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Electronic Voting System in Pakistan: Benefits and comparative Analysis with Traditional Voting System

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Abstract

Electoral reforms are the most prominent and specific way to ensure transparency, time-saving, and accuracy of in-time results after the elections in a country with a democratic government structure. The key stakeholders for implementation and policymaking in the Government of Pakistan are reluctant to implement the new electronic voting (E-Voting) system for elections as this System is more efficient, accurate, automated, Artificial Intelligence (AI) based System, and time-saving as well as cost-saving System. It will ensure transparency, eliminate political players' unjust influence and corrupt practices during elections, and empower Pakistan's true democratic leadership style. Above all, this transformation will enable maximum voter involvement through online voting modes like mobile phones, laptops, etc.

Key Words: Electoral reforms, democratic government structure, Electronic Voting (E-Voting) Artificial Intelligence (AI) based Systempolitical players, true democratic leadership style

1. Introduction

In Pakistan, organizing an election event was always the biggest challenge to the organizers due to uncertainty and malpractices during the entire election process. Almost 10% of the total number of 7,000 polling stations were faced with the situation of poll rigging. This situation has been met by the political System in Pakistan for decades, due to which this electoral procedure cannot be categorized under the classification of a transparent electoral system in the true spirit.

The essential complexity in the entire System is the implementation of ineffective and inappropriate policies, which are always made under the personal interests of the dominant political players of Pakistan, which leads the entire System to contradict the fundamental human rights of the general public as the personal interest and gains are at priority. National interest has nothing to do with the entire process. This kind of policymaking leaves the basis of justice far behind from reality, and only influential people, instead of the rightly nominated person, are found to be in the assemblies and parliament of Pakistan. Every person during the Voting is faced with some kind of emotional or physical pressure to vote out the particular party or else they are threatened to have negative impacts along with their families in their respective constituency. This leaves no choice to the voters other than casting their votes in favour of that party that coerces, administers, and ensures that the voice is cast to their Candidate. This unethical practice must be stopped to support the Candidate who is in favour of the general public with the involvement of some different mode with almost no control in the System to influence during the entire process. This kind of integration of Internet of Things (IoT) devices will eliminate the abuse of power and authority in the whole System. Then the Election Commission of Pakistan (ECP) can ensure a free and fair election in all the constituencies of Pakistan as prescribed in the Constitution of Pakistan.

1.1. Manual Voting System

Pakistan's electoral System is manual and involves a considerable amount in the case of a general election in Pakistan. The Voting for the national assembly (NA) and provincial assembly (PA) is also manual. The whole process of verification of the voters and the registration of the voters is manual and is followed by printing two ballot papers of different colours for the National Assembly and Provincial Assembly. Verification of voters is verified by the representative of the Election Commission of Pakistan (ECP) in their respective territory to distribute the registration form for Voting and collect them after the prescribed time. There is no mechanism to inform the voters about the vote information or to share the registration details. Due to the absence of this mechanism, the majority of votes are unable to cast their votes due to data entry operators of the ECP. The discrepancies are only found when the voters check their constituency of the ballot through the mechanism of Short Message Service (SMS) designed by ECP. Ballot papers of the same colours are used for Union Council (UC) at the district level.

2. Evaluation of the Objectives and Conceptual Framework

The core objective behind research on the electronic voting system of Pakistan is to identify the most feasible voting system which should be implemented to ensure free and fair elections in Pakistan. The new digital Voting system will be the way to deal with all the poor practices and the improved mechanism of in-time results with accuracy just with a one-click option. This research will also provide the tool for the authenticity of the whole System to eradicate the misconception behind implementing an e-voting system through an Internet of Things (IoT) devices. The problems which are found in the Traditional Voting System (TVS) when compared with the Electronic Voting System (EVS) are as under:

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2.1. Unjust Influence of Political Players

An event like political influence to modify the results in favour of a corrupt contestant has been followed for many decades and has made the foundation of the election process shakier through political victimization. Political victimization is the best tool for political opponents. This concept moves on towards life threats and compulsions on basic needs, which are also categorized as the necessities of life according to Maslow's Hierarchy of Needs. Usually, contestants from the old political families and elite class are more resourceful, and they are least bothered about the better living standards of the general public in the country. When the opponent appears from the broad category such as the middle class or lower middle-class community, then the unjust influence with the help of local administration and security agencies as reinforcements have a substantial impact as contestants from under-privileged class are unable to have their power until they become the part of either provincial assembly or national assembly or any regulatory body (Khawaja & Hasan, 2016).

2.2. Government Structure of Pakistan with Evaluation

According to the Constitution of Pakistan 1973, The state is controlled by the President as an ultimate approving authority after the parliament makes or constitutes any amendment, while the government is supposed to be governed by the Prime Minister (PM) and all the liability of decision regarding the administration and operations of government is borne by PM. Further classification of Parliament and National Assembly (NA) comprises 100 seats for public representatives in parliament and 342 seats in NA.

Table-1

Senate Assembly

Province/Area	General Seats	Seats reserved for		Total
		Women	Technocrats and Ulema	
Federal Capital	2	1	1	4
Punjab	14	4	4	22
Sindh	14	4	4	22
Khabar Pakhtoon	14	4	4	22
FATAs	8	-	-	8
Balochistan	14	4	4	22
Total	66	17	17	100

Distribution of seats in the senate Assembly, displayed by Province[2].

Table -2

National Assembly

Province/Area	General Seats	Seats reserved for		Total
		Non-Muslims	Women	
Federal Capital	2	10		2
Punjab	148		35	183
Sindh	61		14	75
Khaiber Pakhtoon	35		8	43
FATAs	12		-	12
Balochistan	14		3	17
Total	272	10	60	332+10=342

Distribution of seats of the National Assembly, displayed by Province[3].

Figure 3 shows the details of the number of seats in Provincial Assemblies (PAs) in Pakistan are also a limited number of seats for public representatives who compete in the whole election process, such as a competition held for 183 seats out of 297 in Punjab Assembly (PA) and the rest of several centres in Sindh Assembly (SA), Khyber Pakhtoon Khawa Assembly (KPKA), and Balochistan Assembly (BA) are mentioned.

Table -3

Provincial Assemblies

Province/Area	General Seats	Seats reserved for		Total
		Non-Muslims	Women	
Punjab	297	8	35	183
Sindh	130	9	29	168
Khaiber Pakhtoon	99	3	22	124
Balochistan	51	3	11	65
Total	577	23	128	728

Distribution of seats for each Provincial Assembly[5].

Table -4

Category-wise seats in a Union Council

Sl No.	Category	Number of seats
1.	Nazim/ Convener / Mayor	1
2.	Naib Nazim / Assistant Convener/ Assistant Mayor	1
3.	General Counselor	4
4.	Labour Counselor	2
5.	Lady Counselor	2
6.	Lady Labour Counselor	2
7.	Minority Counselor	1
	Total:	13

Category wise number of seats in a union council[7].

After the 18th amendment to the Constitution of Pakistan, the local government is empowered with the delegation of authority to ensure the System of accountability, mechanism of the good-governance model in provinces, and assurance of the provision of social services delivery with effective measures. This was supposed to be implemented in true spirit. Still, the actual implementation is way behind the anticipation and expectations, and delegation is not distributed amongst the districts and then cities at the grass root level. Local government institutions are supposed to go through the election procedure for different ranks of the local government every four years, as figure 4 shows.

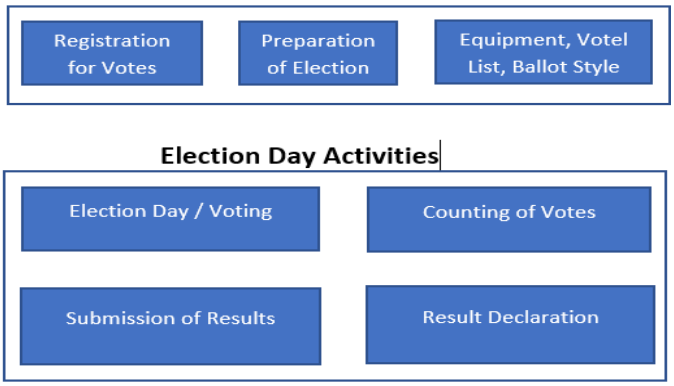
3. Current Electoral System of Pakistan

3.1. Electoral System

The duration of President in Pakistan is established for a term of 5-years as per the constitution of Pakistan. Senate members are elected for six years. In the National Assembly, members are elected by plurality in single-member

constituencies to serve for a 5-year term. In the Provincial Assemblies, the members are elected for five years, and the Chief Minister is selected through the Provincial Assembly. Elections to the local government institutions are held after every four years. Members of the Union Council, including Union Nazim (Union Mayor) and Naib Union Nazim (Assistant Union Mayor), are elected through direct elections. The Electoral College for the election of a District Mayor and the reserved seats of women, peasants and workers and Minorities in the District Council shall be all the members of Union Councils in the district, including the Union Mayor and Assistant Union Mayor. The Electoral College for the election of a Tehsil Mayor, Town Mayor and reserved seats of women, peasants and workers, and minorities in the Tehsil Council and Town Council shall be all the members of the Union Councils in Tehsil or, as the case in Town, including Union Mayors and Assistant Union Mayors. However, for the election to the reserved seats for Women in Zila council (City Council) proportionately divided among Tehsils or Towns shall be all members of the Union Councils in a Tehsil or Town. The Chief Election Commissioner's responsibility is to organize and conduct these elections.

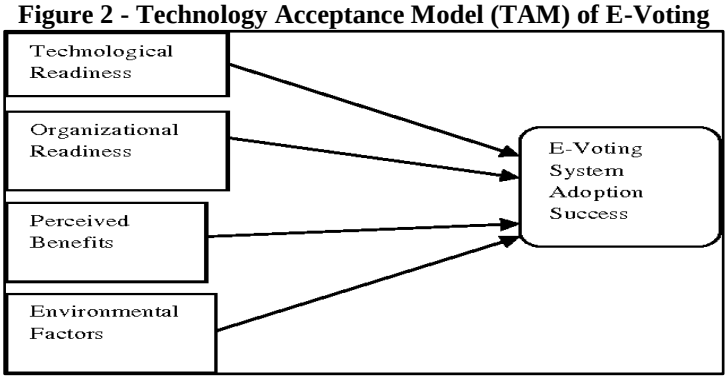
Figure 1 - Tradition Voting of Pakistan



3.2. Evaluating the Role of Nudging for Electronic Balloting

Nudging is the process in which there is the usage of moulding human behaviours. Nudging is the process in which the masses are silently given the direction to act in a certain way. Pakistan has used this process in the recent drive for the awareness of electronic balloting and has applied a different kind of methods to aware the masses about the benefits of the Electronic Balloting. The government has revised its tactics and advised more technological advancements and intense interventions to restrict corruption during the balloting process and spread of anarchy. However, this means that behavioural economics and nudging are not interchangeable terms. Generally, behaviour economics allows us to get insights into our natural limitations and characteristics to design and implement policies that improve results. Many countries use this nudging procedure to force different approaches among the masses for a safer choice. Across the world, Electoral process nudging has been widely used to apprise the masses about precautions, Motivations and anticipations.

Figure 2 - Technology Acceptance Model (TAM) of E-Voting



As per the model prescribed above, E-voting helps select and finalise results only when the factors explained above are cleared amongst the stakeholders, out of who implementing stakeholders are the integral players in this implementation and understanding the benefits of these factors. Nudging will play a vital role in all of these factors. Likewise, Technological readiness will be nudged in the key stakeholders who are held responsible for the preparation and implementation of the e-voting mechanism must be very clear about the proper use of technology along with the practical easiness of technological advancements through the practical demonstrations as well as the implemented models in the developed countries.

Another integral step is to prepare the organizations that are supposed to be the direct and indirect key stakeholders and the ultimate beneficiaries of the e-balloting. E-voting systems are essential to understand the method to

implement it in a true sense, or else the delays and loopholes will continue to linger the results and faults in the System of balloting and Voting.

Society is in dire need of understanding the perceived benefits of the new e-voting and e-balloting System for the elections in a country. Suppose the general public understands the importance of new voting system after understanding the System and easiness in the voting system with the help of this new e-voting system. In that case, no one will neglect the delay in implementing the newly proposed Voting method.

This new initiative will also help the environmental factors to improve with the help of saving cost and money by reducing the printing of ballot papers and then burning or keeping the space for the storage and safety of those ballot papers without any positive purpose. This new and more integrated System also helps the economy of Pakistan through cost-cutting on extra printing expenditure, which is of high amount every time the election procedure is supposed to be initiated again, and poll rigging can also be eliminated as well as the whole process can become more transparent with quick results generation without any doubt and delays.

Different organizations of the government sector are responsible for efficiently delivering goods and services to the general public, such as necessities, housing for shelter, health facilities, basic education as the primary target, social assistance through local bodies, etc. These services are usually provided through manual systems in which human interaction is always mandatory because machines are not intelligent enough to deal with these matters without having a prior knowledge base. Artificial Intelligence (AI) in providing necessities can be addressed more appropriately and with specific results. The primary purpose of AI-based software is to enable the whole System to dig out meaningful information from significant data sources based on preferences provided to the System. This entire process of retrieval of the desired pattern of information by a human being is more time-consuming and undetectable by humans in normal circumstances. With the help of this kind of AI software, risks and problems are identified in less time without any biasedness of any influential stakeholder. This is the rationale behind implementing AI software in any organization (Geek & Leyer, 2022).

Usually, Social acceleration is possible only with the initiatives like digital citizenship of the people living in the society as technological advancements enable people to tacker the life-pace dilemmas in the democratic environment. Decision-making is also becoming speedy with the integration of ICT to address issues with plausible solutions with the characteristics of effective and time-saving. The society needs to be delivered with the targets like awareness about the new System and time-savings after the implementation; the motivation behind the usage of the new System with digital citizenship; the implementation of AI-based System as a new strategic goal, and last but not the minor purpose is to put the strategy into action with goal-directed measures practically (van Kersbergen & Vis, 2022). Government departments' services remain underutilized due to efforts that failed to fulfil the general public's expectations regarding social benefits. The results have shown that slow adopters are always required to be nudged to attain the desired results of behavioral change at the organizational level. This kind of effort is highly significant, with the best results in a real-world setting (Hyytinen et al., 2022).

Whenever a public sector organization is interested in implementing an AI-based system, the Chief Information Officer (CIO) is the most critical person in the whole operations due to the knowledge-based acquired after extensive knowledge from prior education and experience over many years in the relevant industry. Public sector organizations are supposed to rely on the policies of these professionals because of their vast experience and researchers' involvement in the appropriate field (Criado & O.de Zarate-Alcarazo, 2022). The participation of people in the implementation of a new system through extensive research after shared assumptions about the expectations of the general public and acquisition of knowledge from the professionals regarding the ICT becomes more fruitful and beneficial for the overall society (Bougon, M., Weick, K., & Binkhorst, 1977; Orlikowski, W. J., & Gash, 1994; Porac, J. F., & Thomas, 1990).

4. Evaluation Of Government Using Behavioural Insights

As a general practice, many government policies are designed on the basis of how individuals and peoples behave in different situations. Policies are created on the assumption that this behaviour is rational. Yet both individuals and organizations make many decisions that systematically depart from what is rational because sometimes the policies may fail, and the results are not as expected. However, suppose an organization, individual, or any research entity uses insights from behavioural economics, sociology, psychology, or any other aspects and disciplines of Social Sciences. In that case, we can craft better policies that have the most successful outcomes and are very much vibrant for the betterment of society. The Government of Pakistan has tackled the apprehensions of the people about the e-balloting, and it continues to work on the matter

5. Analytical Framework and Functional Pre-Requisites of E-Voting

Functional pre-requisites of e-voting in the analytical framework of the electoral procedure are:

5.1. The requirements of the System comprise information such as names of parties, symbols, vicinity

This new System of Voting will be helpful in all aspects. It will cover the elements of political parties and ease the procedures regarding registration of political parties for elections, registration of voters, ease in casting votes from places other than their birthplace, vacation in calculations of votes without any delays, and transparency of voting procedure without any doubt. The First step in this procedure will be the registration of political parties for

Voting after successful enrollment based on pre-requisites like a no objection certificate after verifications related to their eligibility criteria, such as not being involved in any criminal activity or not having a dual nationality or not a defaulter of tax authorities or unidentified resources beyond limits, etc. Implementing a new voting system will not allow anyone who will be found in any of the pre-requisites and will not become eligible to compete in the election process. Ineligibility will also be communicated through the online email and communication system with a detailed report about the candidates. Verification of candidates will be conducted through agencies as prescribed in the code of conduct and civil servant act 1973 for the authenticity of the verification procedure.

5.2. The System will take as input Candidate information, i.e., name, province, NIC (whole Biodata), qualification etc.

Candidate information will be picked directly from the System of Nadra and Union Councils in Provinces of Pakistan and the Pakistani living overseas. Every national who is living anywhere in the world is also supposed to be part of the election process by all means possible, either through physical presence or online System, to cast their vote as a duty and liability for a better Pakistan, and government should take steps which are mandatory for their right of Voting. This online integrated System will not be required to go through lengthy procedures with the help of backend connectivity. After entering the data in the front-end form, simple biometric information will be tallied to verify voters' knowledge concerning the voting process. This form information will be confirmed after some time or even at the same time when registration will be done as a verification message is received after registration for COVID-19 vaccination.

An additional benefit regarding the voter's registration will be that the voters who are dead and whose verification will be required through biometrics will be failed, for they will not be allowed to cast a vote and be denied automatically. This procedure will require a physical biometric verification after visiting the nearest banks, and banks will be given the front end for proof of voting list identification. With the help of this verification, fake voters will not be entertained, and they will be listed on the final voter's list without any doubt.

5.3. The System will take as input seat information that is region vice seat allocations for PA and NA.

The seat allocation in different regions will be input into the System for the registration of candidates, saving the time of all the participants in the registration and the money consumed in the form of charges against all those steps. The allocations of seats in provincial and national assemblies will be selected from the constituencies list after filing the enrolment papers for participants for the election. This will be entered into the System with the help of data entry operators of the election commission or some third-party organization for data entry due to outsourcing operations. This will save time for the election commission and generate employment for the people who have the ability, knowledge of computers and proficiency in data entry in Pakistan.

5.4. The System will input voters' information such as NIC no, permanent address, all NIC information along with their thumbprint, etc.

Input voters will also be verified with the help of the NADRA database. Data from union councils will be beneficial after integration because the record of death, birth, and other information related to the population are available in their offices and servers. That information will help in the authentication of practical information only. With the help of this step in the e-voting or digitalization of the election process, a lot of extra effort can be saved. The improved mechanisms of e-voting will be furnished as the transparent System of elections in Pakistan after the successful implementation.

This e-voting is also very helpful in uncertain situations like COVID-19 or any other incident. The online portal is also handy to avoid social distancing as the Mobile apps for android and IOS will provide the mobile platforms for Voting and will not require visiting the polling stations. This kind of development can create a realistic approach toward the maximum enrolment of voters. Most problems like elections in Daska and Sialkot can be avoided as voters can cast their votes from home or wherever they are situated and located in Pakistan or outside Pakistan.

5.5. The System will input Polling station details such as location, presiding officer, etc.

Polling stations and the presiding officers from the election commission can be posted in remote rural areas where voters cannot vote due to a lack of knowledge of information technology and computer-based mechanisms or mobile-based app system. This will help the local vote casting from rural areas in the most efficient way and will also reduce the time of calculating votes. The additional infrastructure required in the remote rural regions comprises fast internet connection and laptop or mobile coverage to submit the information for all the voters at a time. This will also require the enhanced cloud-based application for overall polling to overcome the chances of server breakdown as multiple users will be providing information simultaneously, and the chances of server breakdowns are very high. So the online System should be stable enough to handle heavy traffic simultaneously. This test can be run with the help of pilot testing at the phase of data collection and online registration of voters at the early stage to make some improvements in the online voting mechanism to avoid breakdown and lead time in the actual process of the online voting system.

5.6. The System will take as input union council details, i.e., Region, district, and province in which it lies.

Online systems will also help reduce false voters and duplication of voters for vote casting. Most of the time, in the voting procedure in rural areas where transparency cannot be guaranteed due to the absence of actual voters

as either dead or outside the area. Still, the actual voters are in fewer numbers while the casted votes are much more in numbers. For example, a constituency has registered voters of 50,000, but the ballots cast in that constituency were 200,000. This kind of maladministration and mala-fide practice can only be avoided with the help of e-voting procedures.

5.7. The System will do online vote polling.

After implementing the online voting system, the polling system will become cloud-based through online portals to avoid poll rigging and fraudulent polling. Critics like to propel rigging, miscalculating votes, the chances of the destruction of votes due to double stamp, and any other option to corrupt the polling procedure can only be suppressed and negated with the implementation of an online System of Voting cloud-based. The actual representation can be noticed, and the maximum participation can be recorded in this e-voting system during elections. If a developing country like Pakistan wants to ensure a formally transparent System for elections, then the only hope is an e-voting system for polling and elections. This will also employ educated people in the surrounding rural areas as they can be helpful in the voting procedure during elections. This will also create opportunities for them, and the government can avoid undue travel expenditure for presiding officers in remote rural areas.

5.8. The System will take as input the Candidate's NIC no, education, age, gender, permanent address, all NIC information, etc.

During the voting process, the local site's system administrator will be responsible for entering and checking the information entered and verified early during registration with the help of the number provided in the SMS. It will further confirm the originality of voters' identity by using verbal questions from the voters at the time of appearance for Voting. This kind of treatment should not be leaked to keep the poling procedure's secrecy and transparency. The voters should be able to enter the voting area from one gate, the exit should be arranged from another entrance, and the presiding officer should be neutral to ensure the proper administration and implementation of e-voting procedures. This action will also make the polling procedure more authentic, as no outsider can enter the polling station with the original voter with the SMS verification code. Original CNIC will also be mandatory for polling, which will be checked at the time of entrance to the polling station. This will enable the attendance of the voter in the polling station at which the SMS verification code will be sent to the registered mobile number of the voter. That mobile SMS verification will be checked at the next stage, with the fundamental questions answers section as the last authentication.

6. The System will generate a result for each polling station.

Result calculation of votes e-voting will then be done through just one click of the Chief Election Commissioner without delay as all the calculations were already entered in the cloud-based System. This will carry two types of results. Some data was collected through mobile phone apps of individuals in the same tables, while the other data will be collected from the polling stations. The first category with the mobile phone apps will be allowed to cast their votes till a specific time. In contrast, the other variety of polling stations will be allowed to enter the values in the System till the last voter casts a vote, and then the System will lock the results. The single click will give the results in the tabular format or the report format without delay and the official effects of the entire exercise of e-voting. The following problems will be addressed using Electronic Voting System (EVS)

6.1. The System will replace the manual record-keeping System with a computerised Sstem.

This new System is much more straightforward, time-saving, and cost-saving than a lot of troubles and security measures to keep the casted votes can be held, such as the records in the form of casted votes as well as the results are required to be safe for at least ten years which needs a lot of space and security efforts. With the implementation of an e-voting system for vote casting, these flaws can be addressed much better, and more efficient security measures and data retrieval can be guaranteed in this regard. It will not require a lot of space to keep the information and record safe as well as chances of return are also higher even if a fire or any other uncertain situation occurs with the help of computerized backups for recovery of data which is not possible in the physical existence of the voting material.

6.2. The System will reduce the chances of errors occurring while calculating.

The chances of errors are also eliminated as the vote with duplication will not be allowed in the polling. The System will not allow any voter to cast a ballot with multiple selections and will lock the other options after the first option is selected. Then the only option will be left out for submission, and the chances of error are eliminated for better authentication of a foolproof System of polling a vote through e-voting.

6.3. The System will minimize the time being consumed.

The entire voting procedure is saved with the implementation of e-voting protocols due to dedicated efforts relative to practices as follows to date. The performance will enable the team participants from the election commission through reduced luggage and utilization of local human resources after agreements of honesty and hard work with the national interest as a priority.

6.4. The System will increase the security of votes.

Security of votes is also ensured with the transformation of voting from manual to digital because of intangible characteristics, as well as the direct linking of vote casting through a cloud-based system. Usually, presiding

officers are held responsible for the safekeeping of casted votes. The boxes and forms are filled after vote casting is stopped, and voices are calculated for different constituencies. The presiding officers in the e-voting system will only be responsible until the final results are locked from the polling stations. Then it will be forwarded for final submission at the time of ending. Then presiding officers will be relieved from their duties. They cannot be threatened or kidnapped, or any other kind of coercion will be possible due to submitting results from their polling station through an online portal.

6.5. The System will not allow the chance of rejection of the vote.

Many votes are rejected during the counting procedure after the Voting is stopped, and the presiding officers are supposed to be precarious while counting. This online System will relieve the presiding officer from that headache, and they can be set free from their responsibilities due to the result showing with just one click. The time at which presiding officers step out of the polling stations, then the results will be conducted on the TV Channels without any delay or discrepancy in the results because neither a single vote will be rejected nor any chance of miscalculation prevailing due to digital submission and there will be no chance of poll rigging.

6.6. The System will do easy management of records.

Record keeping and safety are also ensured with the implementation of e-voting to replace the old traditional manual voting procedure with the help of digital submission. If any query is to be found, digital records are much easier with the use of find protocols compared to the System of finding some data in the physical shape and a lot of papers. The documents will be managed separately following their constituencies. Then further sub-divisional reports can be found very easily with the help of an online system and from anywhere else, even out of the office, with the help of online access (Solehria & Jadoon, 2011).

6.7. The System wills effortlessly search for desired records.

This will reduce the time of searching as well as analyzing the records in a much better way. Even if the inquirer will be required to find any fact from any constituency and about any individual or any voter, it is possible to see it through the digital records submitted at the time of submission. This whole exercise will also help in findings if any suspicious activity is done during the polling process as well as the suspicious person can be easily identified with the help of fingerprints taken at the time of attendance and from the place where the incident will be done ("Study of Pakistan Election System as 'Intelligent e-Election' Muhammad Nadeem, Dr . Javaid R . Laghari, SZABIST Faculty of Computer Science and Software Engineering," n.d.).

6.8. The System will do online polling to determine whether the voter is registered quickly.

The benefit of an online cloud-based e-voting system is that it will not allow any fake voter to cast a vote due to protocols implemented at different phases in e-voting. The voter who was not registered before will also be able to write at the time of Voting due to data availability at the NADRA database and anywhere in Pakistan and outside Pakistan. The actual voters will be able to cast votes from anywhere with the help of mobile phone apps, local people will be able to cast ballots following their free will, and no one will be able to have coerced decision-making upon the voters in this System (Khawaja & Hasan, 2016).

6.9. High and reliable security can be achieved.

Highly reliable security measures can be achieved to save the online System from any online threat like hacking attacks in this System, as everything will be digitally submitted, which will require strict controls on the data access. The System will not allow any person to modify the results after submission, as it will be disabled at the implementation time. No one will be allowed access to the primary data tables and change the results as every move will be recorded in the System logs. The whole System will be maintained without any compromise on security and privacy. The central authorities will only be able to see the results, and nobody will be authorized for any modifications after the results are gathered. So whatever data was filled from the individuals and polling stations will be shown in the results, which cannot be challenged.

7. Evaluating Data Collection

For data collection, secondary sources will be used. The source of data collection is the office of the Election Commission (EC), websites of the National Assembly (NA), the Pakistan Information Technology Board (PITB), the Senate and Provincial Assembly (PA) of Pakistan, as well as 1973 constitution of Pakistan and E-VOTING IN PAKISTAN BY CH. NAVEED ZAFER AND ANTHONY PILKJAER

8. Research Methodology

Due to the centralised database, this study involved secondary data from the main organizations such as NADRA . NADRA has been sharing the information of Pakistani Nationals either in Pakistan or working overseas with all of Pakistan's regulatory and security agencies. This database is also shared with ECP to categorize every voter in the relevant constituency per the permanent residence address. The other secondary information resources in this research comprise online libraries and written papers on electronic Voting at international level and the online voting mechanism in developed countries like Canada, the United States, etc.

9. Gap Analysis

The Election Commission of Pakistan (ECP) follows the manual System for casting a vote during the elections. All the related records are manually handled, such as the details of voters, the number of polling stations in each constituency, the differentiation of the regions against each constituency, and the information of candidates along with their party. Even though counting votes and collecting polled votes is also manual. Large storage rooms are required to manage and store the records in each election.

The difference between the TVs and EVS elaborates on the differences in systems according to the research (Khan et al., 2011)

Table 5

Sr	Traditional voting system (tvs)	Electronic voting systems (evs)
1	Printed Voting Papers are used in TVs	EVS is a digitalized system of casting votes in the whole election process
2	More than 4 to 6 people, along with Polling agents, are required in the relevant constituency	Only 2 to 3 representatives of ECP will be required to handle the whole constituency during the election process through EVS
3	It involved a considerable amount of operating costs for the whole election process	It involves only the cost of Technology which will be used for the voting process in the form of infrastructure development
4	Transparency cannot be guaranteed on TVs	E-Voting System ensures issue of transparency through strict policies. Likewise, avoidance of casting a vote more than once and only the alive people will be able to cast their votes.
5	Counting votes after completing the voting process is very time-consuming, and counting mistakes cannot be avoided. The final results cannot be issued for at least 1 to 2 days.	Counting votes and issuing final results can be done with just one click of the whole online System. Successful candidates in each constituency and the party with the number of seats can be generated with it.
6	More human resources are required in the whole exercise of election in TVs	Only a few people will be needed to handle the election process, such as the returning officer, technical support officer, and some skilled people.
7	Political involvement is unavoidable in TVS as every political party puts extreme influence on every individual through bribery, coercion, or any other illegal means of persuasion to fulfil mala-fide intentions	No influence can be done in the EVS system due to the input of strict instructions to avoid any foreign involvement
8	The physical presence of voters is mandatory in the polling station for casting of votes during the polling process	Voters can cast their vote through the online System, which will require only an active internet connection and vote casting application for mobile, laptop, or tablet.

The facts found in the gap analysis indicate the need to change Pakistan's current voting system due to the compromising situation in the free and fair elections. The significant challenge to integrating IoT devices and implementing an internet-based voting system is the reluctance of substantial stakeholders responsible for implementing and administering entire polls. This electronic voting system will introduce a free and fair election mechanism with no chance of poll rigging and cancellation of the vote. It will also enable the ECP to announce the per cent accurate results without delay. The political parties participating for the last 30 years are still not interested in adopting the change of E-voting from TVs. This is because they fear losing the elections due to their bad reputation with the general public. Another good reason behind the reluctant behaviour of political parties is that their fake votes will become useless, and they will not be able to cast multiple ballots through one person. The discrepancies of the TVS are recognized by Imran Khan (Ex-Prime Minister of Pakistan). They introduced the E-Voting mechanism with the help of an Electronic Voting Machine (EVM) which was not accepted by the ECP and all the other parties except Pakistan Tehreek-e-Insaf (PTI) in the beginning. Then it was cancelled after the regime change operation in Pakistan. The primary objection at the front was based on rumours and suspicions. The need for extra polling staff to conduct the general election can be resolved without adhering to the allocation of additional budget and different working hours required to count the votes precariously and eliminate the extra burden on the national economy. The security of the polling stations is also handed over to the military personnel and police officials to primary a peaceful environment for voting at the polling stations. A cost of Rs. 440 billion was incurred in the general election of 2018. This new E-voting system will require a one-time cost for the development mechanisms and security of the entire framework. The intangible gains will be gained after the complete set-up and establishment of the E-voting system to ensure a transparent electoral process. The purpose behind the introduction of the new E-voting system and EVM was based on the reason such:

- Eliminate the blame of Poll rigging during general elections in Pakistan
- Tackle the responsibility of political parties as well as the citizens about the election being unfair
- Eliminate the chances of influence of political parties in power with the help of ECP Staff and assurance of accurate polling results.
- To deal with the delays in the result's announcement to save the time and energy of the general public. This will also remove the deliberate delays in the information of results.
- Counting ballot papers will also become easy and timely as the EVM and E-Voting mechanism as just one click will provide the total count which will declare the winning party and Candidate in just a matter of clicks. Counting will ensure that the results follow the total votes cast in the vicinity of the polling station and there is no miscalculation in the counting.

10. Conclusion

The facts which are found in this study are:

- Vote rejection is so usual and casual due to prima facie
- Safety measures for the casted votes in the ballot papers are way more costly and riskier due to the many boxes full of ballot papers in Traditional Voting System, which require more special rooms for safety and storage.
- In the current voting system, a large number of polling staff is required in the TVS to handle the overwhelming response of the general public during the elections.
- Turnover of voters is always less than the anticipated number of voters due to the travelling issues in the elections. The poll rigging is easily managed due to the corrupt staff of the ECP.

11. Recommendation

The efforts towards the corruption-free independent and autonomous regulatory election commission of Pakistan to elect the righteous people from the general public until or unless the electoral reforms in the form of E-voting and EVM are implemented in a true sense. Free and fair elections cannot be held through TVS which is manual because of all the malpractices and poll rigging in the electoral process. The only hope towards the long-term growth and success of Pakistan through free and fair elections can be assured through the implementation of digitalized and modern Voting methods, which are e-voting and EVM. The evolution of EVM will give strength to the merit-based and final success of candidates doubtlessly. No one will be able to put allegations and make the election process controversial because of the transparency and foolproof mechanism.

Suitable governance mechanisms can also be implemented by eliminating TVS and EVM for Voting at the national level and the e-voting system for voting overseas Pakistanis living abroad. Examples of good governance and fair electoral process are in developed countries such as Canada, Brazil, and Australia. Developed countries do not compromise on providing justice to their citizens, which enhances their credibility worldwide. Imran Khan (Ex-Prime Minister of Pakistan) was trying to create a good governance model in Pakistan, which was unacceptable to the corrupt mafia of politicians and bureaucrats. Good governance is the only factor that will attract foreign investors and give them the confidence to bring Foreign Direct Investment (FDI) to Pakistan through Multi-National Organizations (MNOs) after ensuring a feasible business environment and availability of profitable business ventures.

Additionally, policies of ECP and the electoral process, in collaboration with the primary stakeholders such as voters (both National and overseas), must be made after direct input from them as the ultimate beneficiary. An in-depth analysis of the new proposed System must be precariously done while maintaining only the national interest as a priority. Political stability in the short-term and long-term will ensure the consistency of the government's policies. Transformation of TVS to EVM or e-voting can only be achieved after the willingness of the major political parties of Pakistan. Pakistan can then complete the goals and targets related to sustainable economic development.

The factors like corruption in society, the environment of nepotism and favouritism in the public sector organizations, and reluctance towards the wastage of available resources are social evils, and they have penetrated even at the grass root level in government organizations. Applicable law-making related to the mechanism of punishment in case the public official is alleged and proven guilty is the need and demand of the current situation of Pakistan because the rule of law is the only hope to ensure sustainable development of the industry and economy of Pakistan. For instance, if the culprits of the Daska election were caught and punished exemplary, other similar people would have taken the lesson from them, but that has not happened. The culprits were allowed to let go due to their corrupt chief executive as the Chief Election Commissioner (CEC), which is also proved by the audio leaks in Pakistan.

The probability of rejection of votes will automatically become zero as the electronic System will not allow any voter to opt out for the second party at the same time as one party is selected. All the other options will become disabled then vote rejection will automatically be nullified and eliminated. The implementation of EVM and E-Voting will also relieve the economy by saving a handsome amount spent in every general election after every five years. As well as, the machine will allow only those people who are alive and will enrol to vote at the time of voting at their respective constituencies. The travel and timing constraints will also be eliminated because of the

availability of e-voting applications, which will enable the educated people to cast their vote while staying at home and on their jobs. So, this will also extraordinarily increase the vote turnover because majority votes are either rejected or delayed with the intervention of personnel of the election commission. The voters who are unfamiliar with the use of updated technology or do not have the relevant application will be able to visit the polling station to register and cast their vote.

The problems like correction of data, modification of data, and finding of the relevant polling station (as happened in the elections of limited seats in Pakistan) will also be eliminated because votes will be cast in the related constituencies even if the vote was cast through the online System of EVM. A problem like placing someone in the wrong polling station will also be resolved. The massive increase in voter turnover will force the policymakers of Pakistan to implement the mechanism of punishment if proven guilty through institutional reforms. The proposed System of E-Voting and EVM will enable the economy to grow in the long-term as well as the short-term because of the implementation of the cost-effective online voting system and the most feasible for every Pakistan national, either living in Pakistan or outside Pakistan, to earn a livelihood. They are also easy to maintain and store, error-free and time-saving at the time of final results.

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