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The Usage of Electronic Voting Machines Worldwide: An Analysis of Patterns of Adoption and Discontinuation

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Abstract:

This study examines the global patterns in the adoption and discontinuation of Electronic Voting Machines (EVMs) in electoral processes. It seeks to understand the motivations behind the adoption of EVMs by some countries and the reasons to abandon them. This study aims to examine the key factors influencing the decision to adopt EVM technology across different electoral systems and to investigate the reasons and challenges leading countries to discontinue the use of electronic voting machines. Guided by Democratic Theory which emphasizes participation, representation, accountability and legitimacy as the core principles of electoral democracy, the research explores how political systems either include or reject technological innovations in voting. Employing a qualitative approach, the study identifies key political, institutional and technological factors influencing the trajectory of EVM usage worldwide. The findings contribute to a deeper understanding of how technology interacts with democratic governance and the conditions under which EVMs enhance or undermine electoral integrity.

Keywords: Electronic Voting Machines, Democratic Theory, legitimacy, electoral process, democratic governance, transparency, accountability

INTRODUCTION

The manner of free, fair and reliable elections is a cornerstone of democratic governance, and innovations in electoral technology have increasingly shaped how countries manage this process. Among these innovations, the adoption of Electronic Voting Machines (EVMs) has emerged as one of the most debated global trends over the past three decades. An Electronic Voting Machines (EVMs) is a new electronic device that is designed to record votes and promote transparency in the electoral system. Its considerably reduces certain types of fraud and rigging, provides exact counts by eliminating spoiled ballots, enhances voter turnout, overcome electoral expenditures and encourage oppressed communities to vote. Over the past few decades, many countries have

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adopted various forms of electronic voting systems, including direct recording electronic machines, optical mark recognition and internet voting, reflecting a global trend towards digitizing elections.

This change has been motivated by the desire to reduce errors, expedite vote counting and enhance voter participation, particularly in large and diverse electorates such as India and Brazil. However, the adoption patterns have varied significantly, with some countries fully integrating EVMs into their national elections, others have limited their use to pilot projects and possibility studies, while some eventually discontinuing their use due to concerns over security, transparency and public trust. This research paper aims to analyze the global patterns of adoption and reasons behind discontinuation of electronic voting technologies worldwide.

The main objectives of this research are twofold i.e., To examine the key factors influencing the decision to adopt EVM technology across different electoral systems and to investigate the reasons and challenges leading countries to discontinue the use of electronic voting machines. Accordingly, the study is guided by the following research questions: What factors influence countries to adopt Electronic Voting Machines? Why do some countries discontinue the use of Electronic Voting Machines after initially adopting them?

LITERATURE REVIEW

Extensive work has been conducted on the use of Electronic Voting Machines(EVMs) in electoral processes, by the various scholars such as Alvarez and Hall (2008), Prasad et al. (2010), Pomares (2012), Norris (2014), Wolf et al. (2011), Aung.et al (2013) and Herstatt et al. (2014). These studies represent a broader trend of digital transformation in governance, intended to increase public trust and participation in democratic processes. Hall (2009) argues that EVMs were introduced to mitigate issues such as ballot stuffing, vote miscounting and logistical inefficiencies seen in manual systems.

Scholars such as Alvarez and Hall (2008) emphasize the mixed experiences of the U.S, where electronic systems improved accessibility but also raised concerns over auditability and the potential for manipulation. Several studies highlight the advantages of EVMs in minimizing electoral malpractices. According to Prasad et al. (2010), EVMs in India led to a measurable decline in electoral fraud. Similarly, in Brazil which uses a fully electronic voting system, found a positive correlation between the adoption of EVMs and increased voter turnout, especially among the less educated population. Additionally, EVMs can significantly reduce logistical costs and processing time. Mohan and King (2016) reported improved administrative efficiency in countries that adopted EVMs across multiple electoral cycles.

Studies by Feldman et al. (2007) and Appel et al. (2009) demonstrate that many EVM models are prone to tampering, often without leaving any physical evidence. Mercuri (2001) and Rivest (2006) advocate for Voter Verified Paper Audit Trails (VVPAT) as an essential component to ensure auditability and restore voter confidence. Furthermore, Gritzalis (2002) outlines ten critical security supplies for e-voting systems, including voter anonymity, vote integrity and system transparency. Moreover, contemporary debates emphasize the balance between technological innovation and democratic legitimacy, stressing that electoral reforms must engage electoral stakeholders, civil society and the broader public to sustain confidence in electronic voting technologies (NDI, 2022). Barelli, (2023) mentions that as technologies evolve, newer proposals in

e-voting systems also focus on integrating blockchain and cryptographic mechanisms to enhance voter privacy and result verifiability.

Shukla (2018) briefly explained in his book about the historical context of the elections in India and traditional method used for voting. He also discussed the evolution of the electronic voting machines in India including its technical features and political reception. He also analyzed the responses of the various political parties and opposition groups to the introduction of EVM.

Similarly, Solanki.et al (2019) explained that the world has embraced electoral changes to the parliamentary elections and assembly. The manual voting method has been changed by electronic voting machines (EVMs). But there are legitimate questions being asked about the strength and dependability of the EVMs. Voter Verified Paper Audit Trail (VVPAT), which was later linked to the EVM, was determined to be non-auditable and unverifiable. In this research study, he compares the ballot paper voting system with the electronic voting machine (EVM), highlighting the shortcomings of the current electoral system. This study offers an overview of blockchain technology, its implications and the potential revolution it may bring about in the area of Indian electoral reforms by comparing factors such as cost, time, transparency, risk factor and auditing/verification.

Overall, the global adoption and discontinuation of electronic voting machines (EVMs) worldwide represent a dynamic and complex phenomenon influenced by technological, political, social and security considerations. Electronic voting, broadly encompasses Direct Recording Electronic (DRE) machines, optical mark recognition devices and other computerized systems designed to facilitate voting and vote counting (International IDEA, 2023).

THEORETICAL FRAMEWORK

Democratic theory provides an essential lens through which the adoption and effectiveness of Electronic Voting Machines (EVMs) can be critically assessed. At its point, democratic theory concerns itself with how political systems support the principles of participation, representation, accountability and legitimacy all of which form the foundation of electoral processes. The introduction of technology in elections, particularly through EVMs, must be evaluated in light of how it enhances or undermines these democratic values. One of the core assumptions of democratic theory is the right to political participation. EVMs are often introduced to make voting more efficient and accessible, especially for marginalized groups. Another assumption in democratic theory is that transparency in political processes and decision-making is essential for the effective functioning of democracy and the fair representation of citizens.

Democratic theory also emphasizes accountability, asserting that elected representatives must be held accountable to the electorate. For this to happen, the electoral process must be accurate and opposing to exploitation. In countries like the United States, the decentralized nature of election management and varying EVM technologies have raised concerns about inconsistencies and lack of consistent auditing, leading to public doubt and legal disputes. Countries that have implemented strict audit protocols, independent oversight and transparent procurement processes better uphold accountability, a core democratic value. Democratic theory, therefore, implies that the technical design of EVMs must reflect institutional responsibility and citizen oversight, not just operational convenience.

The efficiency of EVMs cannot be judged only by usefulness or cost-effectiveness rather, their role in increase or weakening democratic values must be central to any evaluation. Democratic theory thus provides a very critical analytical lens for understanding whether technological innovations like EVMs are helping democracy, or potentially undermining it.

RESEARCH METHODOLOGY

This study employs a qualitative research design to analyze the global patterns in the adoption and discontinuation of Electronic Voting Machines (EVMs). A cross-national analysis is carried out to map when and where EVMs have been adopted, sustained, or discontinued across various countries. The data for this study are drawn exclusively from the secondary sources, including international observation reports, legal documents, policy papers and peer-reviewed academic literature. Thematic analysis and process tracing are employed in this research to uncover causal mechanisms and stakeholder perspectives, which are then integrated with the statistical results for triangulation and explanatory validation, ensuring a better understanding of global EVM implementation trends.

GLOBAL ADOPTION OF ELECTRONIC VOTING MACHINES AND THE REASONS BEHIND IT

The implementation and management of Electronic Voting Machines (EVMs) vary notably across countries, reflecting differences in political systems, technological infrastructure and institutional capacities. While, several democracies have embraced EVMs as a means to improve electoral efficiency, transparency and accessibility, others have encountered faced challenges related to security, public trust and legal error. The processes involved in attaining, deploying, maintaining and auditing EVMs are often shaped by national electoral frameworks and governance models. The researcher discusses those reasons due to which countries have implemented these machines. Some of the countries which are using these machines are given below.

Brazil

The EVMs were first introduced and tested in 1996 during elections in Santa Catarina. The Supreme Electoral Court of Brazil approved the use of electronic voting technology. The purpose of Brazil adopting electronic voting machines was primarily to combat widespread electoral fraud and improve the efficiency and accessibility of the voting process. The Brazilian Superior Electoral Court, i.e. Tribunal Superior Eleitoral (TSE) led this initiative to address two main problems observed with the traditional paper ballot system;

1: Struggling widespread fraud in the paper ballot tabulation process, which involved thousands of counters and was vulnerable to manipulation.

2: Addressing issues related to electoral accessibility and reducing the number of spoiled ballots. Brazil's complex electoral rules require voters to select from thousands of candidates, which made paper voting prone to errors and logistical challenges.

This transition was driven by TSE, an institution widely recognized for trustworthiness, competence and autonomy in managing Brazil's elections. They regularly test the systems publicly to find and fix vulnerabilities, reinforcing public trust. The electronic system also allows for better management of voting data and minimized human error in counting votes.

Brazil became the world's first country to conduct nationwide elections entirely using an electronic voting system in 2000. Since then, it has continued to lead the way in the adoption and development of electronic voting technology, remaining at the forefront of the global electronic voting movement. Owing to its positive response and demonstrable success, Brazil has served as good model for other countries to adopt it (Brasil, 2007). With the adoption of EVMs, Brazil has drastically reduced the electoral frauds and eliminated the manipulation of results that was possible with hand-counting, such as adding extra votes to tabulation sheets after polling had ended. This change substantially increased confidence in the integrity and transparency of Brazilian elections. Moreover, with EVMs, voters only needed to enter a candidate's number and confirm their choice, making voting more sensitive and significantly reducing the number of invalid or blank votes. Studies indicate that the proportion of valid votes for federal representatives increased from 54% in 1994 (all paper ballots) to 90% in 2002 (all electronic voting). This especially benefited illiterate and low-literacy voters, broadening democratic participation. Additionally, the rapid processing of results improved public trust, reduced post-election tension and contributed to the stability of the electoral process

Belgium

Belgium first introduced e-voting in 1991 and formally legalized the system in 1994. It was subsequently implemented in the municipal and general elections that took place in 1999 and 2000. Three million Belgians cast electronic ballots in the May 18, 2003 general elections. The purpose behind adopting these machines were to simplify the voting operation itself to provide a more accessible and efficient voting experience, reducing errors and increasing the reliability of election results, providing an auditable system to increase transparency and trust in elections.

The Federal Public Service of the Interior has trained and approved these systems, ensuring the accuracy and security of the electronic voting process in 2003 based on an audit report that was made public following an exercise that involved approximately one million votes.

These machines are successful in reducing null votes, leading to a lower share of invalid votes in cantons using e-voting compared to those using paper ballots and the entire voting process is very simple (Dandoy, 2014).

Estonia

In 2005, Estonia officially adopted the electronic voting machines in their country. The reason behind adopting the electronic machines were to increase voter accessibility and convenience, boost voter turnout and to modernize the government’s electoral infrastructure as a part of its broader digital governance strategy. Through this system, the citizens were able to get the most accurate voting information from a computer with an Internet connection from anywhere in the world. According to their administration, about 1.3 million peoples are using this system since its introduction. In 2014, an analyst team raised questions about the security but the Estonia Election Commission dismissed those concerns, asserting that no incident had occurred that compromised the confidentiality, integrity or transparency of the voting process (Perrigo, B. 2019).

Moreover, the Estonian’s e-voting system has been appreciated for its security, transparency and convenience. It has also been credited with increasing voter turnout in Estonia.

Australia

In Australia, the concept of the electronic voting has not been adopted on a full-scale, but has introduced or trialed various forms of electronic or digitally assisted voting in limited contexts. These initiatives primarily aimed to reduce the various malpractices of their electoral system, to enable blind or low-vision voters and people with other disabilities to cast their vote in secret and independently.

A secondary motivation was to enhance the efficiency of electoral administration through faster voter check-in using Electronic Certified Lists, quicker ballot processing with scanning technologies and reduced manual workload in counting complex preferential voting systems. Trials such as iVote in New South Wales and electronic terminals in the Australian Capital Territory also reflected efforts to modernize electoral processes while maintaining inclusivity. Overall, the adoption of electronic methods was driven by the dual goals of expanding voter participation and streamlining election logistics, rather than replacing the traditional paper-based system. It was presented by the Capital Territory Election Commission in 1999. Initially, the plan was made by the two companies to use it but later on, one company dropped out from the project, and by 2001 the system was prepared to use in the states elections

Argentina

In Argentina, electronic voting was adopted in various provinces largely in order to enhance transparency, speed up vote counting, reduce costs and improve voter confidence in the electoral process. Provinces such as Salta pioneered e-voting experiments, motivated by expectations that touch-screen machines combined with paper ballots would make elections easier for voters, better capture choices as intended, accelerate processing of results and help forestall fraud or ballot irregularities inherent in multiple-ballot systems.

The Philippines

The Philippines adopted electronic vote-counting machines and automation to address long-standing problems of vote counting delays, electoral fraud and lack of public trust in manual elections. The legislative measures such as Republic Act 8436 (1997) and its amendment RA 9369 (2007), formalized the shift towards automated systems in order to improve accuracy, transparency and efficiency in national and local elections.

Adopting optical-mark recognition machines and vote-counting machines (VCMs) allowed the Commission on Elections (COMELEC) to speed up tabulation and result transmission, reducing opportunities for manual manipulation such as vote padding or “shaving”., It ensures faster announcement of winners and aimed to modernize electoral administration while responding to public demand for credible and fair elections.

The United States

The United States initially relied on manual voting procedures involving paper ballots, which made both the casting and counting of votes time-consuming and labor-intensive. To streamline the process, lever voting machine was invented in 1980, by a company for the automatic vote counting which makes the process quite easier.

With the advancement of technology worldwide, the US decided to adopt Electronic Voting Machines in 1990s. According to a 2004 survey, approximately 675 counties in the United States, representing around 30% of all registered voters, had adopted electronic voting systems (Lin,2007). However, despite the increasing adoption of electronic voting machines, the technology has received a cool reception, with opinions on its implementation and effectiveness remaining divided. The US government has spent 3 billion for purchase and deployment of the Direct recording electronic machines with the aim of boosting the confidence of the voters on the electoral system (Zdun, 2022). Nevertheless, concerns regarding the security, transparency and auditability of these systems persisted leading some states to reconsider or limit their use in subsequent elections.

Spain

In Spain, full-scale e-voting for general elections has not yet been adopted, however, authorities have pursued pilot projects and incremental technology deployment with the aim of improving electoral administration, enhancing usability and evaluating whether electronic means can complement traditional voting methods. For example, non-binding remote internet voting pilots such as those conducted in Catalonia in 2003, were intended to assess usability, reliability, security and whether e-voting might serve as a complementary channel alongside postal voting.

In addition, during European Parliament and municipal elections, Spain has implemented "Electronically Managed Polling Stations" (EMPS / MAE) and used technology such as PDAs, laptop computers, electronic ID-card readers and digital transmission of results to speed up administrative tasks, improve accuracy in vote count, reduce manual errors and enhance the timeliness of results, all without compromising electoral integrity.

In November 2003, the Parliament of Catalonia elections saw the successful implementation of three e-voting pilot tests, featuring modern technologies. These included remote Internet voting for eligible voters residing overseas, as well as touch-screen voting machines equipped with an electronic counting system, marking a significant milestone in Spain' electoral modernization (Buchsbaum, 2004).

The overarching motivation has been to modernize electoral processes improving efficiency, transparency and trust while being cautious about legal, security and constitutional constraints that currently limit full e-voting adoption in the country.

India

India adopted Electronic Voting Machines (EVMs) primarily to improve the efficiency, transparency and integrity of its electoral process. Prior to the introduction of EVMs, elections were conducted using paper ballots and manual counting, which were not only expensive, time-consuming, but also prone to fraudulent practices such as ballot stuffing and susceptible to counting errors. The introduction of EVMs significantly reduced election costs, expedited the counting process enabling faster result announcements and curtailed electoral fraud with features like security locking, thumb impression verification and restrictions on voting speed.

The Election Commission of India (ECI), an independent constitutional body, oversees the acquisition, testing, deployment and maintenance of EVMs. The Commission has coordinated with

public sector manufacturers such as Bharat Electronics Limited (BEL) and Electronics Corporation of India Limited (ECIL) to produce EVMs under strict quality control principles. The procurement process is centrally managed and subject to thorough technical scrutiny, including testing for tamper resistance and observance with security protocols (Chandrashekharan, 2014).

India's EVM model consists of two core components: A Control Unit and a Ballot Unit, connected by a cable and operated by polling officers. To enhance transparency and verifiability, India introduced the Voter Verified Paper Audit Trail (VVPAT) system in 2013, and it became compulsory in all parliamentary constituencies by the 2019 General Elections (ECI, 2019). The VVPAT allows voters to verify their vote through a printed slip, thereby strengthening auditability and public trust in the process (Rao & Suri, 2020).

Despite widespread adoption, EVMs in India have occasionally faced criticism and legal scrutiny. Political parties and civil society groups have raised concerns about potential machine tampering, lack of transparency in code verification and limited public access to technical audits. However, independent research by Prasad et al. (2010) and subsequent Supreme Court rulings have generally upheld the reliability of India's EVMs, especially after the integration of VVPATs. Overall, EVMs have been successful in India in reducing the practice of booth-capturing, faster the votes counting process eliminating the invalid votes and improved the accessibility across diverse regions.

The table represents the countries that are using the EVMs in their electoral system.

Countries	**EVM Implementation**
Brazil	Nationwide
India	Nationwide
Philippines	Nationwide
Belgium	Regional/National
Estonia	National (also e-voting)
Venezuela	Nationwide
UAE	Federal/National
Namibia	National
Bhutan	Nationwide
Nepal	Selected elections
Bangladesh	Partial

Source:(jagranjosh.com/general-knowledge/which-countries-use-electronivotingmachines)

Reasons and Challenges Leading Countries to Discontinue the Use of Electronic Voting Machines (EVMs)

Several countries initially adopted Electronic Voting Machines (EVMs) to modernize their electoral processes, aiming for increased efficiency, speed and security in voting and counting. However, over time, some nations discontinued their use due to significant reasons and challenges. Some of the major countries that stopped using it are discussed below:

Bahrain

In 2006, Bahrain planned to experiment first time with the Electronic Voting Machines in their national elections. But due to intense pressure from the opposition political parties and leaders, the

government had decided to revert to the paper voting. The opposition was claiming that these machines were suspected to the vote-rigging. (Wolf,2011)

Bahrain's decision to abandon EVMs aligns with broader concerns seen internationally regarding the vulnerabilities and trust issues inherent in electronic voting systems that lack verifiable paper trails and transparent security assurances. These issues have led several countries and states worldwide to revert to paper ballots or hybrid systems to preserve election integrity and public confidence.

Netherlands

The Netherlands was once among the most prominent adopters of electronic voting machines (EVMs) in Europe, with widespread use of these devices from the late 1990s until 2007. The introduction of Electronic Voting Machines began as early as the late 1980s and by the mid-1990s, these machines were widely used across the country, especially due to their speed, administrative efficiency and modern appeal. The two principal suppliers (Nedap and Sdu) dominated the market, with Nedap machines adopted by approximately 90% of municipalities. These were standalone machines mainly relied upon mechanical or electronic interfaces and in some cases, touch screens. But in 2006, the activist group “Wij vertrouwen stemcomputers niet” (“We do not trust voting machines”) demonstrated live on television how easily Nedap voting machines could be manipulated with changes to the memory chip in under five minutes to alter election results.

Furthermore, the machines emitted electromagnetic signals (Van Eck phreaking), which allowed votes to be detected from outside the polling station, compromising vote secrecy. Investigative commissions later confirmed widespread vulnerabilities: insufficient security safeguards, inadequate physical protections during storage/transport and no paper audit trail.

In late 2007, following expert reports, public pressure and judicial intervention, the Dutch government withdrew all approvals for existing voting machines. By October 2007, the Regulation for Approval of Voting Machines was officially revoked, which banned any EVM from Dutch elections at the national level (Smith, 2012).

Despite the issues encountered, many stakeholders, including mayors and voters, continue to have faith in electronic voting. Drawing on past positive experiences, they are advocating for the reintroduction of e-voting, demonstrating a persistent confidence in the technology's potential to enhance electoral efficiency, accuracy and modernization of the electoral process (Kumar, 2011).

Ireland

In 2002, Ireland used EVMs in limited constituencies during the general election and a national referendum, covering approximately 18% of the electorate. The initiative aimed to expand the use of EVMs nationwide for subsequent local and European elections. However, reports raised serious doubts about the security and transparency of the machines. It included the risk of tampering and the lack of voter-verifiable paper audit trails, making independent verification of results impossible (EDRI, 2012).

Moreover, the Irish government established an Independent Commission on Electronic Voting and Counting to evaluate the system. While some enhancements were recommended, such as improved software and voter-verified audit trails, these were never fully implemented. The costs were

substantial, with about €51 million spent on purchasing machines and an additional €3.2 million on their storage. The machines were eventually sold for scrap at a fraction of their original cost. Therefore, Ireland has chosen to retain paper ballots due to their transparency, security and public trust, as paper ballots allow for straightforward recounts and audits unlike the electronic system (Duncan, 2012)

Germany

In 2009, Germany's Federal Constitutional Court ruled that the Direct Recording Electronic Voting Machines (DREs) used in parliamentary elections were unconstitutional because they didn't allow citizens to verify the results, violating the public nature of elections. The Court emphasized that elections must be transparent and open to public scrutiny without requiring specialized technical knowledge. Although the Court ruling didn't declare e-voting inherently unconstitutional, it called for improved transparency measures or legislative adjustments to balance accessibility with transparency (Rao, 2015).

United Kingdom

The United Kingdom has a long history of experimenting with electronic voting machines, although full-scale adoption has remained limited. Early concepts of voting machines date back to the 19th century, with mechanical devices proposed by reformers like the Chartists in the 1830s and later developments including push-button and lever machines through the 19th and 20th centuries. Contemporary direct-recording electronic (DRE) voting machines, which record votes directly in the machine without paper ballots, were developed in the 1970s and trialed in the UK as well as in other countries.

But the principal issues leading to the limited use or abandonment of electronic voting in Britain are persistent concerns over security vulnerabilities, lack of voter-verifiable paper audit trails and public confidence in the integrity of elections. Without a tangible and verifiable paper record, it is difficult to conduct meaningful recounts or audits independent of the machine’s software (Michael, 2024).

Norway

In 2008, the Norwegian government decided to experiment with electronic voting in order to make their electoral process more transparent. In September 2011, a pilot test of electronic voting was conducted during local government elections across ten municipalities, marking the first trial of its kind in the country. Following the successful experiment, the government decided to extend the initiative to the 2013 parliamentary elections. After extensive debate in Parliament, a small majority was accepted to proceed with e-voting trials for the upcoming parliamentary elections. In second trial of e-voting twelve municipalities participated in the experiment. Although the 2011 and 2013 trials received favorable press and no serious security issues were brought up, but the matter is still disruptive in politics. Concerns have been raised in the talks regarding the security measures for the vote's online transmission. Due to insufficient political backing, the Norwegian government decided in June 2014 to discontinue further experimentation with Internet voting, effectively halting the introduction of e-voting in the country (Cortier, 2012).

Paraguay

The integration of technology into Paraguay's electoral processes began in the early 2000s, with the Superior Court of Electoral Justice (TSJE) showing sustained interest in modernization. Early experiments included renting electronic voting machines and piloting electronic components in elections (TEDIC, 2024).

By 2013, the Court of Electoral Law declared that the country met the legal, technical and logistical conditions to implement electronic voting in municipal elections, promising increased efficiency and transparency. However, after initial trials, years of debate and criticism followed, as civil society, politicians and technical experts raised concerns about transparency, security and the protection of personal data. Consequently, the country reverted back to the traditional paper-based voting method.

Italy

In 2006, Italy experimented the voting device on national level in four polling stations. However, after the elections, authorities decided to revert to traditional paper ballot system as they consider it cheaper and easy to use (Report on EVMs and Overseas Voting, 2024).

Bangladesh

Electronic Voting Machines (EVMs) were first successfully introduced in Bangladesh in 2007 during the election of the working committee of the Dhaka Officer's Club. The initiative was led by S.M. Lutful Kabir of BUET, with technical support from the local manufacturer Pilab Bangladesh. Although the government considered a broader implementation, the plan was delayed due to incomplete voter lists containing photographs.

In 2010, EVMs undergo an important trial when they were experimentally used in 14 polling stations during the Chittagong City Corporation elections. These machines were developed by the Bangladesh University of Engineering and Technology (BUET) in collaboration with the Bangladesh Machine Tools Factory. However, subsequent attempts to deploy EVMs in the Rajshahi City Corporation elections faced a major setback when approximately 1,200 machines were withdrawn due to unresolved technical errors. Following this, the Election Commission opted to acquire higher-quality machines from international suppliers (Times of India, 2021).

EVMs continued to be used periodically in later elections, such as in Rangpur (2016) and the Khulna City Corporation polls, demonstrating some operational success but without full-scale nationwide adoption. For the first time, EVMs were employed in a general election across six constituencies i.e., Dhaka-6, Dhaka-13, Chattogram-9, Rangpur-3, Khulna-2 and Satkhira-2covering over 2.1 million voters. To familiarize the citizens with the technology, the Election Commission organized mock voting sessions. However, on election day, technical issues such as fingerprint mismatches and machine malfunctions led to delays and voter complaints.

While the ruling party and its allies supported EVMs as a step toward efficiency and modernization, opposition parties, particularly the Bangladesh Nationalist Party (BNP), voiced concerns that EVMs could enable vote rigging. These doubts, joined with allegations of irregularities in some elections, have fueled persistent protests and demands from opposition groups to abandon EVMs altogether (Rita, 2023).

Country	Year of Adoption	Current Status	Year of Discontinuation	Key reasons/Observations
India	1999	Sustained	---	Widely improved
Brazil	1996	Sustained	---	Widely used
United States	Early 2000	Mixed (partial used)	--	Some states revert to paper ballot because of hacking
Germany	2005(trial)	Discontinued	2009	Declare unconstitutional by court
Italy	2006(trial)	Discontinued	2006	Found paper voting more reliable
Philippines	2010	Sustained	---	Used in national and local elections

CONCLUSION

The global experience with EVMs demonstrates that their effectiveness depends not merely on the technology itself, but on the broader political, legal and institutional environment in which they are implemented. Countries such as Brazil, India and the Philippines illustrate how EVMs can enhance efficiency, reduce electoral fraud, improve accessibility and accelerate vote counting when supported by trusted electoral institutions, transparent procedures and voter-verifiable audit mechanisms. Their success underscores the importance of strong governance frameworks, systematic testing and continuous technological innovation in building public confidence.

In contrast, cases like the Netherlands, Germany, Ireland and Norway illustrate that the absence of transparency, verifiable audit trails and adequate safeguards can erode trust, regardless of the potential benefits of modernization. The concerns ranging from security vulnerabilities and lack of voter verifiability to high operational costs indicate that the credibility of elections rests fundamentally on the ability of citizens to verify and trust results, rather than on technological sophistication alone.

Therefore, the adoption of EVMs cannot be viewed as a universal solution but as a context-dependent reform. Their success relies on three interlinked conditions: (1) robust legal and institutional safeguards that guarantee auditability and transparency; (2) secure, tamper-proof systems subjected to independent technical scrutiny and (3) active voter education to ensure confidence in the process. Nations that meet these conditions are more likely to benefit from EVMs while those that fail to establish them may find traditional paper-based systems more reliable for safeguarding democratic legitimacy.

Ultimately, EVMs should be adopted not merely in pursuit of modernization but as part of a comprehensive strategy to strengthen democratic governance. When implemented responsibly with adequate checks and balances, they can serve as powerful tools to enhance electoral integrity, however, when applied without trust-building measures they risk eroding public confidence in the very foundation of democracy itself.

References:

Dandoy, R. (2014). The impact of e-voting on turnout: Insights from the Belgian case. *Paper presented at the 1st International Conference on eDemocracy & eGovernment, (ICEDEG 2014*) organized by IEEE Computer Society at Quito, Ecuador in April 2014.

Alvarez, R. M., Hall., T. E., & Trechsel, A. H. (2009). Internet voting in comparative perspective: The case of Estonia. *Political Science & Politics, 42*(3), 497-50.

Kumar, A. (2009). Election Commission of India: Ensuring free and fair elections. *Indian Journal of Political Science, 70*(3), 773-84.

Kumar, D. A., & Begum, T. U. S. (2012). Electronic voting machine: A review. Proceedings of the International Conference on *Pattern Recognition, Informatics and Medical Engineering,* held in Salem, Tamilnadu, India on March 21-23, 2012.

Doe, J., & Khan, R. (2025). Adoption and abandonment of electronic voting machines: A cross-national study. *Journal of Electoral Technology and Democracy, 18*(2), 101-20.

Kumar, S., & Walia, E. (2011). Analysis of electronic voting system in various countries. *International Journal on Computer Science and Engineering, 3(4)*, 1826-30.

Alvarez, R. M., Levin, I., Pomares, J., & Leiras, M. C. C. (2013). Voting made safe and easy: The impact of e-voting on citizen perceptions. *Political Science Research and Methods, 1*(1), 117-37.

Alvarez, R. M., Hall, T. E., & Hyde, S. D. (Eds.). (2008). *Election fraud: Detecting and deterring electoral manipulation.* Brookings Institution Press.

López-Pintor, R. (2010). *Electoral management design: The international IDEA handbook.* International IDEA

U.S. Election Assistance Commission. (n. d.). Help America Vote Act (HAVA) of 2002. https://www.eac.gov/about/help_america_vote_act.aspx

Palmer, E. (2009, Mar. 25). *Germany: Constitutional Court decision on electronic voting.* Law Library of Congress.

European Digital Rights. (2006, May 10). Alarming results from Italian experimental e-voting. https://edri.org/our-work/edrigramnumber4-9evoting.

Bangladesh Election Commission. (2018, Dec. 30). Bangladesh uses EVMs for first time in general election. *The Economic Times.*

McCarthy, J. (2004, Feb. 18). Hazards of electronic voting. *The Irish Times.* https://www.irishtimes.com/opinion/letters/hazards-of-electronic-voting-1.1305604

International IDEA. (2006). *Electronic voting / E-counting in elections: A study of current practice.* International Institute for Democracy and Electoral Assistance. https://www.corteidh.or.cr/tablas/28047.pdf

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