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The acceptance of E-Government services in Lahore

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Abstract

The acceptance of E-Government services in Lahore, Punjab, Pakistan faces challenges due to low computer self-efficacy among residents. This study examines the connections between computer self-efficacy, perceived usefulness, perceived ease of use, and E-Government adoption. The aim is to enhance digital inclusion and improve government service accessibility, efficiency, and transparency. Data was collected from 384 residents in Lahore through structured questionnaires, using a quantitative correlational research design. SPSS software was employed for analysis, including descriptive and inferential statistics such as multiple regressions. The literature review addresses key factors influencing e-government adoption, highlighting challenges such as the digital divide and privacy concerns, alongside efforts of the Punjab Information Technology Board (PITB) to promote digital initiatives. Findings provide actionable insights for policymakers, contributing to enhancing e-government services in Lahore and beyond. The comprehensive nature of the research offers a robust foundation for designing interventions to drive digital inclusion and improve government service accessibility. Recommendations include optimizing perceived usefulness, boosting computer self-efficacy, simplifying the user experience, ensuring demographic inclusiveness, conducting regular assessments, promoting security and trust, conducting targeted outreach, undertaking longitudinal studies, and expanding research scope to other regions. By implementing these recommendations, stakeholders can advance e-government proliferation, meet citizen demands effectively, and drive transformative digital initiatives within public administration.

Keywords: E-Government Adoption, Computer Self-Efficacy (CSE), Perceived Usefulness (PU), Perceived Ease of Use (PEOU and Digital Literacy

1. Introduction

The research set out to search the determinants behind the citizen adoption of E-Government facilities in Punjab. Revamping governance globally, E-Government carries a plethora of advantages and opportunities. However, its deployment in Lahore, Punjab encounters several hurdles and problems. The issue at hand delves into the difficulties and impediments, which obstruct the successful rollout of digital government schemes in this area. It particularly sheds

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light on how individuals' confidence in their computer skills influences their perceptions about the usefulness and user-friendliness of E-Government services. Additionally, it outlines the examination questions, objectives, and the theoretical framework guiding the study. Finally, the foundations underpinning the research are elucidated in the arrangement of the thesis.

1.1. Background of the study

E-government utilizes information and communication technologies (ICT) to improve the provision of governmental services, citizen engagement, and operational efficiency, thereby reinforcing democracy's foundational pillars such as accessibility, transparency, and efficiency (Wang et al., 2014). E-government, fundamental for making public administration more accountable, convenient, and oriented towards citizens' needs, has been underscored by entities (Doran et al., 2023). The evolution of e-government traced back to initial computerization in the mid-20th century, accelerated significantly with the advent of the internet in the 1990s (Chadwick, 2011). South Korea's early adoption of ICT in government during the 1980s exemplifies a pivotal shift toward digital governance that many countries have since followed (Moon, 2002). The development of e-government varies globally, with advanced economies such as Japan, South Korea, and Singapore creating benchmarks through comprehensive digital platforms and services (Younus et al., 2023).

Meanwhile, emerging economies progress at varied paces, tailoring digital strategies to their unique contexts. For Pakistan, a modernization drive acknowledging the role of technology and e-government as essential for sustainable development initiated with the Information Technology Policy and Action Plan in 2000, leading to significant institutional and infrastructural advancements. The establishment of the (MoIT) in 2002 marked a commitment to digital governance, promoting ICT use across governmental departments and aiming to streamline operations and enhance service delivery This period also saw the Federal Board of Revenue implementing online tax filing systems, aimed at improving transparency and accessibility (Arfeen, 2014).

The global movement towards digital governance seeks to leverage the internet's capabilities to make government operations more efficient and citizen-centric (Warkentin, 2002). E-government, defined as the utilization of digital technologies to improve the provision of administrative services, engagement with people, and the streamlining of administration operations, has evolved significantly in Pakistan. This transition toward digital governance was marked by the introduction of the Information Technology Policy and Action Plan in 2000, representing a significant shift in recognizing the crucial role of technology and e-government for sustainable socioeconomic advancement. Essential initiatives outlined in the plan included the development of human resources, improvement of IT infrastructure, ensuring universal internet access, and enacting consumer protection legislation. Following this, the establishment of the (MoIT) in 2002, alongside key institutions such as the National Database and Registration Authority (NADRA) and the Citizen Police Liaison Committee (CPLC), underscored a pivotal societal transformation. NADRA, in particular, has become a global frontrunner in identification solutions, implementing advanced biometric-based national identity cards and e-passports. Conversely, the CPLC has significantly contributed to transparency in vehicle verification through its online services (Afreen, 2014).

In October 2002, the government replaced the IT Commission with the Electronic Government Directorate (EGD) under the Ministry of Information and Technology. EGD focuses on advancing e-government initiatives, symbolizing a commitment to harnessing technology for better governance in Pakistan. Electronic Government Directorate (EGD). The primary goal was to promote the use of (ICT) in government departments, ushering in an era of digital governance. Various federal and provincial government departments launched online portals and

services, including tax filing and permit applications, to make government services easily accessible to citizens (Afreen, 2014).

The replacement of the IT Commission with the Electronic Government Directorate (EGD) within MoIT in October 2002 further indicated the government's dedication to leveraging technology for improved governance. The primary aim of the EGD has been to advance e-government initiatives, promoting the utilization of ICT across government departments to inaugurate a digital governance era (Afreen, 2014). Progress has been notable since 2002, with significant developments such as the Federal Board of Revenue's online tax filing system highlighting the emphasis on accessibility and simplicity. Transparency and the expansion of service outreach through mobile applications have also been focal points, aligning with broader worldwide movements toward digital revolution within governance structures (Taylor & Francis, n.d.).

E-government, or electronic government, leverages technology such as computers and the Internet to improve public services, making interactions with government organizations more convenient and accessible for citizens. The positive taking on digital government is influenced by key factors such as CSE, PU, and PEOU. Computer self-efficacy is about individuals' confidence and capability in expending electronic government services (Rana et al., 2019).

The perceived value and perceived simplicity of use play a vital role in fostering the acceptance of government websites and services. When users perceive these platforms as simple, well-designed, and easy to interact with, they are more likely to accept and use these connected services. In Lahore, Punjab, varying levels of computer literacy contribute significantly to the uptake of electronic government services. Efforts for instance providing free computer courses and public access to computers in libraries have been made to improve the population's computer literacy (Butt, & Tahira, 2019).

Furthermore, the Government of Punjab established the Punjab Information Technology Board (PITB) in 1999 to promote IT, explore global opportunities, and boost the IT sector's growth in the province. Additionally, Lahore has been at the forefront of integrating (ICT) into administration operations to facilitate citizen service delivery and ensure transparency, with notable initiatives such as the Lahore Smart City project launched in 2018 (Chohan, n.d.). The Punjab government continues to address challenges such as the digital divide, resistance to change among government employees, and concerns about privacy and security through policy changes, awareness campaigns, investments in infrastructure, and training (Asmi et al., 2016).

1.2. Research problem

The research endeavors to investigate the factors contributing to the lower-than-expected adoption rate of e-government services in Lahore, Pakistan. Despite significant efforts to modernize public services using information and communication technologies. It seeks to delve into how the interactions between individuals' confidence in using computers (computer self-efficacy), their perception of the usefulness, and the ease of using online government services influence the adoption levels among the residents of Lahore. The primary concern is that the residents' low confidence in their computer-related abilities may significantly reduce their perception of the value and user-friendliness of these e-government services, preventing effective engagement. In a developing urban context like Lahore, it's essential to identify these obstacles to craft strategies that enhance digital participation, ensure all residents have equal access to government services, and ultimately, help Enhance the effectiveness and openness of governmental operations, amid an ongoing digital evolution.

1.3. Research Questions

RQ1: Does computer self-efficacy influence the adoption of e-government in Lahore?

RQ2: Is there any relationship between perceived usefulness factors in shaping the adoption of e-government in Lahore?

RQ3: Does perceived ease of use contribute to the adoption of e-government in Lahore?

1.3.2 Research objectives

RO1: To determine the relationship between computer self-efficacy and the adoption of e-government in Lahore.

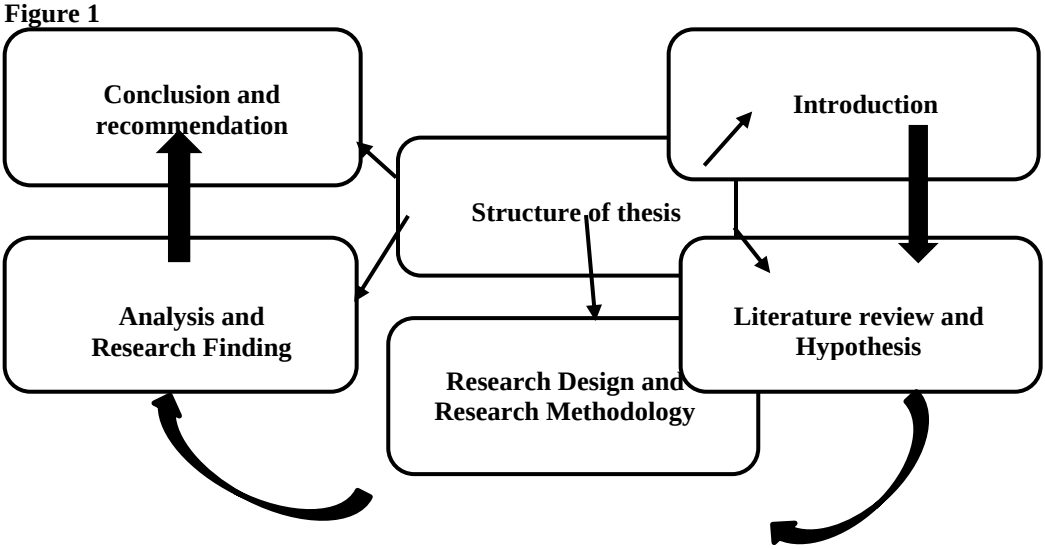
RO2: To examine the impact of perceived usefulness factors on the adoption of e-government in Lahore.

RO3: To determine the perceived ease of use contributes to the adoption of e-government in Lahore.

1.4. Significance of study

This research is of paramount significance in advancing e-government services, particularly in Lahore, by addressing crucial gaps in our understanding of adoption dynamics. Investigating the relationships among key variables informs policymakers in Lahore and beyond, guiding the formulation of strategies aligned with citizens' confidence in computer-related abilities and perceived utility. Uncovering nuanced influences of computer self-efficacy offers actionable insights for user-friendly interface design and educational interventions. The exploration of perceived usefulness optimizes e-government services, enhancing overall administrative efficiency and citizen engagement in Lahore.

Figure 1



2. Literature review

The initiatives for digital government in Lahore have been a segment of a wider national movement toward the digitalization of government services to enhance their efficiency and accessibility. Established in 1999, the Punjab Information Technology Board (PITB) has played a critical role in integrating ICT within various governmental sectors to bolster service delivery and streamline governance. The factors changing the adoption of e-government in Lahore include computer self-efficacy, perceived usefulness, and perceived ease of use of the introduced systems (Sharif et al., 2015)

These determinants are critical in affecting the citizens' willingness to use e-government platforms, thereby impacting their satisfaction and intentions to continue using these amenities.

The integration of electronic government services in Lahore, Pakistan, has been significantly influenced by CSE, PU, and PEOU, indicating a complex interplay of factors that both challenge and facilitate advancements in this sector. Emphasize the need for digital literacy programs to bridge gaps in access and education, thereby enhancing computer self-efficacy among citizens. The perceived benefits of using online systems, highlighted by (Wirtz et al., 2015), are crucial for the uptake of digital government services, suggesting that users need to recognize clear advantages in engaging with digital platforms. Venkatesh et al. (2011) note the critical role of usability and accessibility, pointing out that user-friendly designs and multilingual support can significantly increase adoption rates.

However, Lahore's journey toward e-government is not without obstacles. Issues like a marked digital divide, reluctance to change among government officials, and concerns over privacy and security pose significant challenges to the adoption rate. Addressing these concerns demands continuous policy updates, public education campaigns, and the strengthening of secure online protocols. Enhancing public trust through robust cybersecurity measures and transparent practices is key to the sustainable adoption of e-government services. Efforts to reinforce this trust include the implementation of strict data protection regulations and initiatives aimed at increasing confidence in digital transactions (Ahmed & Campbell, 2015).

E-government initiatives are essential for governments worldwide to enhance the provision and effectiveness of public services. This literature review examines how CSE, PU, and PEOU influence e-government service adoption in Punjab, Pakistan, with a center on Lahore. The development of digital government in this context reveals the necessity of understanding the impact of these factors. Ebrahim and Irani (2005) describe e-government as leveraging Utilizing Information and Communication Technologies (ICTs) to improve the dissemination of public information and services to citizens, framing a backdrop to this complex issue.

2.1. Computer Self-Efficacy (CSE)

Computer Self-Efficacy (CSE) refers to an individual's assurance in their capacity to proficiently utilize computers and associated technologies. This concept, a specific type of self-efficacy, significantly impacts how individuals approach technology adoption. Higher levels of CSE tend to encourage individuals to engage with new technologies more freely and tackle any issues they encounter, which is particularly beneficial for the uptake of e-government services. A notable correlation exists between CSE and the usage of e-government services, with findings indicating that individuals with better CSE are more inclined to use digital government platforms (Wangpipatwong et al., 2008).

The foundation of CSE lies in Bandura's social cognitive theory and revolves around the belief

in one's skills to execute tasks using computer technology successfully. Within the context of e-government where citizens use digital platforms to access public services those with higher CSE levels are more confident in their ability to manage online interfaces. This confidence leads to a more favorable outlook towards adopting technology, fostering a sense of adeptness and diminishing the perceived difficulties of engaging with digital government services.

Further research, such as that by Asmi et al. (2016), underscores that heightened CSE positively affects individuals' perceptions of the ease associated with technology use. As the perception of user-friendliness improves, it consequently boosts the acceptance of e-government initiatives. Additionally, those with strong CSE are more open to facing and overcoming technology-related challenges and innovations, resulting in greater participation in e-government platforms. As governments progress towards digital service provision, grasping the implications of CSE is vital for devising strategies that boost users' confidence in their abilities, ultimately encouraging the taking on and sustained use of digital government facilities.

2.2. Perceived Usefulness (PU)

Perceived Usefulness (PU) is a pivotal concept in technology adoption, referring to users' attitudes toward the advantages of technology in enhancing their well-being and productivity. As originally defined by Ahmed & Campbell, (2015), in the Technology Acceptance Model (TAM), PU is the extent to which an individual perceives that utilizing a particular system will enhance their job effectiveness. When it comes to digital government, PU is about the perceived advantages of engaging with e-government services, including time savings, cost reduction, and enhanced accessibility of services. Research indicates that PU has a straight positive influence on the inclination to utilize digital government facilities and is a robust predictor of actual usage behaviors (Rana et al., 2019).

In the case of electronic government taking on in Punjab, Lahore, it is crucial to comprehend and tackle public opinions regarding the utility of online services for the effective execution of such endeavors. The role of PU as a key influence on technology adoption intentions is well documented. The perceived benefits of digital platforms and services are major considerations in the decision-making processes of citizens. Individuals are predisposed to embrace and actively participate in e-government initiatives if they are convinced of the tangible benefits these digital services bring to their daily activities, including simplifying processes and offering advantages that traditional, offline methods cannot provide.

2.3. Perceived Ease of Use (PEOU)

Perceived Ease of Use (PEOU), stemming from the Technology Acceptance Model (TAM), pertains to an individual's assessment of the simplicity associated with employing a system (Ahmed & Campbell, 2015). This construct assesses users' expectations regarding the effort needed to learn, understand, and utilize e-government services. Perceived Ease of Use (PEOU) has a substantial impact on both Perceived Usefulness (PU) and the actual intention to use e-government systems. According to research findings, the greater the perceived intuitiveness and user-friendliness of a service, the higher the likelihood of individuals adopting it (Albayati et al., 2020).

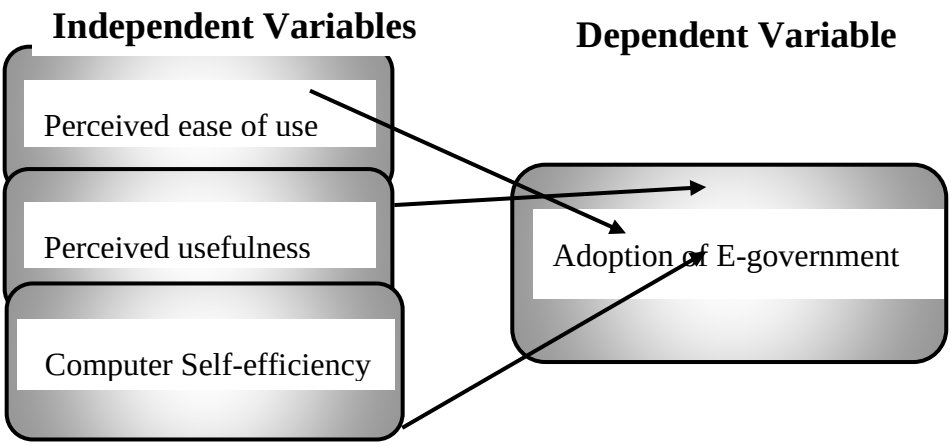
In Lahore, Punjab, the significance of PEOU is heightened, particularly given the diverse demographic and educational backgrounds of the population. Prioritizing perceived ease of use becomes essential for ensuring inclusivity in the acceptance of digital government facilities, especially where digital literacy levels may vary (Ahmed & Campbell, 2015). Enhancing user-friendly interfaces and intuitive design significantly reduces perceived complexity, addresses potential barriers to adoption, and fosters a positive user experience. Policymakers and developers should focus on creating interfaces that are not only functional but also accessible to

a wide range of users. Clear navigation, simple procedures, and minimal learning curves contribute to a positive user perception of ease of use, ultimately encouraging greater engagement with online government platforms (Abdulkareem, & Ramli, 2021).

2.4. Research formwork

The research framework illustrates the relationship between dependent and independent variables. In this study, the adoption of e-government is positioned as the dependent variable (DV), while computer self-efficacy (CSE), perceived usefulness (PU), and perceived ease of use (PEOU) are classified as independent variables (IV). The research aims to demonstrate how these independent variables impact the single dependent variable, suggesting a correlation between them.

Figure 2



2.5. Hypothesis

H1: There is a significant relationship between computer self-efficiency and the adoption of E-government.

H0: There is no significant relationship between computer self-efficiency and adoption of E-government.

H2: There is a significant relationship between perceived ease of use and adoption of E-government.

H0: There is no significant relationship between perceived ease of use and adoption of E-government.

H3: There is a significant relationship between perceived usefulness and adoption of E-government.

H0: There is no significant relationship between perceived usefulness and adoption of E-government.

These hypotheses suggest anticipated relationships between the key variables and the adoption of e-government services in Lahore. The research aims to validate or refute these hypotheses through empirical investigation and analysis.

3. RESEARCH DESIGN

3.1. Methodology

The methodology section stands as the critical structure of a research study. It outlines the well-defined methods and strategies applied to investigate the research queries introduced in Chapter One and to evaluate the hypotheses developed in Chapter 2. Viewed as a detailed plan or blueprint for the study, this chapter specifies the particular techniques and procedures adopted during the research process. It acts as a guide for researchers, offering an exhaustive overview of the steps undertaken to tackle the research questions or verify the hypotheses. The success of the methodology in ensuring the study's transparency, dependability, and reproducibility is crucial. By delving into the methodology, one gains insight into the depth and systematic nature of the investigative process through a discussion on research design, selection of participants, methods of data collection, strategies for data analysis, and adherence to ethical standards.

In more detail, the methodology initially sets forth the overarching research strategy, distinguishing whether the focus is on numerical data (quantitative research) or on comprehending experiences (qualitative research). It then proceeds to delineate the profile of the participants, describing how they were selected, including any specific criteria used for their selection. The methodology further elaborates on the instruments or approaches employed for data gathering, meticulously explaining their use and any measures taken to verify their reliability and efficacy.

3.2. Research design

The research design functions as the blueprint for the entire study, outlining the plan and structure that guides the investigation. This study employs a quantitative utilizing correlational research design to investigate the connections between computer self-efficacy (CSE), perceived usefulness (PU), perceived ease of use (PEOU), and the adoption of e-government services in Lahore. A correlational design is selected to evaluate the magnitude and direction of the relationships between the independent variables (CSE, PU, and PEOU) and the dependent variable (e-government adoption). In the situation of this research on digital government adoption in Lahore, Pakistan, the selected research design is crucial for gathering relevant data and drawing meaningful conclusions.

3.3. Quantitative method

The quantitative aspect of the research involves collecting numerical data to analyze patterns, trends, and relationships. Data will be collected through a survey method from a representative sample of residents in Lahore. The survey will be structured with closed-ended questions to quantify independent and dependent variables.

3.4. Population of the study

In research, the selection of a demonstrative sample from the population is the main step. The study's population denotes the complete set of individuals or entities to which the research aims to apply the findings universally. When examining e-Government adoption in Lahore, the study's population might encompass all legal-age residents in Lahore eligible to access and utilize e-Government services. The exact population size must be determined based on the most recent census data or available statistical information regarding the number of individuals within the jurisdiction of Lahore who use or are potential users of e-Government services.

The target population for this study comprises the entirety of Lahore, the capital city of Punjab,

with a population of 11,126,285 residents. Among various cities and districts in Punjab, Lahore stands out as the largest and most populous urban center, making it the focal point of the research. Given its significant population size and prominence within the province, understanding e-government adoption trends and patterns in Lahore holds paramount importance in gaining insights into broader societal dynamics and technological advancements within Punjab. Therefore, the study will concentrate solely on Lahore, recognizing its vast population as the primary focus for examining e-government adoption behaviors and preferences.

3.5. Target Population:

Lahore	11,126,285

3.6. Sample size

The sample size in this study represents how many individuals from the target population will participate in the research. It's critical to select an appropriate sample size to ensure the research findings are statistically significant and can be applied to the broader population. Various statistical methods are available for calculating sample size, considering expected effect size, desired statistical power, margin of error, and confidence level. In correlational research, like the current study, a larger sample might be necessary to identify a genuine relationship between variables, especially when the anticipated correlations are subtle.

This research employs random sampling to select participants. After identifying a target population, the study proceeds to collect data from the sample, which aids in making inferences about the population as a whole. Generally, a larger sample allows for the collection of more data, enhancing the accuracy of the research findings. The sample size directly influences the reliability of the expected results, with larger samples typically providing a higher degree of accuracy. Referring to the guidelines for sample size provided by Morgan (1970), the minimal number of participants recommended is 377. According to Table 1, based on Krejcie and Morgan’s guidance, the study's sample size is 384 respondents, indicating a diligent adherence to these established criteria to ensure sufficient data collection for reliable outcomes.

Sample size table of Krejcie and Morgan (1970).

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	354
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	191	1200	291	6000	361
45	40	170	118	400	196	1300	297	7000	364
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10000	370
65	56	210	136	480	214	1700	313	15000	375
70	59	220	140	500	217	1800	317	20000	377
75	63	230	144	550	226	1900	320	30000	379
80	66	240	148	600	234	2000	322	40000	380
85	70	250	152	650	242	2200	327	50000	381
90	73	260	155	700	248	2400	331	75000	382
95	76	270	159	750	254	2600	335	1000000	384

3.7. Data Collection Methods

Data will be gathered using a structured questionnaire consisting of validated scales to measure CSE, PU, PEOU, and e-government adoption. The questionnaire will be distributed online to broaden reach and facilitate ease of access for respondents. To guarantee clarity and relevance, a pilot test will be conducted with a small subset of the population, and feedback will be integrated into the final version.

3.8. Unit of Analysis:

Determining the unit of analysis is a critical precursor to data collection. The unit of analysis may range from individuals to groups and organizations, depending on the study's nature and context (Sakaran & Bougie, 2016). For this particular study, the unit of analysis is the interest group, specifically concentrating on the general public, mainly composed of employees engaged in e-government public service delivery in Lahore.

3.9. Data Analysis:

The study's data analysis was conducted using the SPSS primarily focusing on descriptive analysis to gain insights into respondents' general understanding. SPSS was instrumental in tasks such as summarizing data, presenting it in tabular format, and assessing the frequency of outcomes. Its user-friendly interface and compatibility with various variable types facilitated easy access and comprehension of data. Researchers found SPSS advantageous due to its automation, simplifying the setup of models, and providing essential data management and editing tools. Furthermore, SPSS offered comprehensive statistical capabilities, enabling precise outcome analysis. SPSS emerged as a valuable tool for researchers, offering efficient data

handling and advanced statistical analysis capabilities to enhance understanding and interpretation of research findings.

3.10. Ethical Considerations:

Addressing ethical considerations in research is crucial. Firstly, obtaining informed consent involves transparently disclosing the study's nature, potential risks, and participants' rights while ensuring confidentiality and anonymity. Implementing privacy measures to protect data, detailing storage and access protocols, and maintaining confidentiality are essential. Emphasizing researcher integrity, transparency, and addressing conflicts of interest are paramount. Conducting a thorough risk assessment to minimize potential harm and respecting participants' dignity and diversity are vital. Adhering to ethical guidelines, and codes of conduct, and obtaining institutional review board approvals are fundamental throughout the research process. Ensuring transparency and accountability in data handling, analysis, and reporting is key (Hammersley, 2015).

4. Data Analysis and Research Findings

4.1. Cronbach Alpha

Evaluating the validity and reliability of the questionnaire required the computation of Cronbach's alpha, a central statistical tool for detecting issues during the data collection phase. This measure was pivotal to confirm both the reliability and validity of the instrument (Tavakol & Dennick, 2011).

To compute Cronbach's alpha, a preliminary distribution of the questionnaire was carried out among a subset of participants reflective of the larger survey demographic. This step aimed at gauging the tool's effectiveness and pinpointing areas for refinement. Engaging a cohort of 384 participants, they were encouraged to respond candidly. Post-questionnaire, inquiries regarding the clarity and comprehensibility of the questions were made, providing valuable feedback on the questionnaire's clarity. While there are numerous techniques for assessing reliability, Cronbach's alpha was the method of choice in this study. The values of Cronbach's alpha span from 0 to 1, where higher figures are indicative of enhanced reliability. Nevertheless, what constitutes an acceptable level can vary, with values from 0.5 to 0.6 sometimes considered sufficient (Tavakol & Dennick, 2011).

Table 2

Reliability Statistics	
Cronbach's Alpha	N of Items
.967	25

Table 1

Item Statistic.

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
CSE1	85.15789473684211 0	413.482	.721	.965
CSE2	85.29210526315790 0	431.259	.390	.968
CSE3	85.65789473684211 0	425.080	.493	.967
CSE4	84.88947368421053 0	417.589	.742	.965
CSE5	85.01315789473685 0	424.270	.543	.967
CSE	85.20210526315790 0	421.610	.845	.965
PU1	85.05789473684212 0	416.259	.681	.966
PU2	84.83421052631580 0	411.745	.775	.965
PU3	84.67105263157895 0	416.228	.706	.965
PU4	84.81052631578947 0	417.807	.761	.965
PU5	84.86052631578949 0	419.955	.732	.965
PU	84.84684210526316 0	416.024	.874	.964
PEU1	85.30526315789474 0	427.723	.512	.967
PEU2	85.18157894736842 0	410.318	.729	.965
PEU3	84.96578947368421 0	428.010	.638	.966
PEU4	85.12105263157895 0	412.751	.816	.964
PEU5	85.28684210526316 0	411.590	.782	.965

PEU	85.172105263157900	417.589	.893	.964
AeG1	84.976315789473690	407.648	.863	.964
AeG2	85.105263157894740	418.074	.692	.966
AeG3	84.805263157894740	414.360	.842	.964
AeG4	84.947368421052630	416.777	.725	.965
AeG5	84.657894736842110	417.359	.787	.965
AeG6	84.813157894736850	412.988	.796	.965
AeG	84.884210526315800	414.197	.924	.964

Table 3 presents the alpha values for all constructs. The majority of the reliability coefficients exceed 0.8, suggesting the constructs' reliability. However, the construct 'Perceived usefulness' demonstrates the lowest reliability value (0.964).

4.2. Response rate

Data collected from the city of Lahore, Pakistan, involved calculating the response rate by dividing the number of respondents who completed the questionnaire by the sample size determined for the study, as outlined by Hamilton (2009). In this case, all 384 questionnaires distributed were returned immediately to the researcher, achieving a 100% response rate with each response considered usable for analysis.

Table 4

No. of distributed questionnaires	384
No. of returned questionnaires	384
No. of partially filled questionnaires	04
Ratio of response rate	100%
No. of final usable questionnaires	380
Ratio of valid response rate	98.96%

The table indicates that 384 questionnaires were distributed, and all 384 were returned; there were no unreturned questionnaires. Four questionnaires were partially completed. The response rate was 100%, with 380 questionnaires considered valid, leading to a valid response rate of

98.96%.

4.3. Descriptive statistics

The collected data were imported into SPSS for analysis at this stage, where descriptive statistical tests were utilized to examine the data. Descriptive statistics aim to offer a concise summary of the gathered data. These descriptive tests were employed to summarize the data obtained from the sample target population in Lahore, Pakistan. Having a clear understanding of the respondent profile is crucial for interpreting the outcomes accurately. The detailed profiles of the respondents are presented in the table below. This analysis examined 380 respondents.

Table 5

Respondent profile.

Demography	Indicator	Frequency	Percentage
Gender	Male	290	76.3%
	Female	90	23.7%
Age	18-25	262	68.9%
	26-35	92	24.2%
	36-45	23	6.1%
	Above 45	3	0.8%
Education	High School	19	5%
	Bachelor’s Degree	266	70%
	Master’s Degree	92	24.2%
	Doctoral Degree	3	0.8%
Occupation	Student	94	24.7%
	Employed	180	47.4%
	Unemployed	80	21.1%
	Self-employed	26	6.8%

This table shows that the demographic breakdown of the respondents is as follows: 76.3% male and 23.7% female. In terms of age, 68.9% were aged 18-25, 24.2% were aged 26-35, 6.1% were aged 36-45, and 0.8% were above 45. Regarding education, 5% had a high school degree, 70% had a bachelor's degree, 24.2% had a master's degree, and 0.8% had a doctoral degree. In terms of occupation, 24.7% were students, 47.4% were employed, 21.1% were unemployed, and 6.8% were self-employed.

4.3.1. Gender

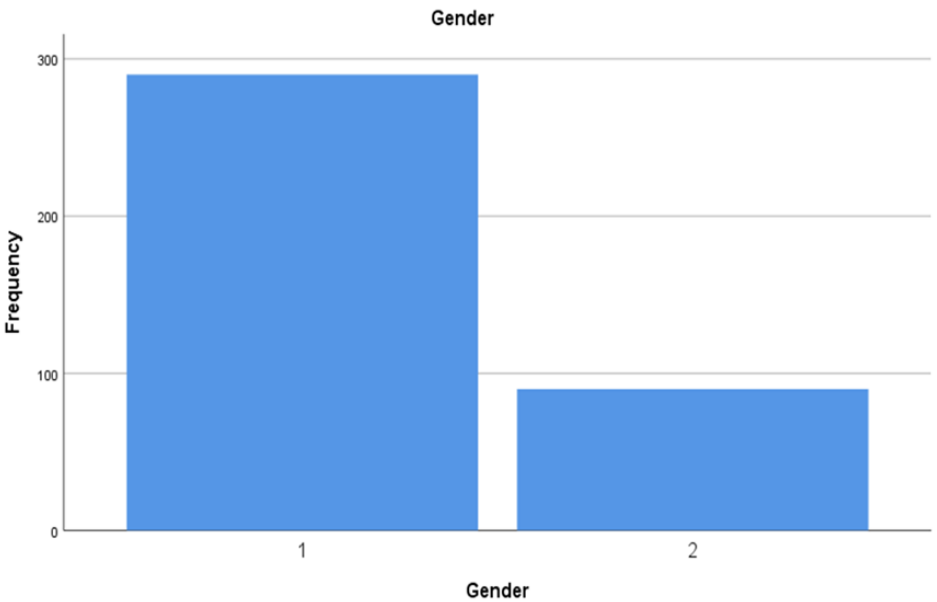
The gender distribution of respondents shows that 76.3% were male and 23.7% were female. This data is based on a total of 380 valid responses.

Table 6

Gender

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	290	76.3	76.3	76.3
	Female	90	23.7	23.7	100.0
	Total	380	100.0	100.0	

Figure 4



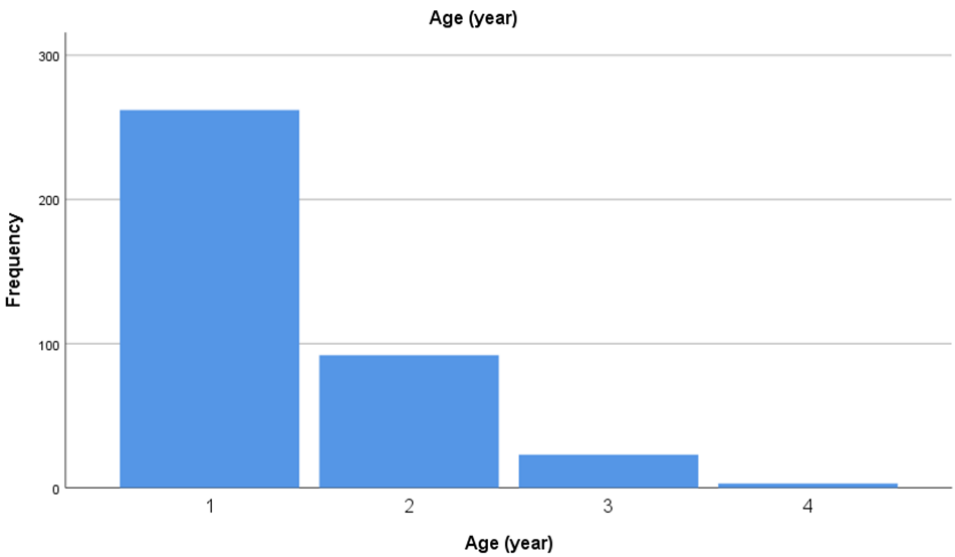
4.3.2. Age

The age distribution of respondents indicates that 68.9% were aged 18-25, 24.2% were aged 26-35, 6.1% were aged 36-45, and 0.8% were above 45. These percentages are based on a total of 380 valid responses.

Table 7

Age (year)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-25	262	68.9	68.9	68.9
	26-35	92	24.2	24.2	93.2
	36-45	23	6.1	6.1	99.2
	Above 45	3	.8	.8	100.0
	Total	380	100.0	100.0	

Figure 5



4.3.3. Education

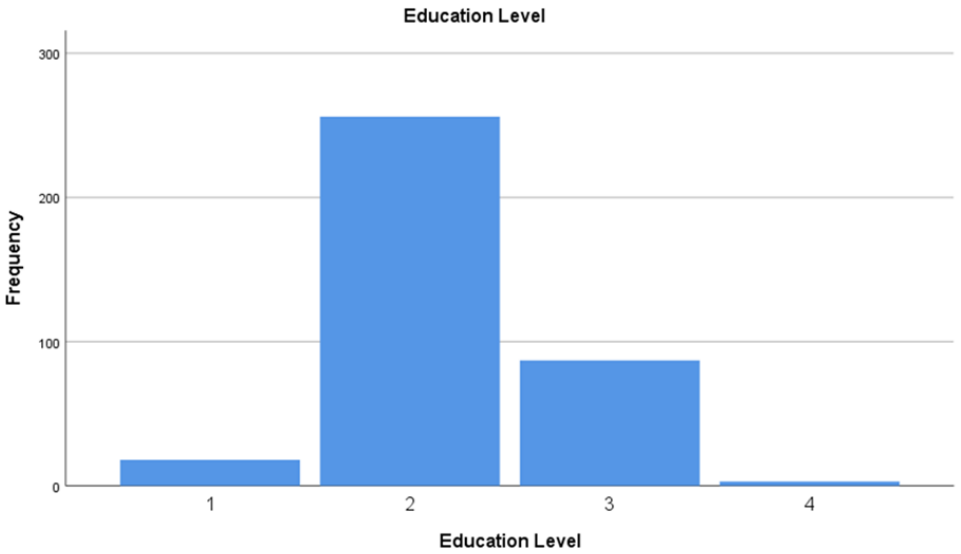
This table shows that the respondents' educational backgrounds were diverse: 5.0% had completed high school, 70.0% held bachelor's degrees, 24.2% had master's degrees, and 0.8% had doctoral degrees. This data is derived from a total of 380 valid responses.

Table 8

Education					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High School	19	5.0	5.0	5.0
	Bachelor degree	266	70.0	70.0	75.0

	Master degree	92	24.2	24.2	99.2
	Doctoral Degree	3	.8	.8	100.0
	Total	380	100.0	100.0	

Figure 6



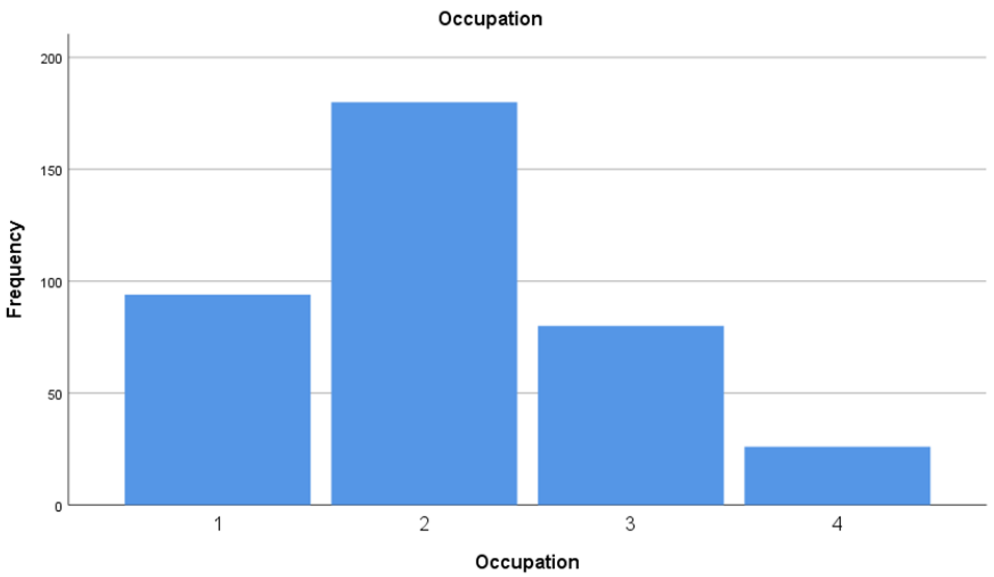
4.3.4. Occupation

The occupation distribution of respondents is as follows: 24.7% were students, 47.4% were employed, 21.1% were unemployed, and 6.8% were self-employed. These percentages are based on a total of 380 valid responses.

Table 9

Occupation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Student	94	24.7	24.7	24.7
	Employed	180	47.4	47.4	72.1
	Unemployed	80	21.1	21.1	93.2
	Self-employed	26	6.8	6.8	100.0
	Total	380	100.0	100.0	

Figure 7



4.3.5. Descriptive analysis

To illustrate the primary attributes of the dataset, a descriptive analysis is performed. Following Sekaran and Bougie's (2010) guidelines, utilizing the mean and standard deviation enables a comprehensive understanding of how respondents answered the questionnaire.

Table 10

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Gender	380	1	2	1.24	.426
Age (year)	380	1	4	1.39	.638
Education	380	1	4	2.21	.530
Occupation	380	1	4	2.10	.851
CSE	380	1.6	4.4	3.361	.8690
PU	380	1.8	5.0	3.716	.9965
PEU	380	1.0	5.0	3.391	.9329
AeG	380	1.67	5.0	3.678	.993
Valid N (listwise)	380				

The dataset comprises 380 observations on gender, age, education, occupation, CSE (Computer Self-Efficacy), PU (Perceived Usefulness), PEU (Perceived Ease of Use), and AeG (Attitude toward Technology). The mean gender value is 1.24, with a standard deviation of 0.426. The average age is 1.39 years, education is 2.21, and occupation is 2.10, with respective standard

deviations of 0.638, 0.530, and 0.851. CSE ranges from 1.6 to 4.4 with a mean of 3.361, PU ranges from 1.8 to 5.0 with a mean of 3.716, PEU ranges from 1.0 to 5.0 with a mean of 3.391, and AeG ranges from 1.67 to 5.0 with a mean of 3.679, all with their respective standard deviations.

4.5 Test of hypotheses:

4.5.1 Regression without controlled variables

Table 11

Hair et al. (2014)		**Cohen (1988)**	
0.75	Substantial	0.26	Substantial
0.50	Moderate	0.13	Moderate
0.25	Weak	0.02	Weak

This study draws inspiration from Cohen (1988), who posited the presence of a significant coefficient of determination. Based on the R-squared value, the study incorporates government technology in elucidating dimensions such as accountability, responsiveness, participation, rule of law, transparency, effectiveness, and efficiency. SPSS algorithms are utilized to elucidate the endogenous variable.

4.5.2 Coefficients

Table 12

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.121	.115		1.050	.294
	CSE	.348	.045	.304	7.690	.000
	PU	.366	.041	.367	8.983	.000
	PEU	.304	.048	.286	6.283	.000

a. Dependent Variable: AeG

The coefficients of the linear regression model predicting AeG (Dependent Variable) with three

predictor variables: CSE (Computer Self-Efficacy), PU (Perceived Usefulness), and PEU (Perceived Ease of Use). The constant term is 0.121 with a standard error of 0.115 and is not statistically significant (T=1.050, Sig=0.294). CSE has a significant positive effect on AeG (B=0.348, Std. Error=0.045, Beta=0.304, T=7.690, Sig=0.000), as does PU (B=0.366, Std. Error=0.041, Beta=0.367, T=8.983, Sig=0.000), and PEU (B=0.304, Std. Error=0.048, Beta=0.286, T=6.283, Sig=0.000). The complete model demonstrates the significance of the predictors in explaining the variance in AeG.

4.3.6. ANOVA.

Table 13

ANOVA						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	273.346	3	91.115	340.938	.000[b]
	Residual	100.486	376	.267		
	Total	373.832	379			
a. Dependent Variable: AeG						
b. Predictors: (Constant), PEU, CSE, PU						

The ANOVA results indicate a highly significant regression model (F=340.938, Sig=0.000) for predicting AeG (Attitude toward Technology). The model has three predictors: PEU, CSE, and PU. The regression accounts for a substantial portion of the variance in AeG, as evidenced by the regression sum of squares of 273.346 and a mean square of 91.115. The residual sum of squares is 100.486, and the total sum of squares is 373.832. This suggests that the predictors collectively contribute significantly to explaining the variability in AeG, supporting the overall significance of the model.

4.3.7. Model Summary

Table 14

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.855[a]	.731	.729	.516961129625864
a. Predictors: (Constant), PEU, CSE, PU				

The regression model predicting AeG shows a strong positive linear relationship (R = .855) between the predictors (PEU, CSE, PU) and the dependent variable. Approximately 73.1% of the variance in AeG can be explained by these predictors (R Square = .731). The adjusted R Square, which accounts for the number of predictors and sample size, is slightly lower at .729. The standard error of the estimate (.52) indicates the average difference between observed and predicted values of AeG. The model provides a good fit to the data, with a high percentage of variance explained by the predictors.

4.4. Results with control variable

4.4.1. Model Summary

Table 15

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.870[a]	.757	.752	.494542214272947
a. Predictors: (Constant), PEU, Age (year), Occupation, Gender, Education, CSE, PU				

The model, incorporating predictors (Constant, PEU, Age, Occupation, Gender, Education, CSE, PU), exhibits a strong association with the dependent variable, (AeG) as evidenced by a high R-value of 0.870. It accounts for a substantial proportion of the variance in AeG, with an R Square of 0.757. The adjusted R Square (0.752) indicates the model's robustness, considering the number of predictors. The standard error of the estimate is 0.495, reflecting the typical prediction error for AeG.

4.4.2. ANOVA

Table 16

ANOVA						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	282.851	7	40.407	165.216	.000[b]
	Residual	90.981	372	.245		
	Total	373.832	379			
a. Dependent Variable: AeG						
b. Predictors: (Constant), PEU, Age (year), Occupation, Gender, Education, CSE, PU						

The ANOVA results indicate a highly significant regression model (F=165.216, Sig=0.000) for predicting AeG (Adoption of E-Government). The model includes seven predictors: PEU, Age, Occupation, Gender, Education, CSE, and PU. The regression accounts for a substantial portion of the variance in AeG, with a regression sum of squares of 282.851 and a mean square of 40.407. The residual sum of squares is 90.981, affirming the overall significance of the predictors in explaining the variability in AeG.

4.4.3. Coefficients

Table 17

Coefficients						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)	-.256	.153		-1.668	.096
	Gender	.091	.067	.039	1.361	.174

	Age (year)	.058	.055	.037	1.051	.294
	Education	-.172	.072	-.092	-2.398	.017
	Occupation	.179	.033	.153	5.421	.000
	CSE	.367	.044	.321	8.420	.000
	PU	.419	.043	.421	9.701	.000
	PEU	.282	.049	.265	5.756	.000
a. Dependent Variable: AeG						

The coefficients of the linear regression model predicting AeG (Dependent Variable) are as include seven predictors. The constant term is statistically non-significant (B=-0.256, Std. Error=0.153, T=-1.668, Sig=0.096). Among the predictors, Occupation (B=0.179, Std. Error=0.033, Beta=0.153, T=5.421, Sig=0.000), CSE (B=0.367, Std. Error=0.044, Beta=0.321, T=8.420, Sig=0.000), PU (B=0.419, Std. Error=0.043, Beta=0.421, T=9.701, Sig=0.000), and PEU (B=0.282, Std. Error=0.049, Beta=0.265, T=5.756, Sig=0.000) significantly influence AeG. Education has a negative effect (B=-0.172, Std. Error=0.072, Beta=-0.092, T=-2.398, Sig=0.017), while Gender and Age are not statistically significant predictors. The overall model is highly significant in explaining the variance in AeG (F=165.216, Sig=0.000).

4.7 Result

4.7.1 Hypothesis Result

H1: The 1st hypothesis (β1= 0.321, t1=8.420, Sig1= .000) is that there is a significant relationship between computer self-efficiency and adoption of E-government.

H2: The 2nd hypothesis (β2= 0.421, t2=9.701, Sig2= .000) is that there is a significant relationship between perceived usefulness and adoption of E-government.

H3: The 3rd hypothesis (β3= 0.265, t3=5.756, Sig3= .000) is that there is a significant relationship between perceived ease of use and adoption of E-government.

5. Summary of hypothesis testing

This study investigates how key variables such as computer self-efficacy (CSE), perceived usefulness (PU), and perceived ease of use (PEU) influence the adoption of E-government (AeG). Using quantitative methods and regression analysis, the research explores the dynamics between these factors. The appropriateness of the predictive model was initially gauged using the R-squared (R^2) value. According to Cohen's (1988) standards, an R^2 value of 0.757, shown in Table 4.15, indicates a strong association, well above the significance level of 0.26, aligning with the classifications by other researchers. Regression coefficients for the independent variables are detailed in Table 4.12, with their significance confirmed via t-tests and corresponding p-values. Remarkably, all the independent variables demonstrated a significant link with AeG, having p-values less than the standard alpha level of 0.05 (p-values were .000 for all). Among them, perceived usefulness (PU) was the strongest predictor ($\beta = .421$), succeeded by computer self-efficacy (CSE) ($\beta = .321$) and perceived ease of use (PEU) ($\beta = .265$), underscoring the central role of PU in driving E-government adoption. The model's strength is further supported by the ANOVA results (Table 4.13), showing a highly significant F-value ($F = 340.938$, $p < .000$),

which confirms the model's predictive validity regarding AeG.

The research hypotheses posited a significant impact of each independent variable on AeG, which was confirmed as follows:

H1: Computer self-efficacy significantly influences AeG, supported by a t-value of 7.673 and a p-value of .000.

H2: Perceived usefulness significantly affects AeG, confirmed by a t-value of 8.894 and a p-value of .000.

H3: Perceived ease of use significantly impacts AeG, upheld by a t-value of 6.009 and a p-value of .000.

The findings of the study validate the hypotheses, demonstrating that computer self-efficacy (CSE), perceived usefulness (PU), and perceived ease of use (PEU) significantly impact the adoption of E-government (AeG). The model exhibits a notable explanatory capability of roughly 72.5%, highlighting the crucial influence of user perceptions and competencies on the uptake of digital government technologies. Such results have important consequences for the formulation of policies and the implementation of strategies aimed at fostering the adoption of E-government services.

5.1. Conclusion and Recommendations

5.1.1. Conclusion:

This study meticulously investigated the dynamics of digital government adoption in Lahore, Punjab, focusing on the interplay between computer self-efficacy (CSE), perceived usefulness (PU), and perceived ease of use (PEOU). Employing a structured methodology and leveraging a large sample of Lahore city residents, the research robustly assessed the factors influencing e-government services adoption. Its quantitative analysis, characterized by a high response rate, offered decisive evidence of the pivotal roles of CSE, PU, and PEOU in embracing e-government. Descriptive statistics outlined the demographic profile of participants, predominantly young and educated, reflecting Lahore's orientation towards digital technologies. Inferential statistics delivered deeper insights into the relationships among the studied variables, with hypothesis testing validating the initial theoretical expectations. The analysis demonstrated that CSE significantly influences e-government adoption, signifying the importance of confidence in using computers within the digital governance context. PU was identified as a critical factor, highlighting the importance of recognizable benefits in e-government services for enhancing citizen participation. Furthermore, PEOU was found to significantly influence the adoption of e-government, suggesting that user-friendly interfaces could markedly improve satisfaction and uptake of these services.

The findings represent a significant contribution to the discourse on digital governance transformation in emerging economies, offering nuanced insights for policymakers in Lahore's socio-political context. The study advises that enhancing computer self-efficacy, emphasizing the utility of e-government platforms, and ensuring their ease of use are essential for the success of future e-government initiatives. It also points to the necessity of addressing the digital divide and adapting policies consistently, setting a foundation for further exploration into human-technology interactions within the public service realm. Additionally, it underscores the importance of examining other factors such as trust, security, and privacy to understand better citizens' perceptions and adoption of e-government services.

5.1.2. Future recommendation:

To enhance the perceived usefulness of e-government services, optimizing them for maximum utility is essential. This optimization includes creating clearer pathways for users, developing robust support systems, and adopting convenient communication strategies. To boost computer self-efficacy, it is vital to introduce initiatives aimed at improving digital literacy. These initiatives could involve community-based training programs, providing subsidized access to educational courses, and offering user assistance services. Simplifying the user experience is another critical recommendation. This simplification can be achieved through focusing on intuitive UI/UX design across e-Government platforms, standardizing interfaces, and ensuring comprehensive support resources are available.

Ensuring demographic inclusiveness is crucial. Strategies should be tailored to provide equitable access to e-government services for all demographic groups, irrespective of their education level or technological proficiency. Regular assessments and the solicitation of feedback are important for continuously evaluating service uptake and user satisfaction. This approach allows for the adaptation of services to meet evolving needs and leverages feedback for service refinement.

Promoting security and building trust is imperative. Enhancing security measures and communicating transparently about data protection practices can help foster trust and confidence in e-government systems among citizens. Targeted outreach and awareness campaigns are necessary to increase the adoption of e-government services. These campaigns should be culturally sensitive, especially in rural areas, and information should be provided in local languages to ensure broad understanding and engagement.

Undertaking longitudinal studies is recommended to observe E-Government adoption trends over time, taking into account socio-political shifts and technological progress. Lastly, expanding the research scope to other regions could provide valuable insights. This expansion allows for comparative analysis and the identification of region-specific drivers of adoption and best practices. Adhering to these recommendations can significantly help stakeholders in enhancing e-government proliferation, meeting citizens' demands efficiently, and propelling transformative digital initiatives within public administration.

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