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**THE IMPACT OF TECHNOLOGY IN THE ELECTORAL
PROCESS IN PAKISTAN: OPPORTUNITIES AND CHALLENGES**

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ABSTRACT

This article seeks to assess the impact of technology in the electoral process in Pakistan with a view of evaluating the chances of technology as well as the challenges it poses. In the introduction, the author gives a brief background of the elections in Pakistan and the importance of innovation in the electoral process. It argues that, although technology has the potential of improving the electoral processes in Pakistan, its introduction should be done with the understanding of the challenges that exist within the Pakistani society and politics. A number of issues have been discussed under the opportunities of technology in elections including the biometric voter registration, electronic voting machines, and social media in voter education and campaigns. These innovations are aimed at enhancing the identification of the voters, management of elections, and increasing the transparency of the electoral process with a view of increasing confidence in the electoral process. But the paper also identifies potential challenges of these technologies such as cybercrimes, the issue of the digital divide and fake news, which if not well managed may tamper with the credibility of elections. To this end, the paper compares the previous experiences of successful and unsuccessful technology integration in Pakistani elections and identifies the lessons to be learnt. Some of the recommendations that can help in the effective use of technology include; improving on the security of technology, increasing awareness on technology and ensuring that there are laws that regulate the use of technology in elections. The conclusion restates the importance of adopting technology while putting in place measures that will help to manage the negative impacts while supporting free and fair elections in Pakistan's democracy.

Keywords: Technology, Elections, Opportunities, Transparency, EVMs, Cyber Security

Introduction

Pakistan's electoral map has changed over the years, and this is because of the nature of politics in the country and the people it seeks to serve. Pakistan has gone through different forms of government and administration, military rule and democratic systems, which has influenced its election systems. The 2018 general elections can be considered as a significant step, which was accompanied by the higher turnout and some new technologies,

for example, the RTS for real-time transmission of the results. Nevertheless, the electoral system still has some significant problems such as the lack of transparency, the cases of voter fraud, and organizational problems which can compromise the credibility of the elections (Ahmed, 2017).

In the light of today's elections, it can be stated that technology significantly contributes to the improvement of the electoral processes. The integration of technology in the society has been on the rise in the recent past, and this has been evidenced by the use of biometric voter registration, EVMs, and digital platforms for voter awareness (Norris, 2018). These have the capacity of enhancing the election management, minimize the chances of electoral fraud and enhance voters' participation due to easier and efficient methods of voting. However, the use of these technologies is only possible if the electoral bodies are capable of managing the challenges that come with them, for instance, the cybersecurity threats and the digital divide (Verma, 2019).

This paper has identified the opportunities and challenges of technology in elections and therefore recommend for a middle ground in the integration of technology in the Pakistani election system. With the help of technology, it is possible to increase the openness and effectiveness of the electoral processes; however, this also means that new threats appear, which should be avoided. The thesis of this discussion is that while the potential of technology in Pakistan's elections is great, the actual application of technology in the electoral process needs proper planning, strong legal framework, and deliberate attempt to ensure that every citizen is able to take advantage of the technology (Shafiq, 2020). If these challenges are not met, then the implementation of technology in the Pakistan's elections might lead to worsening of the existing problems like voter suppression and disinformation instead of solving them.

Opportunities of Technology in Elections

The use of biometrics as well as the use of online registration in the process of voter registration and identification is a good step towards the improvement of the credibility of Pakistan's elections. Fingerprint and facial recognition, which are some of the biometric systems, assist in removing multiple voting and voter fraud, thus ensuring that only the qualified voters are allowed to vote (Gibson & Cantijoch, 2017). The online voter registration platforms provides convenience since citizens can register or update their details from the comfort of their homes and not necessarily from the electoral offices hence increasing the voter turnout especially in the remote areas. All these technologies if well adopted can

enhance the development of a comprehensive and credible voter's register which is important for the credibility of elections.

Technological innovations have also been of great significance in election management especially through the use of electronic voting machines and automated results transmission system. EVMs help in speedy and efficient voting and tallying of votes as they eliminate errors that result from manual voting and reduce on the time taken to announce the results of the elections (Aiyengar & Simon, 2019). Also, the result tabulation systems, for instance, Pakistan's RTS help in transmitting the election results from the polling stations to the central database in real-time, thus increasing the transparency and decreasing the chances of rigging (Malik, 2020). These technologies help in increasing the efficiency of the election process hence increase the public confidence in the results of the election.

As for the voter education and awareness, social media and mobile applications have been used during the recent elections to the greatest extent. These digital platforms help the electoral bodies and civil society organizations to pass important information regarding the electoral process such as the registration process and the voting centers among others to a wider population (Schroeder, 2018). Social media campaigns can be directed at certain audiences, for instance, young people who are likely to be more active on social media and hence more likely to be influenced by social media campaigns to vote. Mobile applications, however, are capable of sending real-time information and notifications to the voters thus, ensuring that the voters are active throughout the election process (Anduiza et al., 2019).

Furthermore, technology has brought changes in the campaigning and fundraising methods of election, giving candidates and political party's better ways of reaching out to the electorate and soliciting contributions. Social media and other digital platforms help in reaching out to the targeted audience and engage directly with the voters by sending personalized and rapid replies to their concerns (Boulianne, 2020). Other new sources of funds include the crowdfunding, which enables the candidates to gather small amounts of money from multiple supporters and thus, level the playing field in the campaign financing (Preece, 2016). Also, through the use of technology, election observation and transparency can be enhanced by real-time monitoring and data analysis, which helps in identifying any form of malpractices and take appropriate measures to address them hence enhancing the credibility of elections (Kreiss & McGregor, 2018).

Challenges and Risks Associated with Technology

The use of technology in electoral processes brings about several cybersecurity threats and risk such as hacking and data leaking. Since elections are now based on digital infrastructure for registration, voting, and vote counting, they are vulnerable to cyber threats that aim at influencing the processes or the outcomes (Halderman & Teague, 2019). For example, hackers can hack into the electronic voting systems, or the online database, thus, influencing the outcome of the election (Nyst, 2020). Also, the exposure of data breaches threaten the privacy of the voters' data as it can be used to commit identity theft or to sway voters' decisions. Some of the measures that can be put in place to secure the electoral process include; strong encryption methods and constant monitoring.

Another problem that can be linked to the integration of technology in the electoral process is the digital divide, which is a difference in the ability of people to access technology and their level of digital literacy. In Pakistan, the internet and digital devices are not readily available to all especially in the rural and low-income regions and therefore the digital divide widens the gap in voter turnout (Khalid & Ahmed, 2021). This means that citizens who do not have an access to technology or the relevant technical knowhow of navigating through the digital platform will be denied their right to vote thus creating a democratic gap. This problem can only be solved by specific measures, including digital literacy courses and the availability of assistive technologies so that all citizens can engage in the democratic process.

This is exacerbated by the fact that elections are now conducted in the technological age whereby mis-information and dis-information are rife. Other than being a source of voter education, social media is also a source of fake news where people spread wrong information with the aim of influencing voters or sabotage the election (Bradshaw & Howard, 2018). This can include such things as false information about the candidates, including stories which are not true about the candidates, or misinformation about the voting process, which can lead to voters being misled and making wrong decisions. The spread of fake news on social media is a challenge to the electoral process since it becomes hard for the authorities to combat fake news. This problem can be solved not only by the use of fact-checking tools but also through media literacy campaigns to make the voters discern the information received from the social media platforms (Pennycook & Rand, 2019).

The use of technology also has its demerits and can cause voter apathy and is rather expensive. This can be a drawback since using digital platforms may lead to voters disengagement as the process looks more technical (Boulianne, 2020). In addition, there is a lot of money that has to be spent to create, put in place and sustain the technological environment in which today's elections are held. This entails the money that is spent to buy electronic voting machines, the cost of protecting online databases and the cost of training the electoral officials on how to manage these systems (Norris & Grömping, 2017). These costs can put a financial burden on electoral commissions and this is even more so in developing countries such as Pakistan where funds are a luxury. As a result, the potential risks and benefits of technology in elections have to be weighed so that the system is not overburdened with the integration of technology.

Case Studies: Technology in Pakistani Elections

The use of technology in elections in Pakistan has been on and off, though some measures have been quite successful. A clear example is the use of the Results Transmission System (RTS) during the 2018 general elections where the results from the polling stations were transmitted in real-time to the central database (Bari, 2019). This system was intended to increase the efficiency and the openness of the results tabulation procedure. Despite the problems that RTS encountered – from the technical problems to the allegations of abuse, the use of the technology in the conduct of the elections showed that technology has the capacity to enhance the electoral processes if there is adequate support in terms of infrastructure and training (Khan, 2020). Furthermore, the application of biometric systems in some constituencies in the identification of voters gave a more credible means of identifying the voters and therefore minimised the chances of electoral malpractice (Jamil, 2019).

The lessons learnt from these technological applications can help future elections in Pakistan. A major lesson is the need to have a good understanding of the technology to be used and to test its use on a small scale before applying it on a wide scale. The challenges that were experienced with RTS showed that there is the need to have a thorough evaluation of the system and prepare for possible failure especially in an election (Siddiqui, 2020). Furthermore, the use of the biometric verification systems highlighted the importance of training of the electoral officials on how to use the technology, and the importance of sensitization of the public on the new measures that are being taken in the electoral process (Zubair, 2019). These lessons imply that although it is possible to

use technology in the electoral processes to produce great results, it is crucial to prepare for such processes and prepare to respond to any eventuality.

Effects of technology on Pakistan's elections have been positive as well as negative. On the positive side, technology has enhanced the issue of transparency and accountability where RTS was introduced to enable political parties and observers to monitor in real time (Shah, 2019). This level of transparency has the ability of enhancing confidence in the electoral process especially in a country that has over the years experienced cheating in the electoral process (Ahmad, 2019). However, the problems that occurred in the implementation of RTS also raised controversies, especially the allegations of election fraud and thus affecting the credibility of the results in some ways (Javed, 2020). This means that although technology can improve the quality of elections, the effects depend on the quality of the systems used and the environment within which they are applied.

The management and application of technologies in Pakistan's election processes present both the advantages and disadvantage of technology in the electoral process. While the use of technology in elections can be effective in increasing transparency and efficiency of the electoral process, it does not come without the need for a lot of investment in the physical aspects of the technology, personnel training, and public sensitisation. The previous experiences show that although technology may hold the key to enhancing electoral performance, it has to be well handled so as not to worsen other problems or generate new ones.

E-Governance and Election Administration

E-Governance has proved to be a powerful instrument in election management especially in countries such as Pakistan where conventional approaches have been associated with certain problems concerning openness, effectiveness, and inclusiveness. E-Governance is the utilization of Information Communication Technologies in the provision of government services and when it comes to elections, it entails the incorporation of technology in the registration of voters, election administration and the communication between the electoral body and the electorate (Nadeem & Masood, 2020). Thus through the integration of e-Governance into the management of elections in Pakistan, it can be conceivable that the processes will be made more efficient, with less human interferences and above all the electoral process will be more credible. This change not only brings the elections in the modern era but also brings them closer to more people.

Election management and e-Governance are interconnected through the employment of electronic voter registration and management systems. These systems enable voters to register, view their details and obtain other services from the commission without having to walk into an office. This is especially so in a country like Pakistan where physical barriers to registration of voters due to geographical and logistical factors are rife (Awan & Khan, 2021). In addition, electronic systems can easily eliminate the possibility of multiple registrations as the information feeds through the electronic system. These enhancements help in building a better and credible voters' register that is important for the credibility of elections.

Besides the voter registration, e-Governance improves the control and monitoring of the electoral process. EVMs are being used in various pilot projects across Pakistan and digital platforms for monitoring election has been introduced to give an idea of how the election administration can be in the future (Siddiqui & Qureshi, 2019). EVMs help in speeding up the voting process by the time taken to cast and count the votes while digital monitoring platforms help in monitoring the whole election process in real-time and easily identify any form of rigging. When properly utilized, the above technologies can greatly enhance the organization and the credibility of elections thus making the public have confidence in the results of the elections.

Nevertheless, there are some issues that are associated with the implementation of e-Governance in election management. Challenges like cyber risks, the digital divide, and the need to allocate significant resources to infrastructure are some of the challenges that need to be well negotiated to make these initiatives successful (Khan & Shaikh, 2022). Also, there is the absence of adequate laws and policies that regulate the application of technology in elections to make sure that these systems are utilized appropriately. Nevertheless, the opportunities for the use of e-Governance in the electoral process are vast and can help to improve the situation with the elections in Pakistan and make them more transparent, effective and democratic.

Emerging Technologies in Elections

It is possible to transform the Electoral process through the integration of systems such as Artificial Intelligence and Blockchain by augmenting efficiency, security and transparency. AI can be employed for several components of elections including the voter's participation, data processing, and ensuring election integrity. For instance, AI could be helpful in analyzing the voter's behavior by predicting turnout aided by algorithms which allow

them to more effectively distribute resources according to demand (Wang & Siau, 2019). Advanced polls in precincts give AI based polling Chatbots the real time information as to where the voters are supposed to vote, the procedure to follow and even the platforms of the candidates thus encouraging voter turnout (Nguyen, 2020). Moreover, it can help in the monitoring of social media for misinformation and trends of election meddling, which would enhance the election management.

Blockchain solutions have the potential to enhance voting processes and protect the integrity of voters by offering a strong and efficient method of counting votes. Blockchain technology entails the automatic documenting of every transaction and makes it simple to prevent vote tampering by involving all the parties in the counting process, a development that may result to be beneficial for elections (Swan, 2018). The use of this technology increases overall confidence in the election process because the voter has a unique ability to track their vote from the moment it is cast to the end of the counting process (Zheng et al. , 2019). In Estonia and Switzerland, there are pilot projects that serve as proof of the use of the blockchain during elections processes and how it guarantees security and manage through anonymity anonymity of voters.

The application of AI and blockchain technology in elections have several challenges. Many developing nations, Pakistan included, may not have the required infrastructure and skills which are available in advanced countries for the implementation of these technologies (Sharma et al. , 2021).

There are, however, many ethical concerns related to the use of AI in elections, such as the conflict involved with voters' privacy and balancing of possible bias in AI algorithms that could potentially interfere with election results, if left unchecked (Mittelstadt et al., 2016). Another problem is related to blockchain, that is the metric size, for example, national elections are characterized by multitude transactions which make them even more complicated (Huang & Nicol, 2020). Notwithstanding the challenges that are connected with the application of the precinct technologies in the improvement of the electoral integrity, it remains pertinent to invest resources and seek more ways to enhance and even alter these systems.

Pakistan's election processes would change for the better if technology such as AI and Blockains were embraced in the future and the necessary problems are solved with ease. Developing the necessary infrastructure, ensuring that the election officers are adequately trained to implement the technologies and provisions

for dealing with possible ethical and technical matters would be critical. AI and blockchain technologies discriminate towards improved security and transparency as well as efficiency of conduct of elections and hence the democratic credibility of the country would greatly be enhanced. Therefore, in the light of future enhancement of the digital trend, it would be of paramount importance to Pakistan to keep in touch with the new technological developments which would help maintain the integrity of elections.

Recommendations for Effective Technology Integration

Regarding the proper integration of technologies in the electoral processes, the endorsement of appropriate measurements against cybercrimes and data security should be done: the fact that voter registration, electronic voting, and results transmission processes have been digitized makes the protection of these systems from cyber threats important (Kshetri, 2021). This involves the implementation of secure communication channels, strong encryption algorithms, periodic maintenance of systems and other strategies that are aimed at enhancing security of sensitive election and transmission information. Furthermore, the deployment of a peripheral book-keeper in the management teams will help trace and counter the threats during the actual process thus protecting the electoral process. Additionally, the security of voters' data is most significant and measures like controlled access and data anonymization should be executed in order to prevent leakage or misuse of voters' data (McDonald, 2020).

Therefore, it is important to equip voters and election officials with the digital literacy skills required to facilitate the efficient incorporation of technology in the elections. The public needs to be educated on how to work with the E-voting systems, verify their registration details, and know how to distinguish real information from rumors through various social media platforms (Norris & Nai, 2018). In addition, it is also necessary to train election workers on new technologies, such as how to set up electronic voting machines and how to keep and use the computerized voter registry. Such programs should be easily available and designed to meet the needs of various target groups such as the rural dwellers and the elderly. By improving the digital literacy of the voters, it will be possible to target the voters in the technology based elections while reducing the chances of errors occurring and increasing the number of turnout (Mukherjee, 2019).

The elements of self-election monitoring and self-auditing are very important in the verification of free and fair elections. Technology should be complemented with stringent measures of independent

monitoring to verify the functionality of the technology and compliance with the electoral process (Levine, 2019). This can be the engagement of outside evaluators who would evaluate the effectiveness of the machines used for voting and the establishment of other institutions which would facilitate the electronic transmission of results. These also assist in achieving the integrity of the in electoral process by providing verification and confirming the integrity of the technology used (Prasad & Anderson, 2018). Moreover, an organization may perform such thorough checks of its digital systems on a regular basis in order to find and correct the weakness before it is put into practice.

Thus, there is a need to develop the legislative and regulatory framework which provides for the use of technological means in the conduct of elections in a comprehensive and systematic manner. This framework would include the procedures of utilizing such technologies as electronic voting machines, blockchain voting systems and AI-engaging tools for voters (Goodman & Smith, 2020). It should also deal with the legal aspects of cyber threats, data breach and the spread of false information in social media. Moreover, there are needs for the appropriate rules to be in place to specify the roles of various parties including electoral management bodies, technology providers and other stakeholders. This framework assures that the application of technologies in the elections is uniform, transparent and accountable to the people and therefore provides a sound basis for the advancement of concept of digital democracy in Pakistan (Cain & Darr, 2021).

Conclusion

In conclusion, the use of technology in electoral processes is a revolutionary step that can help improve the effectiveness, accountability, and inclusiveness of elections. Some of the key points show how digital technologies can help in simplifying the process of voter registration, increase the efficiency of vote counting and secure transmission of the results. However, there are various challenges that come with technology and thus, the implementation of technology should be done carefully; the challenges include; Cybersecurity threats, the digital divide, and the need for strong regulatory frameworks. The role of technology in the electoral processes cannot be overemphasized and there is so much that can be achieved. Technological innovations like electronic voting systems, biometric identification, and blockchain for records can greatly enhance the credibility of elections. It is also capable of solving problems that are associated with election such as voter fraud and ballot tampering, it also helps in monitoring and reporting in real time thus making the election to be more credible

and reliable. In the future, moderation is the key to the use of technology. It is important to welcome the advancement in technology but at the same time consider the problems that may arise in the form of privacy, accessibility or inclusiveness. As the country progresses and seeks for ways in improving the electoral process through the use of technology, the engagement and communication between the stakeholders will be crucial. Thus, focusing on both innovation and safeguards, the future of technology in the Pakistani elections can bring the improvements to the electoral process.

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