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Elections In The Digital Age: A Study Of Evms' Social Impact In Pakistan

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Abstract

The objective of this research was to evaluate the potential and challenges of Electronic Voting Machines (EVM) in the context of societal implications, concentrating on Pakistan as a case study. The role of socio-political context, social attitudes, and trust has been explored to know how these factors affect the acceptability and efficacy of EVM in a developing democracy like Pakistan. A quantitative case study research design has been used for this research. Some important factors have been identified using factor analysis, such as public trust, civic participation, digital divide, which have a great influence on the success or failure of EVM. The result also emphasizes a crucial aspect of aligning technological development in the electoral arena with the social environment, showing that effective implementation of EVM not only requires know-how of technology but also a grasp of the social environment is essential. This research also provides a policy guideline for the formation of a comprehensive strategy considering socio-cultural dynamics and capabilities of voters to deal with the latest technology and training them through mass media awareness programs to adopt EVM in Pakistan. The study findings also provide a roadmap for the Election Commission of Pakistan and legislatures for a smooth acceptance of EVM by making this adoption in line with the requirements and expectations of society.

Keywords: *Elections and Civic Engagement, Voters Education, EVM in Pakistan, Elections, Voters Education, Electronic Voting Machines.*

1. Introduction

An electoral system is the process of translating votes into representation (Mitchell, 2005). Voting procedures play a significant role in conducting free and fair elections in a democracy (Ravi, et al. 2022). Elections in democracies are considered a benchmark and symbol of democracy (Hudhaibi et al. (2023). The ballot boxes are the only opportunity for the public to grind the government through an accountability process to throw unnecessary representatives out of the legislative assemblies (Pippa Norris, 2004). Elections and democracy are interlinked and serve as the sin-quo-non for democracy and governance. It is the fundamental right of the citizens to participate freely and fairly in the election process and also serves as a fundamental aspect of democratic societies. Since the emergence of democracy, a manual voting system has

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been used, which is criticized due to its error-prone nature and time-consuming process. An electoral cycle has 11 steps and each step has its effectiveness on the credibility of Elections.

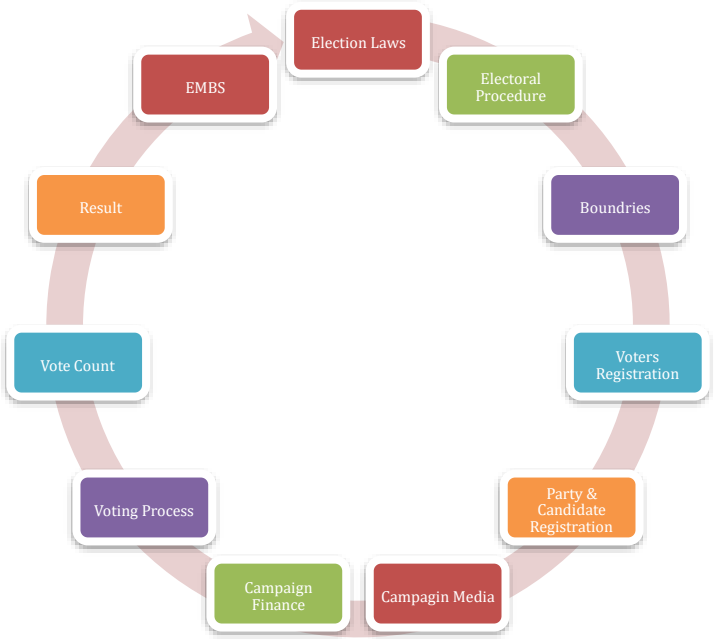

Figure 1.1: 11 Steps of Electoral Cycle[1]

Pakistan's democratic journey has seen uneven ups and downs since its independence. After witnessing several phases from 1947 to 1970, Pakistan's democratic journey was reshaped after the enactment of the Constitution of the Islamic Republic of Pakistan in 1973. According to the Constitution, elections to the general seats of National Assembly and Provincial Assemblies are direct elections through the first past the post system, whereas the elections to the reserve seats of National and Provincial Assemblies and elections to the Senate are held indirectly through a system of proportional representation.

The social dynamics of a country are interdependent on the election results. After voting for Brexit in 2016, a resurgence in hate crimes was recorded (Apffelstaedt et al. 2022). The United Nations claimed that the United Kingdom is "a more racist country" due to this increase in hate crimes (Brown and Coates, 2021). Similar hate crimes were seen in the United States of America (USA) after Trump's victory in US Presidential Elections in 2016 (Jeltsen, 2016). These two major examples show that an election directly affects the social dynamics of a country.

The social aspect of Pakistani culture plays a vibrant role in the tapestry of the electoral landscape of Pakistan. These dynamics intertwine with civic engagements and community participation. In Pakistan, elections are not seen as a political event but as a collective carnival of democracy. The social dynamics are far beyond the ballot casting, influencing the citizens' expression of identity and engagement with the politics of the country, contributing to a large narrative building of the country.

[1] Why Election Fails? By Pippa Norris

As per ECP, 45 percent of voters till July 2017 are in the age bracket of 18-35 years (ECP, 2023). The youth of a country having a 45 percent share in the electoral rolls of Pakistan has a great impact on shaping the political landscape of a country. Pakistani youth has been seen as actively engaged in political discourse and participation in the electoral process.

Pakistani society has a rich social implication on elections due to cultural bonding and family ties. Historically, these factors have been witnessed in influencing voters' behavior by making electoral choices based on the recommendations of religious, community, and family leaders/elders. Besides these factors, major social issues also play a significant role in shaping voters' preferences. The candidates who, during the election campaign or his elected term, pay special attention to issues like poverty, unemployment, healthcare facilities, inflation, and education facilities have more resonated with voters for gaining support.

Pakistan's ethnic, linguistic, and social groups also play a vital role in the electoral process. The candidate addressing the concerns of these segments of society gains support from them. Societal groups like civil society organizations and youth and women's rights advocates are also engaged in electoral processes like voter education and campaigns. In the era of emerging technologies, social activism through social media has been witnessed as a potential force in elections. The youth is using social media to participate in electoral discourses and processes actively. This revolution has also reshaped political campaigns, and political leaders are actively seen using social media to disseminate their mottos to gain electoral support.

Electoral problems in elections like fraud, violence, and ballot stuffing have led to compromised quality of elections failing to meet international standards (Hyde, 2011; Kelley, 2012). Claims of Electoral fraud have affected developing countries and developed countries that remained under discussion due to different charges by the opposition parties. From the United States of America to Myanmar, Brazil, and Indonesia, these chants are common (Berlinski, N, 2023). This hue and cry have also hit Pakistan since its election in 1970.

Despite the potential benefits, the technology in elections remains controversial, with concerns about the security and reliability of electronic voting systems. Technology in elections has seen an impactful step regarding the efficient conduct of elections and prompt performance of activities after polling hours. Whether it is Biometric Voting, Electronic Voting, or Internet Voting, all these technologies are made to make the voting process more accurate, efficient, and less time and resources consuming than traditional voting. Not only the cost but also increased voter turnout, fastened the result tabulation process, and improved accessibility (Hisamitsu and Takeda, 2007).

The purpose of this study is to find out the potential societal impact of Electronic Voting Machines and how the citizens of Pakistan see these machines in the future. The findings of this research will be helpful to get insights into social implications for improving the electoral process and strengthening democracy in Pakistan.

2. Literature Review

It is a fundamental right of the citizens to genuine elections manifested in the right to vote and the right to be elected (Pran, & Patrick, 2007). The procedure of casting votes and translating those votes into seats of any relative assembly is called the Electoral system (Menocal, n.d). An electoral system's effectiveness can be measured by accountability, representativeness, and fairness (Allan Wall, 2012). Elections are an integral part of the electoral system and the cornerstone of democratic societies and serve as a fundamental right for citizens of a country. By casting their votes, citizens exercise their right to elect representatives, shaping the pathway for their nations' development (IDEA, 2005).

Pakistan has a bicameral parliamentary system having the National Assembly and Senate at the Federal level. The term of each Assembly, according to the Constitution of Pakistan enacted in 1973, is five years, whereas the Senate is not subject to dissolution. Several types of research have been conducted regarding the use of technology in elections concerning a specific country(s). The researchers on Computer Science, mathematics, and engineering carried out studies regarding the technicalities of EVM, which is 72 percent of all the research on EVM. However, 10.8 percent of research has been carried out by social scientists to dig into the other aspects of EVM (Oostveen, et al. 2019).

According to Dandoy (2014), electronic voting may pose challenges for certain demographics, such as elderly individuals or individuals with impairments, by potentially impeding their ability to submit their ballots successfully. Oostveen & Besselaar, (2003), in their study regarding electronic voting and its impact on media, explores the social and social-psychological dimensions of media influence on voting behavior. According to the authors, a positive correlation between the availability of electronic voting and increased voter turnout. Moreover, the research revealed that individuals are more inclined to support politicians who possess the same social identity as them when they cast their votes electronically.

According to research by Oostveen, Anne-Marie, Van den Besselaar, and Peter. (2019) has found that only a little research has been carried out regarding the social aspect of EVM. The scholars found that developed democracies have a more equitable and impartial approach to researching e-voting compared to emerging democracies. Emerging democracies exhibit less scrutiny towards e-voting and instead prioritize their attention on technological features. This research's limitation was relying on a Scopus database search, which may not encompass all pertinent scholarly literature. Imrana (2022), in a critical study of elections in Pakistan, found that elections in Pakistan are held in a hostile environment rather than a conducive which is the requirement of an objection-free election. Instead of keeping national interest at the top, the political parties use political indifferences and keep personal interest in electoral reforms. The authors recommended setting aside personal political differences to develop a consensus to achieve the best electoral reforms. Vassil and Weber in 2011 researched the turnout of elections, and they found that e-voting not only increases turnout but also brings disengaged people into closer contact with politics, which fortifies equality in society.

2. Research Methodology

Finding paths of procedures during a research design is based on quantitative, qualitative, and mixed methods (Creswell, 2014). In the social sciences, there are five main research strategies: experiments, surveys, archival analysis, histories, and case studies. Each strategy has its own set of strengths and weaknesses, and selecting the appropriate strategy depends on several factors, such as the research question, context, and available resources (Yin, 2003).

This research is carried out using a quantitative method with a case study approach to comprehensively examine the social impact of EVM on the political environment of Pakistan. In addition to design, our methodology thoroughly examines the complexities of population and sampling, guaranteeing a diverse and inclusive group of stakeholders that are essential to the election process. The data-gathering instruments, comprising a carefully crafted blend of questionnaires, are meticulously constructed to elicit insights. A diverse set of stakeholders, including elections, law, policy, experts, and observers from society who have taken part in the electoral process, are taken on board to carry out this research.

3. Hypothesis

H0: Society has no implications for the success of EVM.

H1: Society has potential implications for the success of EVM.

4. Results and Discussion

A survey was conducted through Google Forms and reached the participants in person and through email, and the responses of 252 participants were recorded. To know the social factors that significantly impact the adoption of EVM, a Principal Factor Analysis has been performed.

A correlation analysis of EVM and societal impact reveals a statistically significant and moderately positive association between the use of EVM and perceived societal impact. This result suggests that study participants think there is a discernible beneficial impact on society aspects when EVM usage rises.

Correlations of EVM and Social Impact

		EVM	Social Impact
EVM	Pearson Correlation	1	.578**
	Sig. (2-tailed)		.000
	N	252	252
Social Impact	Pearson Correlation	.578**	1
	Sig. (2-tailed)	.000	
	N	252	252

**. Correlation is significant at the 0.01 level (2-tailed).

Table 1.1: Correlation Analysis of Social Impact on Adoption of EVM

From Table 1.1, it is evident that a statistically significant correlation is found, ranging from moderate to strong, that is positively associated with EVM and Social Impact. The increased correlation coefficient in comparison to the prior analysis with Political Impact indicates that Social Impact may have a more robust association with EVM. The strength of the association suggests that variations in Social Impact are closely linked to significant variations in EVM in the same direction. Nevertheless, this does not indicate a cause-and-effect relationship. The correlation between EVM and Social Impact is significant at the 0.01 level, which suggests a strong level of confidence in the validity of the relationship within the specific dataset.

We have performed factor analysis on each implication of the adoption of EVM and started with Political impact. This section provides an analysis of the Principal Component Analysis (PCA) performed on the results of the survey, with a specific focus on the societal effects of implementing EVMs. We have conducted the Ordinary Least Squares (OLS) test on social effects, and the resulting findings are presented below.

Model Summary

Mode l	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.578[a]	.334	.332	.31517

a. Predictors: (Constant), Social Impact

Table 1.2: Model Summary of Social Implication on Adoption of EVM

Table 1.2 shows a model summary of the social impact of EVM, The R-value shows a moderate to strong positive correlation between social impact and EVM. The R Square value of 0.334 shows that a significant impact of 33.4% of society on EVM adoption is recorded. The adjusted R square value is however slightly low. Due to the presence of only one independent variable (predictor) in the current model, the difference between R Square and Adjusted R Square is minimal.

From the above model, it is interpreted that social impact is a notable and strong predictor of the dependent variable EVM. However, as 66% of the explanation is unaccounted, we cannot forget that our research has 03 other variables which might be additional factors that influence the dependent variable.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.477	1	12.477	125.605	.000[b]
	Residual	24.833	250	.099		
	Total	37.310	251			

a. Dependent Variable: EVM
b. Predictors: (Constant), Social Impact

Table 1.3: ANOVA test of Social Impact on the adoption of EVM

From Table 1.3, it is clear that the F-Statistic is large and the p-value is small. It shows that social impact as a predictor has significantly predicted EVM. To make it simpler, Social Impact significantly affects EVM in the above model. It is important to highlight here that the p-value is .000 showing a significant relationship between dependent and independent variables.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.633	.072		8.728	.000
	Social Impact	.535	.048	.578	11.207	.000

a. Dependent Variable: EVM

Table 1.4: Coefficients of social implication on the adoption of EVM

From Table 1.4, the results show that social impact significantly predicts EVM. If we increase one unit in social impact or improve social impact by one unit, it will increase EVM's successful adoption by 0.535 units. The changes in social impact are linked to the significant success of EVM.

The second part of this research was to find underlying factors that are important for the adoption of EVM in Pakistan. We started with KMO and Bartlett's test to check the adequacy of the data.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.676
Bartlett's Test of Sphericity	Approx. Chi-Square	61.415
	Df	6
	Sig.	.000

Table 1.5: KMO and Bartletts's Test of Societal Implication on Adoption of EVM

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy returned a value of .676, suggesting a modest level of suitability for the factor analysis. As per Table 1.5, Bartlett's Test of Sphericity yielded a significant result ($\chi^2 = 61.415$, $df = 6$, $p < .001$), indicating that the factor analysis was suitable for the given data set.

Component Matrix[a]

	Component	
	1	2
Public Trust	.787	.267
Civic Engagement	.700	.302
Reduce Urban Rural Voters Gap	.607	-.300
The challenge of accessing and using EVM by low-knowledge people	-.274	.871

Extraction Method: Principal Component Analysis. [a]
a. 2 components extracted.

Table 1.6: Component Matrix of Societal Implication on Adoption of EVM

From Table 1.6 it transpires that we got Two components by factor analysis. Within the component matrix, Public Trust exhibited a substantial loading of .787 on Component 1, whereas the Challenge of accessing and using EVM by individuals with limited expertise displayed a significant loading of .871 on Component 2. This indicates a robust correlation between these variables and their corresponding components.

Total Variance Explained

Component	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.552	38.797	38.797	1.467	36.674	36.674
2	1.011	25.283	64.079	1.096	27.406	64.079

Extraction Method: Principal Component Analysis

Table 1.7: Total variance explained for societal impact on the adoption of EVM

From Table 1.7, it is evident that the cumulative variation explained by the two components was statistically significant, with Component 1 explaining 38.797% and Component 2 explaining 25.283% of the variance. The two-factor solution accounted for a total of 64.079% of the variance in the data set.

Rotated Component Matrix[a]

	Component	
	1	2
Public Trust	.828	-.067
Civic Engagement	.762	.000
The challenge of accessing and using EVM by low-knowledge people	.094	.908
Reduce Urban Rural Voters Gap	.438	-.516

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]
a. Rotation converged in 3 iterations.

Table 1.8: Rotated Component Matrix of Societal Implication on Adoption of EVM

The factor loadings were somewhat modified and improved in interpretability following the Varimax rotation, as seen in Table 1.8. After rotation, Component 1 had a greater loading of .828 for Public Trust, whereas Component 2 showed a significant loading of .908 for the Challenge of accessing and using EVM by individuals with limited expertise.

To conclude the factor analysis for the societal implications of the adoption of EVM, a bivariate solution has been found that accounts for a substantial proportion of the variability in the dataset. Component 1 was predominantly linked to Public Trust and Civic Engagement, while Component 2 was connected to the Challenge of accessing and utilizing EVM and mitigating the Urban-Rural Voters Gap. These findings indicate that there are separate and independent factors that can influence the adoption of EVM.

An observable impact has been observed in the use of EVMs in narrowing the difference between urban and rural voters, with a modest variation. The participants have demonstrated a reasonable level of perception of the function of EVM in fostering public trust and enhancing civic involvement, with a moderate degree of variability and a median value. Regarding the challenges associated with accessing and using EVMs, the respondents showed moderate agreement, with a mean of 1.59 and a standard deviation of 0.776. This indicates a moderate range of viewpoints among the participants. A correlation analysis of EVM and societal impact reveals a statistically significant and moderately positive association between EVMs and perceived societal impact. This result suggests that study participants think there is a discernible beneficial impact on society when EVM usage rises.

4.1 Hypothesis Testing

As per our hypothesis, we assumed the following:

Null Hypothesis: Societal effects have no implications for the success of EVM.

Alternate Hypothesis: Society has potential implications for the success of EVM.

From the above-given data, it is evident that the Coefficient, i.e., B, is 0.535 with a t-value of 11.207, indicating the strength and direction of the relationship between societal impact and EVM. As the p-value (.000) in Table 5.13 is less than 0.05 hence, we reject the null hypothesis and accept the alternate hypothesis.

4.2 Social Factors Affecting Acceptance of EVM

To know the societal factors that can influence EVM adoption, a question was also undertaken in the research.

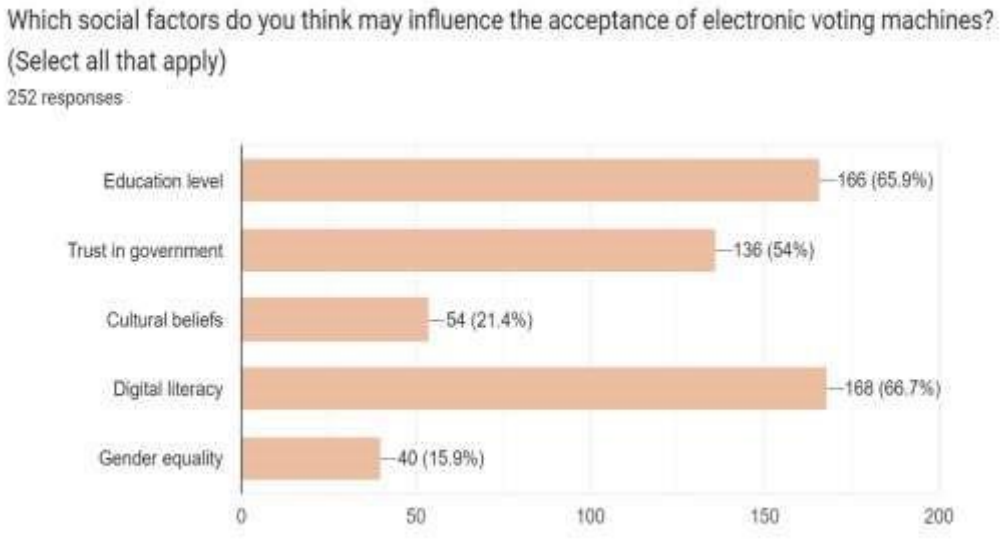

Figure 1.2: Social Impact that can Influence Acceptance of EVM

Figure 1.2 presents a compilation of several societal elements together with the corresponding number of respondents who hold the belief that each aspect could impact the acceptability of EVMs.

Education Level: Based on 166 responses (65.9%), this element is considered the most influential. There is a positive relationship between higher levels of education and a stronger acceptance of EVMs, potentially because individuals with more education have a more comprehensive understanding of the technology. Selected by 136 respondents (54%), trust in government is a noteworthy determinant. This implies that the level of public trust in governing bodies directly correlates with the likelihood of their acceptance of EVMs. Understanding and proficiency in using digital technologies and tools. Chosen by 168 participants, accounting for 66.7% of the total, this indicates the importance of possessing the ability to utilize digital technologies for the acceptability of EVM. It emphasizes the significance of acquainting the voting population with digital interfaces in order to enhance the acceptance of EVMs.

Cultural Beliefs garnered 54 responses, accounting for 21.4% of the total, indicating a moderate influence on the acceptability of EVM. This suggests that conventional voting procedures are strongly embedded in some cultural contexts, which in turn impacts the acceptance and implementation of new technology. Among the 40 comments received, accounting for 15.9% of the total, it was perceived as the least influential aspect. Nevertheless, it is crucial to contemplate the potential impact of gender perspectives on the acceptability and utilization of EVMs in various geographical areas.

5. Conclusion

This thorough research on the societal potential and challenges for the adoption of EVM, we conclude that societal aspects are very crucial in the acceptance or rejection of any new norm or technology either in the electoral arena or any other sphere of life. Through regression analysis of the obtained data, our null hypothesis has been rejected demonstrating that societal factors have major implications for the success of EVM. In the current socio-political scenarios, this result is not only practically relevant but statistically robust as shown by a p-value of less than 0.0001.

Through the Principal factor analysis, a bivariate solution in the shape of two social factors has been revealed. The urban-rural voter gap and technological and social challenges of accessing and using EVM are the first crucial challenges in the adoption of EVM. Whereas, public trust and civic engagement are found to a potential aspect for the successful implementation of EVM. This splits highlights the complex interplay between cultural factors and the adoption of EVMs, with trust and participation playing an equal role in practical accessibility and bridging urban-rural divisions. We can say that through public trust and civic engagement.

The study shows a significant connection between social factors like public trust, civic engagements, and narrowing down the urban-rural voter gap signifying the interrelation and contribution of these factors to the acceptance or rejection of EVM in Pakistani society. The significance of education, competence with digital technology, and confidence in the government have also been found as major factors that can influence the acceptability and success of EVM. The study's conclusions also emphasize the significance of education, confidence in the government, and competence with digital technology as major factors influencing EVM acceptability.

The research findings also focus on the need for extensive training and mass media awareness programs by ECP as gender perspectives and cross-regional cultural traditions are

apparent challenges in the adoption of EVM. To make it simpler, the social dynamics are necessary to be comprehended for the effective deployment of EVM. The stakeholders and policymakers can use the findings of this study for strategy development by not only focusing on political, logistic, and technical issues but also focusing on society to open the doors for an electoral process that remains acceptable to all.

6. Recommendations

To make recommendations in line with the results and analysis of this study the following recommendations are necessary to be pondered upon for the smooth adoption of EVM as a replacement for traditional voting machines if required so by the Authorities in Pakistan:

i. Mass training programs may be initiated to increase awareness of the citizens regarding the potential of EVM in the society of Pakistan.

ii. Social preparedness may be achieved through extensive public awareness efforts, and educational initiatives are crucial for creating a conducive atmosphere for EVMs.

iii. It is essential to include civic society, media, and educational institutions in spreading precise information to foster a culture that embraces technology.

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