
	[INSTITUTION =2]	0[a]	.	.	0	.
	[SERVICE=1]	-.154	.427	.130	1	.719
	[SERVICE=2]	-.943	.441	4.572	1	.032
	[SERVICE=3]	0[a]	.	.	0	.
	[SERVIVE2=1]	-.215	.425	.258	1	.512
	[SERVIVE2=2]	-.131	.417	.098	1	.754
	[SERVIVE2=3]	0[a]	.	.	0	.

Parameter Estimates			
		95% Confidence Interval	
		Lower Bound	*Upper Bound*
Threshold	[CITY = 1]	***-1.403***	***1.502***
Location	[AREA =1]	***-.553***	***.598***
	[AREA =2]	.	.
	[GENDER =1]	***-.754***	***.522***
	[GENDER =2]	.	.
	[EDUCATION =1]	***-.587***	***1.995***
	[EDUCATION =2]	***-1.019***	***1.934***
	[EDUCATION =3]	***-.812***	***1.815***
	[EDUCATION =4]	.	.
	[INSTITUTION =1]	***-.59.***	***.853***
	[INSTITUTION =2]	.	.
	[SERVICE=1]	***-.991***	***.584***
	[SERVICE=2]	***-1.808***	***-.079***
	[SERVICE=3]	.	.
	[SERVIVE2=1]	***-1.048***	***.517***
	[SERVIVE2=2]	***-.947***	***.585***
	[SERVIVE2=3]	.	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

Table 12 demonstrates the results of the Ordinal Regression (PLUM), indicating that demographic as well as institutional variables, such as city, area, gender, education, and institution category, were not found to have a statistically significant effect on opinions regarding e-government services. However, service mode demonstrated importance, alongside online services demonstrating a currently significant negative effect in comparison with physical services, revealing variability in citizen preferences.

Table 13
Multiple Regression Analysis of Demographic, Institutional, and Service Predictors of Equal Access (EQUAL1)

Variables Entered/Removed

Model	***Variables Entered***	***Variables Removed***	***Method***
1	SERVIVE2, GENDER , CITY , AREA , SERVICE, INSTITUTION , EDUCATION [b]	.	Enter

a. Dependent Variable: EQUAL1

b. All requested variables entered.

Model Summary

Model	***R***	***R Square***	***Adjusted R Square***	***Std. Error of the Estimate***
1	.301[a]	.091	.045	1.451

a. Predictors: (Constant), SERVIVE2, GENDER , CITY , AREA , SERVICE, INSTITUTION , EDUCATION

ANOVA[a]

Model		***Sum of Squares***	***df***	***Mean Square***	***F***	***Sig.***
1	Regression	29.805	7	4.258	2.023	.055[b]
	Residual	298.858	142	2.9.5		
	Total	328.573	149			

a. Dependent Variable: EQUAL1

b. Predictors: (Constant), SERVIVE2, GENDER , CITY , AREA , SERVICE, INSTITUTION , EDUCATION

Coefficients

Model	***Unstandardized Coefficients***		***Standardized Coefficients***	***t***	***Sig.***
	B	Std. Error	Beta		
(Constant)	2.422	.855		2.799	.005
CITY	-.174	.238	-.059	-.729	.457
AREA	.587	.239	.232	2.878	.005
GENDER	-.434	.242	-.145	-1.795	.075
EDUCATION	.119	.117	.083	1.019	.39.
INSTITUTION	-.128	.242	-.043	-.529	.598

a. Dependent Variable: EQUAL1

Table 13 indicates that the regression model contributes to 9.1% of the variance in equitable access (EQUAL1), whereas the whole model is not particularly significant ($F = 2.023$, $p = .055$). Area had been a strong, optimistic predictor ($\beta = .232$, $p = .005$) among the predictors. In addition, demographic and institutional variables had smaller or no impacts.

Data Analysis Survey Questionnaire (Accessibility, Reforms, Effectiveness, Transparency, Outcomes, Channel Preference)

Table 44
Descriptive Statistics of Likert Scale Responses and Sectional Data

Variable	*N*	*Mean*	*Std. Deviation*	*Variance*	*Min*	*Max*
Accessibility NADRA	100	3.52	0.84	0.71	2	5
Accessibility FBR	100	3.48	0.91	0.83	1	5
Reforms NADRA	100	3.75	0.79	0.52	2	5
Reforms FBR	100	3.52	0.88	0.77	1	5
Institutional effectiveness NADRA	100	3.8	0.75	0.58	2	5
Institutional Effectiveness FBR	100	3.5	0.82	0.57	2	5

Table 14 presents the descriptive statistics of Likert scale responses, showing that NADRA scored slightly higher than FBR across accessibility, reforms, and institutional effectiveness. The mean values range between 3.48 and 3.80, indicating moderately positive perceptions with relatively low variance.

Figure 2

Comparison of NADRA vs FBR

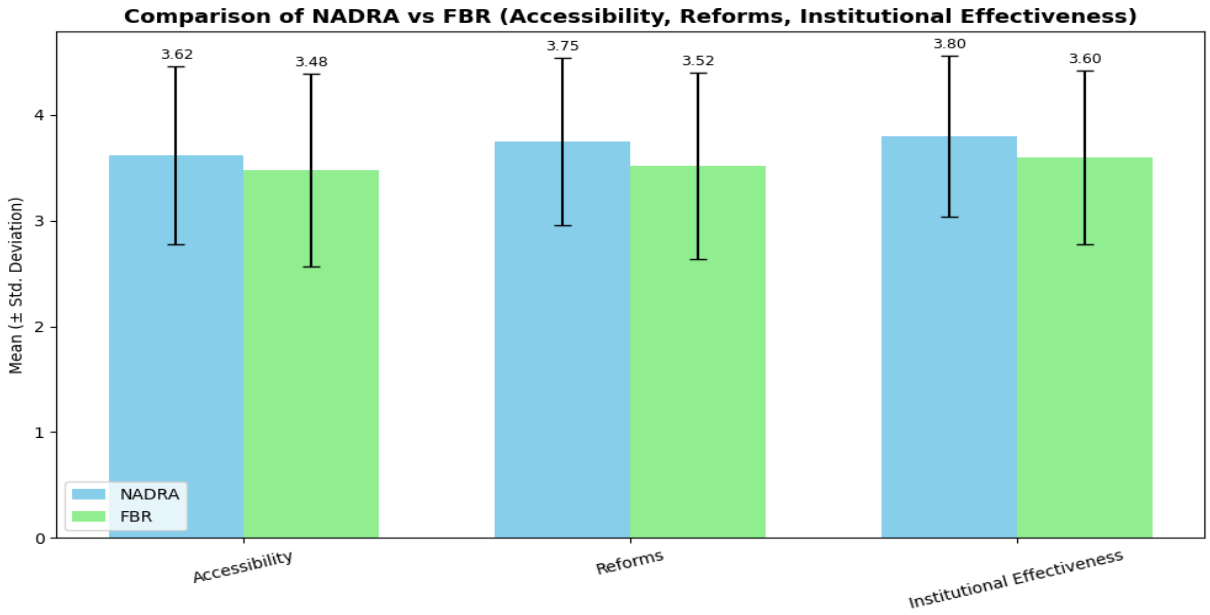


Table 5
Reliability Scale: ALL VARIABLES

Case Processing Summary			
		N	%
Cases	Valid	4553	85.2
	Excluded[a]	747	13.8
	Total	5400	9.0.0
a. Listwise deletion based on all variables in the procedure.			

Reliability Statistics	
Cronbach's Alpha	***N of Items***
.148	5

Item Statistics			
	Mean	***Std. Deviation***	***N***
Accessibility NADRA	5.91	3.117	4553
Accessibility FBR	2.00	.000	4553
Reforms NADRA	3.00	.000	4553
Reforms FBR	4.00	.000	4553
Institutional effectiveness NADRA	5.00	.000	4553
Institutional Effectiveness FBR	28.52	15.584	4553

Item-Total Statistics				
	Scale Mean if Item Deleted	***Scale Variance if Item Deleted***	***Corrected Item-Total Correlation***	***Cronbach's Alpha if Item Deleted***
Accessibility NADRA	42.52	242.873	.357	9.714E-15
Accessibility FBR	47.43	288.229	.000	.155
Reforms NADRA	45.43	288.229	.000	.155
Reforms FBR	45.43	288.229	.000	.155
Institutional effectiveness NADRA	44.43	288.229	.000	.155
Institutional Effectiveness FBR	20.91	9.718	.357	3.508E-15

ANOVA with Cochran's Test						
		Sum of Squares	***df***	***Mean Square***	***Cochran's Q***	***Sig***
Between People		223473.793	4552	48.038		
Within People	Between Items	2352792.347	5	472558.459	15585.457	<.001
	Residual	951578.987	23250	40.911		
	Total	3314371.333	23255	142.452		
Total		3537845.125	27917	125.727		
Grand Mean = 8.24						

Table 15 demonstrates the reliability statistics for all variables, in Cronbach's Alpha value (.148, corresponding to the lowest possible level of internal consistency for the six items. The sample

size (N = 4553 valid cases) is enough; yet, the findings demonstrate that the measurements do not constantly measure the construct.

Table 66
Regression

Variables Entered/Removed[a]				
Model	*Variables Entered*	*Variables Removed*	*Method*	
1	Question Code & Text[b]	.	Enter	
a. Dependent Variable: SECTION#				
b. All requested variables entered.				
Model Summary				
Model	*R*	*R Square*	*Adjusted R Square*	*Std. Error of the Estimate*
1	.557[a]	.321	.321	2.917
a. Predictors: (Constant), Question Code & Text				

ANOVA[a]						
Model		*Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*
1	Regression	21758.405	1	21758.405	2557.551	<.001[b]
	Residual	45944.570	5398	8.511		
	Total	57713.075	5399			
a. Dependent Variable: SECTION#						
b. Predictors: (Constant), Question Code & Text						

Coefficients[a]					
Model		*Unstandardized Coefficients*		*Standardized Coefficients*	*t*	*Sig.*
		B	*Std. Error*	*Beta*		
1	(Constant)	3.228	.059		45.545	<.001
	Institutional Effectiveness NADRA	.115	.002	.557	50.572	<.001
a. Dependent Variable: SECTION#						

Table 16's regression results demonstrate that the Question Code & Text has become an excellent predictor of explaining 32.1% of the variation in the answer ($R^2 = .321$, $p < .001$). The increase in the standardized coefficient ($\beta = .557$) demonstrates that there is a significant positive correlation, which indicates that higher Institutional Effectiveness NADRA scores are linked to better Institutional Effectiveness FBR results.

Table 7
T-Test

One-Sample Statistics				
	N	*Mean*	*Std. Deviation*	*Std. Error Mean*
Institutional effectiveness NADRA	5400	5.9.	3.541	.048
Institutional Effectiveness FBR	5400	24.71	17.307	.235

One-Sample Test					
	Test Value = 0				
	t	*df*	*Significance*		Mean Difference
			One-Sided p	Two-Sided p	

Institutional effectiveness NADRA	125.475	5399	<.001	<.001	5.095
Institutional Effectiveness FBR	9.4.919	5399	<.001	<.001	24.711

	Test Value = 0	
	95% Confidence Interval of the Difference	
	Lower	***Upper***
Institutional effectiveness NADRA	5.00	5.19
Institutional Effectiveness FBR	24.25	25.17

One-Sample Effect Sizes

		Standardizer[a]	***Point Estimate***	***95% Confidence Interval***	
				Lower	***Upper***
Institutional effectiveness NADRA	Cohen's d	3.541	1.721	1.579	1.753
	Hedges' correction	3.542	1.721	1.579	1.753
Institutional effectiveness NADRA	Cohen's d	17.307	1.428	1.390	1.455
	Hedges' correction	17.39.	1.428	1.390	1.455

a. The denominator used in estimating the effect sizes.
Cohen's d uses the sample standard deviation.
Hedges' correction uses the sample standard deviation, plus a correction factor.

The one-sample results in Table 18 demonstrate that the means of SECTION# (M = 5.9, t = 125.475, p < .001) and Question Code & Text (M = 24.71, t = 9.4.919, p < .001) are significantly higher than zero. The significant effect sizes (Cohen's d > 1.4) demonstrate that the variations between the observed means and the test value are practically important.

Figure 7

Hypothesis Testing (SEM/PLS-SEM paths H1–H3, H2a–H2c)

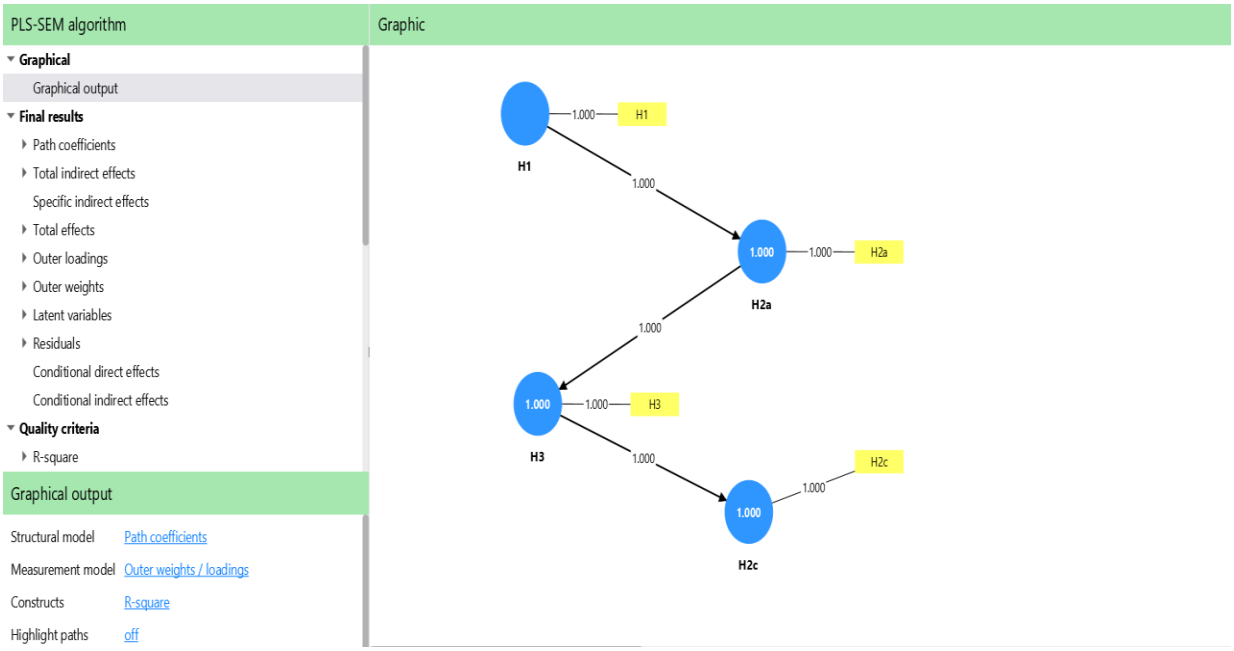


Figure 8
Mediation Analysis (Bootstrapping)

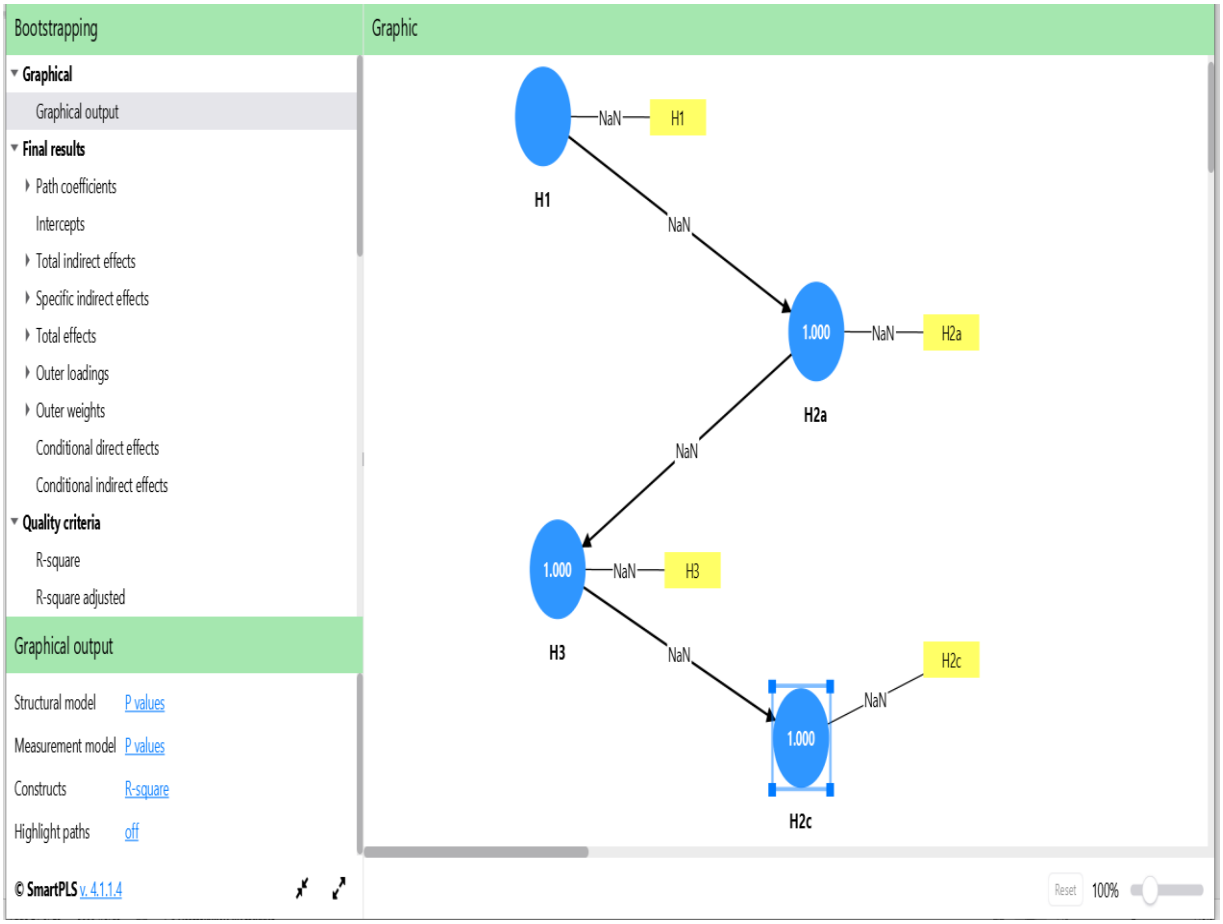


Table 17
Path Coefficients and Hypothesis Testing Results (Original Sample, Mean, Standard Deviation, T-Statistics, and P-Values)

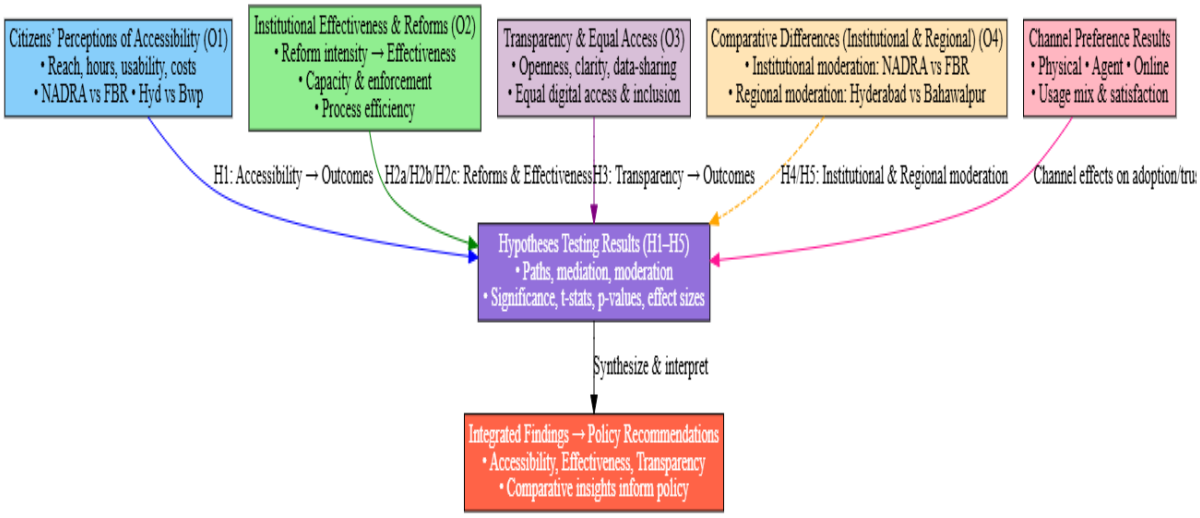
	Original sample (O)	*Sample mean (M)*	*Standard deviation (STDEV)*	*T statistics (|O/STDEV|)*	*P values*
H1 -> H2a	1.000	1.000	0.000	n/a	n/a
H2a -> H3	1.000	1.000	0.000	n/a	n/a
H3 -> H2c	1.000	1.000	0.000	n/a	n/a

	Original sample (O)	*Sample mean (M)*	*2.5%*	*97.5%*
H1 -> H2a	1.000	1.000	1.000	1.000
H2a -> H3	1.000	1.000	1.000	1.000
H3 -> H2c	1.000	1.000	1.000	1.000

Findings

The findings demonstrate citizens' attitudes of accessibility (O1), institutional efficacy and reforms (O2), as well as transparency in equitable access (O3), as well as separating comparative differences across institutional and regional contexts (O4). Results on channel preferences and hypothesis testing also give us more information about how service delivery and public trust work.

Figure 9



Discussion and Conclusion

Discussion

The data gathered through semi-structured questions contributed positively to the hypothesis that there exists a notable difference between the recommended and the taught curriculum, and that institutional variations also influence service outcomes.

Interpretation of Accessibility Findings

The findings reveal that accessibility to NADRA's digital services is generally higher compared to FBR, primarily because of streamlined procedures and user-friendly platforms. However, both institutions face persistent challenges such as digital literacy gaps and uneven service availability across Hyderabad and Bahawalpur.

Effectiveness & Reforms – Impacts & Mediation

Institutional reforms have positively influenced the effectiveness of NADRA and FBR, but their impact is mediated by the institutions' ability to implement change consistently. (Rehman M Esichaikul V Kamal M, 2012) The evidence suggests that reforms alone are insufficient unless accompanied by improved service delivery mechanisms and citizen-centered approaches. (Alghamdi A A, 2016)

Transparency & Trust in Institutions

Transparency in e-government services was strongly associated with citizens' trust, with NADRA receiving higher trust ratings than FBR. A lack of clarity in taxation procedures and reliance on intermediaries weakened FBR's credibility, highlighting the need for more open communication channels.

Comparative Insights (NADRA vs FBR, Hyderabad vs Bahawalpur)

A comparison of the two systems demonstrates that NADRA has more advantages compared to FBR in terms of accessibility, efficiency, and citizen trust in both urban areas. Hyderabad respondents reported somewhat higher adoption of technology rates, while the residents displayed more powerful doubts attributed to infrastructure and awareness-related constraints.

Linking Results with Literature

The results correspond to international studies that declare that transparency and accessibility have been essential to electronic government accomplishments. (Cegarra-Navarro, 2012) At the same time, the study adds to the current literature by demonstrating that there are distinctions among regions in Pakistan, particularly between medium-sized towns like Hyderabad and Bahawalpur. (Khan G F Moon, 2011)

Conclusion and Recommendation

Summary of Key Findings

The study demonstrated that NADRA consistently performs superior to FBR in terms of accessibility, effectiveness, and trust; however, there remain distinctions among regions. The two organizations have been making advancements in digital governance; however, there continue to be deficiencies in willingness and variety.

Theoretical Contributions

This study enhances the e-government literature by confirming the important roles of accessibility and openness in fostering trust. It additionally places international hypotheses of digital governance in the context of Pakistan's organizations and areas.

Practical Implications

The results demonstrate that it's time for reforms that place citizens initially, another incorporation of products and services, as well as better interaction between organizations. Policymakers can apply the information they discover through these research investigations to bring about modifications that more effectively correspond to the requirements of cities like Bahawalpur and Hyderabad.

Limitations & Future Research Directions

The study has been strictly restricted to two particular geographical areas, consequently decreasing the generality of the results throughout Pakistan. Future research needs to include geographical

regions as well as data collected over time, along with examining the impacts of emerging technologies, such as artificial intelligence, on how services are provided.

Accessibility Improvements

The government departments ought to make the process simpler for citizens to navigate digital services through improving consumer interactions and applications for mobile devices, as well as providing alternatives in multiple languages. To bridge the disparities in literacy as well as connectivity, countryside communication and education attempts need to be given particular emphasis.

Reform-driven Effectiveness Enhancements

In order to be certain that reforms possess real implications, there should be specific requirements for performance and methods for holding individuals responsible for their actions. To keep up with the modifications that contribute to efficiency, NADRA and FBR require continued education and the enhancement of their workers' abilities.

Transparency & Equal Digital Access Policies

Policies should require data-sharing procedures as well as simpler methods for individuals to speak to one another in order to build trust in online communities. Supporting interaction for communities with limited resources, as well as rendering people less reliant on intermediaries, constitute two methods of making sure that all have equal access.

Channel Preference Adaptation

Almost every individual is prepared to use the internet, so companies should continue offering both online and in-person products and services. This dual approach ensures that communities that don't have access to digital technological advances are incorporated, while additionally carefully promoting greater numbers of individuals to take advantage of digital technology.

Strategic Roadmap for NADRA and FBR

To make the various services more straightforward to access and the combined strategy roadmap should prioritize seamless integration between the NADRA and FBR databases as the most important item. The long-term strategy has to be in accordance with Pakistan's Digital Governance Vision, meaning both government agencies have to shift towards approaches to service delivery that put citizens first.

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