



DIGITAL ELECTIONS IS IT ABOUT TIME?

AN APPRAISAL OF ELECTRONIC / DIGITAL VOTING

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ABSTRACT

Nationally and internationally there have been several attempts at the adoption of modern technologies in elections. This had a profound effect on the very administration of democracy per se. While some countries have wholeheartedly adopted modern technologies in elections, such as India, Estonia, New Zealand etc., others have regressed and reverted to more traditional forms of paper balloting, such as the Netherlands.

There are obviously arguments, both favouring and opposing, the large-scale adoption of modern technology in elections, with strong advocates on both sides. However, there is a paucity of literature sufficiently documenting these arguments, particularly from the Indian perspective. Instead, the current discourse on electronic voting and counting technologies is scattered with various terms and phrases — electronic voting machines, e-voting, e-enabled elections, remote voting, precinct count optical scanning, etc. Lost in all the technological jargon is the realisation that it is not merely technology but also the critical legal framework that provides the foundation upon which any technological advances in the field of elections must necessarily be constructed. As such, an evaluation of the laws and jurisprudence pertaining to election related technologies is necessary. Furthermore, in order to develop a holistic perspective, it is equally necessary to evaluate the experiences of other democracies in a similar light.

With the adoption of electronic voting machines EVM's and the introduction of VVPAT in India, the pathway to full digitalisation of parliamentary elections has opened up making progress in this direction not only possible but desirable and inevitable. However, there is a palpable dearth of literature, comparative analyses, law reviews and technological assessments in this regard. This necessitates stock-taking exercise and review of the experiences, technologies and laws pertaining to digital elections both in India and abroad. This research paper makes an attempt at such an appraisal.

Keywords: Election Reform, Technology, EVM, Right to Vote, Digital Democracy.

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INTRODUCTION

Technological advances over the last century, particularly in the fields of electronics and telecommunication, have touched nearly all of humanity and left an indelible mark on human life. Today, the footprints of these technologies are clearly visible in every home, office, institution and enterprise. Some of these technologies have greatly benefited mankind, advanced the cause of liberty, and indeed, touched the core of what it means to be human.

This technological revolution has impacted the very exercise of freedom and democracy, specifically the large-scale adoption of electronic voting and, on a smaller scale, internet voting have revolutionised the conduct and administration of elections worldwide. The choice of the word "Digital" in the title is deliberate. It is so that this research is not restricted to Electronic or Internet voting. As such this paper will assume a technology-agnostic posture with the view to analysing the technologies that exist for conducting non-paper balloting and the legal scenario pertaining to their widespread adoption in Elections in India. This paper is, therefore, more akin to a legal-technological status paper that reviews the adoption of technology based, non-paper balloting/voting methods presently in use in India and democracies around the world from the perspective of both law and technology.

India's experience with electronic voting is particularly illustrative. As the Election Commission of India has noted in its status paper on EVM's in India¹, "India is the largest Participatory Democracy of the world, with about 937.1 million registered voters. [...] The Commission is widely acknowledged as a "Global Gold Standard" in Election Management across the World, setting ever-higher standards of efficient and professional conduct of Elections. The Commission has been at the forefront of embracing, adopting and implementing the latest technological advancements in improving and fine-tuning the election processes and systems. The Commission has taken the pioneering initiative of introducing the Electronic Voting Machine (EVM) for recording, storing and counting of votes across the length and breadth of the Country in a transparent, credible and secure manner, backed by appropriate legal support. The use of EVM demonstrates the Commission's unflinching resolve to continually improve, upgrade and strengthen the Electoral Process in the country, The Commission has successfully used EVMs in conducting 132 General Elections to the State Legislative Assemblies and 4 Lok Sabha Elections over the last two decades. [...] 55.41 crores (554 million) voters exercised their franchise in the 2014 Lok Sabha

¹ Status Paper on Electronic Voting Machine (EVM), Edition-4, Election Commission of India, November 2021.

elections using EVMs. 61.3 crore (613 million) voters exercised their franchise in the 2019 Lok Sabha election using EVMs with VVPATs. Since the very inception of the EVMs in 1982, as a positive electoral reform on the electoral scene in India, EVMs are now well accepted by the voters, political parties and other stakeholders, backed by various judicial pronouncements. [...] In the meeting of All National and State Recognized Political Parties held on 12th May 2017, the then Chief Election Commissioner announced that the Commission will ensure 100% coverage of VVPATs in all future elections to the Parliament and State Assembly Elections”.

This status paper appraises India’s experience with EVM’s, from its inception to the present day. To achieve this, this study analyses the technological progress, socio-political feedback and the evolution of the law and jurisprudence on the subject of EVM’s. India’s experience with other forms of electronic voting and internet voting (i-voting) is limited. The digital archives of the ECI were found to be wanting in terms of the acquisition and compilation of literature on the experiences of other nations in this regard. Therefore, this research references multiple, authoritative foreign sources in the hope that there may be some profit to the body of knowledge in cataloguing these experiences. Furthermore, this study seeks to identify gaps in this body of knowledge and make note of open research questions.

CHAPTER-1: BACKGROUND & HISTORY OF EVM

EVM/VVPAT in Indian Elections: Chronology²

Date	Chronology of Events
1977	ECI mooted the idea of EVM
1979	A proto-type was developed
6 th August, 1980	Demonstration by ECI before the representatives of political parties.
January 1981	BEL approached ECI for manufacturing EVMs
29 th July, 1981	ECI held a meeting with the representatives of BEL, ECIL, the Ministry of Law and Chief Electoral Officers of some State
19 th May, 1982	EVMs first used in 70-Parur AC in Kerala
1982-83	EVMs used in 10 Bye-elections in different parts of the Country
5 th March, 1984	Supreme Court of India held that EVMs cannot be used in elections
December 1988	A new Section 61A was included in the Representation of the People Act 1951 (The Supreme Court upheld the validity of section 61A in 2001)
15 th March, 1989	The amendment came into force
January 1990	Electoral Reforms Committee (ERC) formed by Government of India
April 1990	Technical Experts Committee recommended the use of EVMs
24 th March, 1992	Necessary amendments to the Conduct of Elections Rules 1961 were notified by the Government
1998	A general consensus was reached on the use of EVMs for conducting Indian elections.
1999-2004	EVMs used in different state assembly elections
4 th Oct 2010	An all -party meeting was held. Agreement on incorporation of VVPATs along with EVMs.
July 2011	Field trials conducted after the prototype was

²Supra, Note-1.

	manufactured, in Thiruvananthapuram (Kerala), Delhi, Cherrapunjee (Meghalaya), Jaisalmer (Rajasthan) and Leh (Jammu & Kashmir).
July-August 2012	A second field trial was conducted.
19 th Feb 2013	Final model was approved by TEC
10 th May 2013	The Model was demonstrated to all political parties
14 th August, 2013	The conduct of Elections Rules 1961 were further amended and notified to provide for VVPATs
4 th September, 2013	VVPAT was first used in a bye-election for 51-Noksen AC in Nagaland.
8 th October, 2013	Hon'ble Supreme Court directed the ECI to introduce the VVPAT system in a phased manner.
2013 - March, 2017	Limited number of VVPATs introduced in phases by ECI except all 40 Assembly Constituencies of Goa.
12 th May, 2017	All Political Parties Meeting held. The Commission decided to use 100% VVPATs at every polling station in all future elections to Parliamentary and Assembly Constituencies.
Since May, 2017	VVPATs being used in all General/Bye-Elections to Parliamentary and Assembly Constituencies.
11 th October, 2017	The commission decided to conduct mandatory verification of VVPAT slips of randomly selected 01 Polling Station per AC. Subsequently, mandatory verification of VVPAT slips has been further extended to 01 randomly selected Polling Station of each Assembly segment of Parliamentary Constituencies also.
15 th April, 2019	In pursuance of the Hon'ble Supreme Court of India's order dated 8 th April 2019, the Commission decided to conduct mandatory verification of VVPAT slips of randomly selected 05 Polling Stations per AC and each Assembly segment of Parliamentary Constituency in all elections to the Parliamentary and Assembly Constituencies.

BEFORE EVM'S

In its Status Paper³ on Electronic Voting Machine (EVM), the Election Commission of India, chronicled the history and evolution of EVM's in India as follows:-

"The voting system in India has gone through multiple changes. During the first two General Elections to the Lok Sabha in 1952 and 1957, each candidate was allotted a separate ballot box pasted with the symbol of the candidate. The names and symbols of the candidates were not printed on the ballot paper and voters had to drop a pre-printed ballot paper in the ballot box of the candidate of their choice. This system ignited fears of tampering, booth capturing, and manipulation in the minds of the various stakeholders and was soon replaced. In 1960-61, a marking system on the ballot paper was introduced during the midterm elections to the Legislative Assemblies in Kerala and Odisha and this system continued till the 1999 Lok Sabha elections. Before the introduction of the EVM, the ubiquitous Ballot papers were used to cast votes in the Indian Elections, with considerable success. The use of ballot papers was time-consuming, prone to malpractices like booth-capturing and ballot-box stuffing, a large number of invalid votes due to wrong/incorrect marking, subject to prolonged counting drills, more disputes and delayed result announcement besides being an ecologically straining and environmentally unfriendly method".

ECI'S INITIAL EXPERIMENTS WITH EVM'S

The ECI noted the merits of the adoption of then emerging technologies⁴ for the conduct of elections in India as follows:-

"As can be easily appreciated, the weight of cumulative comparative experience of conducting elections since 1952, both with ballot papers and EVMs, and the numerous undeniable merits in the use of EVMs, render the EVMs as a preferred instrument for casting votes. Quite evidently, the use of ballot papers was a traditional, anachronistic and archaic voting method. In order to overcome the aforementioned problems associated with the erstwhile practice of using ballot papers, and also to keep updated with the advances of technology, the ECI mooted the idea of EVM in 1977.

In 1977, Mr. S.L. Shakhdar, the then Chief Election Commissioner of ECI, during a tour to Hyderabad requested the Electronics Corporation of India (ECIL) a PSU of the Department of Atomic Energy to study the possibility of using an electronic device for conducting elections and to design and develop an electronic gadget for the recording of votes. In 1979, a prototype was developed and its operation was demonstrated by the ECI before the representatives of political parties on 6th August 1980.

³Supra, Note-1.

⁴Ibid.

The Bharat Electronics Limited (BEL), Bengaluru, a Defence Ministry PSU, had also developed a "microcomputer-based voting equipment, which they had used for the elections for the various unions of the company". In January 1981, BEL approached ECI about manufacturing EVMs and on 29th July 1981, the Commission held a meeting with the representatives of BEL, ECIL, the Ministry of Law and Chief Electoral Officers of some states regarding the use of EVM in elections".

TOWARDS FULL ELECTRONIC VOTING

Gradually and cautiously, the ECI began steady progress towards the deployment of EVM's in 100% of Lok Sabha constituencies; this required statutory amendment to the Representation of People Act, 1951 and the exercise of power constitutionally vested in the ECI. The status paper⁵ chronicles these developments.

"On 19th May 1982, the ECI issued directives under Article 324 of the Constitution of India for the use of EVMs and conducted elections at fifty polling stations using the machines in an election in the 70-Paravur Assembly Constituency (AC) of Kerala on an experimental basis. The EVMs were further used in 10 Bye-elections across the country in 1982-83. However, due to the absence of any specific law prescribing the use of EVMs, the election was challenged in a petition (Election Petition 01 of 1982 filed by A.C. Jose) and OD 5th March, 1X84, the Hon'ble Supreme Court of India held that EVM cannot be used in an election unless a specific provision is made in law for its use. Consequently, the law was amended by the Parliament in December 1988 and a new Section 61A was included in the Representation of the People Act 1951, thereby empowering the ECI to use EVM. The amendment came into force on 15th March 1989. The Supreme Court upheld the Constitutional validity of Section 61A in its judgement in AIADMK versus Chief Election Commissioner and Others {(2002UJ(1)387)}".

Over the years, the ECI took note of various apprehensions and concerns raised by several political parties in India. To address some of the legitimate issues with regard to the fairness and transparency of the conduct of elections, the ECI took some concrete measures. Some of these measures are described in the status report⁶ as follows:-

However, doubts and speculations regarding this new entrant in the voting system of India persisted in the political atmosphere of the country. In order to gain popular trust and affirm the integrity of the new electronic voting system, the Government of India instituted an Electoral Reforms Committee (ERC) in January 1990, consisting of representatives from several national and state-level political parties under the chairmanship of Mr. Dinesh Go swami. The ERC recommended the examination of EVM by a. waif' of technical experts.

⁵Supra, Note-1.

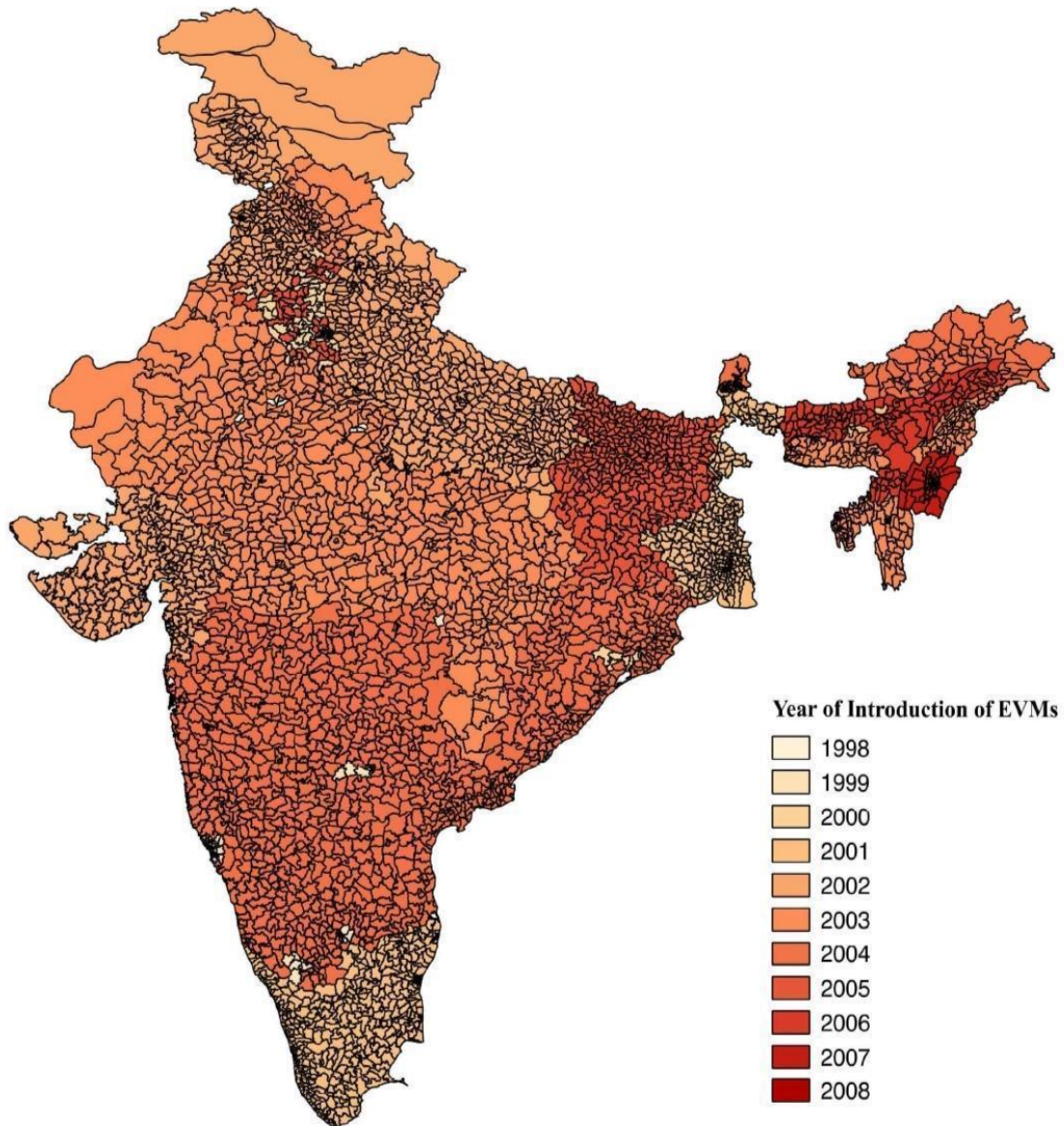
⁶Supra, Note-1.

Consequently, a Technical Expert Committee was formed under the chairmanship of Mr. S. Sampath Chairman, RAC, DRDO with eminent scientists like Dr. P.V. Indiresen (IIT, Delhi), Dr. Rao C. Kasarbada (ER&DC, Trivandrum) in the list among others. The members of the TEC have always been renowned professionals of technical excellence and eminent academic/research record. In April 1990, the Expert Committee unanimously recommended the use of EVMs without any further loss of time marking it technically sound, secure and transparent. On 24th March 1992, necessary amendments to the Conduct of Elections Rules 1961 were notified by the government vis-à-vis the use of EVMs.

In 1998, a general consensus was reached on the use of EVMs for conducting Indian elections. In 1998, EVMs were used in 16 Legislative ACs across three states of Madhya Pradesh, Rajasthan, and Delhi. The use of EVMs further expanded in 1999 to 46 Parliamentary Constituencies (PC), and later, in February 2000, EVMs were used in 45 ACs in Haryana state assembly polls. In 2001, the state assembly elections in Tamil Nadu, Kerala, Puducherry, and West Bengal were completely conducted using EVMs. All state assembly elections thereafter witnessed the use of this machine. In 2004, the EVMs were used in all 543 PCs for the elections to the Lok Sabha. A new technologically advanced voting system completely replaced the erstwhile voting method of using ballot papers. Since 2000, India has witnessed 132 State Assembly Elections and 4 General Elections to the Lok Sabha (2004, 2009, 2014 and 2019) where votes were cast and recorded using the EVMs [...].

A number of technological changes were made in the EVMs in 2001 and the machines were further upgraded in 2006. The pre-2006 era. EVMs are known as 'All EVMs', while EVMs manufactured between 2006 to 2010 are called tM2 EVMs'. The latest generation of EVMs produced since 2013 are known as V3 EVMs''.

TIME-LINE OF INTRODUCTION OF ELECTRONIC VOTING MACHINES IN STATE ASSEMBLY CONSTITUENCIES IN INDIA⁷.



Notes: The years of the introduction of electronic voting machines are obtained from the election commission's orders.

⁷Debnath Sisir, Kapoor Mudit, Ravi Shamika, Report on *The Impact of Electronic Voting Machines on Electoral Frauds, Democracy, and Development*, Brookings Institution, March 16, 2017, Page 35; available at: https://www.brookings.edu/wp-content/uploads/2016/10/evm_march2017.pdf; last visited: 10.05.2022.

INTRODUCTION OF VVPAT

In a step towards data transparency and accountability in the voting process, the ECI introduced new auditing measures in the form of VVPAT. The status paper⁸ traces the demand for, and subsequent implementation of, VVPAT as follows:-

“In a meeting of all political parties held on 4th October, 2010, the parties expressed satisfaction with the EVM but some parties requested the Commission to consider introducing Voter Verifiable Paper Audit Trail for further transparency and verifiability in poll. process. In India, the demand for VVPAT to increase transparency was floating in the air for some time after such a tool was first demonstrated in New York City in March 2001 and first used in Sacramento, California in 2002. The demand was referred to the Technical Expert Committee (TEC) by the ECI.

Introduction of VVPAT implied that a paper slip is generated bearing name and symbol of the candidate along with recording of vote in Control Unit, so that in case of any dispute, paper slip could be counted to verify the result being shown on the Masi/ Under VVPAT, a printer is attached to the balloting Unit and kept in the voting compartment. The paper slip remains visible on VVPAT for about 07 seconds through a transparent window. The Commission referred the matter to its Technical Expert Committee (TEC) on EVMs for examining and making a recommendation in this regard. The Expert Committee had several rounds of meetings with the manufacturers of EVM, namely, BEL & ECIL, on this issue and then had met the political parties and other civil society members to explore the design requirement of the VVPAT system with the EVM.

A prototype was manufactured and field trials were conducted in Thiruvananthapuram (Kerala.), Delhi, Cherrapunjee (Meghalaya), Jaisalmer (Rajasthan) and Leh (Jammu & Kashmir) in July 2011. Following the first field trials, the Commission directed the manufacturers to re-design the VVPAT.

A second field trial was conducted in July-August 2012 after the new model was manufactured. On 19th February 2013, the final model was approved by the TEC. The model was demonstrated to the political parties in a meeting on 10th May 2013. The Conduct of Elections Rules, 1961 was amended and notified on 14th August 2013, thereby, allowing the ECI to use VVPATs along with EVMs. On 4th September, 2013, VVPATs were first used in the bye-election for 51-Noksen AC in Nagaland.

In the meanwhile, on 8th October 2013, in a Public Interest Litigation matter, the Honourable Supreme Court directed the ECI to introduce the VVPAT system in a phased manner. In All Political Parties held on 2nd May 2017, the Commission decided to use 100% VVPATs at every polling station in all future elections to Parliamentary and Assembly constituencies. Since May 2017 VVPATs have been used in all General/Bye-election to Parliamentary and Assembly Constituencies. During the

⁸Supra; Note-1.

General Elections to Lok Sabha 2019, VVPATs were used in all Parliamentary Constituencies.

The Commission had received demands from various political parties for an increase in the mandatory VVPAT slip count ranging from 10% to 100% at different points of time.

For a systematic and scientific examination of the issue, the Commission engaged the Indian Statistical Institute (ISI, one of the most prominent and reputed national institutes devoted to research, teaching and application of statistics and sampling knowledge in the country, to give its expert findings in the matter of appropriate sampling size of VVPAT paper slips count. The Expert Committee comprising of Prof Abhay G Bhatt, Head IST, Delhi Centre, Prof Rajeeva Karandikar, Director, Chennai Mathematical Institute and Shri Omkar Prasad Ghosh), DDS (SSD), CSO, MOSPI nominated by Director General, National Sample Survey Office (NSSO) had wide-ranging consultations with other experts in the field of statistics and examined suggestions received from other groups. The Expert Committee has submitted its Report to the Commission on 22.03.2019. The ISI report unequivocally finds that adoption of a particular percentage as a sample for VVPAT is devoid of any scientific logic or statistical basis. It was further submitted that the absolute number of the sample adopted for verification determines the ability of such sample to represent overall accuracy.

On 15th March, 2019, the Honourable Supreme Court of India admitted a petition filed by 23 political parties on counting of printed slips of 50% VVPATs. The Commission submitted its views based on the systematic and scientific examination by the Expert Committee of Indian Statistical Institute. On 8th April 2019, Hon'ble Supreme Court upheld the integrity of EVMs (*"We are certain that the system ensures accurate electoral results"* and *"Verification of VVPAT slips of 5 polling Stations per Assembly Constituency or Assembly Segment in Parliament Constituency would lead to greater satisfaction."*), however, in the interest of greater satisfaction of stakeholders, increased the sample size of number of WPM slips to be matched with EVM count from existing 1 polling station per Assembly Segment/Constituency to 5 polling stations per Assembly Segment/Constituency. The review of this judgement was also dismissed by the Hon'ble Supreme Court on 07.05.2019. This historic judgement sets at rest the issues on EVMs as well as the demand to count a large number of VVPATs.

In pursuance of the Honourable Supreme Court of India's order dated 8th April 2019, the Commission directed to conduct mandatory verification of VVPAT paper slips of randomly selected 05 (five) polling stations in all future General and Bye Elections to the House of the People and State Legislative Assemblies, in addition to the provisions of Rule 56D of the Conduct of Elections Rules, 1961, after the completion of the last round of counting of votes recorded in the EVMs, as under:

(a) In case of General and Bye elections to State Legislative Assemblies, verification of VVPAT paper slips of randomly selected 05 (five) polling stations per Assembly Constituency.

(b) In case of General and Bye elections to the House of the People, verification of VVPAT paper slips of randomly selected 05 (five) polling stations of each Assembly Segment of the Parliamentary Constituency concerned”.

SOCIO-POLITICAL FEEDBACK

In the decades since the introduction of EVM's in Indian Elections there has been a great deal of social and political conversations surrounding their views. The ECI has been sensitive to the public discourse in this matter and has taken care to record the various points of views, expert opinions and scientific literature in the public domain. The ECI's status paper⁹ records some of this discourse as follows:-

“The use of EVMs meant an amalgamation of technology and trust, tradition and modernity, like moving away from a horse-drawn carriage to motor vehicles. In 1982, when EVM was first used in Kerala, candidate Sivan Pillai challenged its use even before the election. But the Kerala High Court did not entertain his challenge and EVM was introduced as a pilot project. Interestingly, Mr. Pillai, the challenger, won the election when the result was declared. However, Mr. Pillai's opponent challenged the introduction of EVMs thereafter. The said election was re-conducted with paper ballots after the Supreme Court ruling in 1954. However, the 1984 SC ruling against EVMs had been on a legal technicality, and not about their fundamental suitability, and the legal glitch was corrected through an amendment of the Representation of the People Act 1951 in 1988.

The introduction of EVMs for voting in India was met with certain reservations considering the then-existing large-scale illiteracy and socio-economic backwardness of the country. It was often asserted by the naysayers that the multitudes of poor, illiterate, down-trodden, especially in the rural areas, would face hardships and problems in accessing the EVMs and may get disenfranchised out of ignorance, lack of voting education or awareness. However, the concerted and focused information, education and communication programmes launched by the Commission, especially to spread awareness and familiarity with the EVMs and its commitment to reach the last elector, effectively nullified all reservations and doubts in this regard. It is heartening to see the cross-section of Indian society eagerly and positively embracing the EVMs and actively and enthusiastically participating in the electoral process by casting their votes on EVMs. A joint study by the Indian School of Business, Indian Statistical Institute and Brookings Institution establishes that introduction of EVMs led to greater participation in the electoral process by the marginalised and vulnerable voters such as women, scheduled caste and scheduled tribe. Since the advent of EVMs on the electoral scene aspersions on its use have been cast from certain quarters, including political parties and individuals. To meet the challenge raised against the EVMs, the ECI, as an extraordinary measure, threw

⁹Supra, Note-1.

an open challenge to all stakeholders between 3rd and 7th August, 2009 to come forward and prove if the ECI - EVMs could be tampered. However, none could do so.

In 2017, after the results of the 5 State Assembly elections were declared, some political parties had again cast aspersions on the credibility of EVMs. On 12th May 2017, a meeting with all recognised National and State Political parties was organised at Constitution Club, New Delhi. One of the major issues under deliberations during the meeting was the use of Voter Verifiable Paper Audit Trail (VVPAT) along with EVMs during the elections. The Honourable CEC assured 100% coverage of VVPATs in all future elections to the Parliament and State Assembly Elections. He informed the political party representatives that the Commission would hold a Challenge and offer the opportunity to political parties to demonstrate that ECI is used in the recently concluded Assemblies elections in early 2017 (Uttar Pradesh, Uttarakhand, Goa, Manipur and Punjab) \ tampered or that EVMs can be tampered even under the laid down Technical & Administrative Safeguards. Commission held a Press Conference on 20th May, 2017 to announce EVM Challenge and sent invitations to all National and State Recognized Political Parties to participate in the EVM Challenge from 3rd June, 2017 onwards. Only two political parties, namely, Nationalist Congress Party (NCP) and Communist Party of India (Marxist) submitted their interest in participating in the EVM Challenge and reported at the Challenge Venue on 3rd June, 2017. However, they did not wish to participate in the Challenge but only expressed their interest in understanding the ECM process. They interacted extensively with the Technical Expert Committee of the Commission to clear their doubts. The EVM Challenge concluded on 3rd June 2017 itself".

IMPACT OF EVM'S ON INDIAN ELECTIONS

There have been several studies that attempted to measure the impact of the introduction of EVM's on elections in India. Some interesting and significant findings have emerged in this regard. For instance a multidisciplinary report of Brookings Institution¹⁰ India centre concluded that the use of EVM's is statistically correlated with higher voter turnout, lower fraudulent voting and lower wastage of votes. Even more significant the report finds a very strong link between the production of EVM's and a decline in crime, particularly the offences of Murder and Rape. The report records its findings thus:

"The effects of an electronic voting machine on the number of voters and voter turnout is theoretically ambiguous. Unlike paper ballots, Indian voting machines by default record only five votes per minute. As a result, corrupt politicians had to capture polling booths longer to cast false votes, increasing costs of fraud and the chances of detection. Therefore, in the absence of electronic voting, the total number of voters and turnout could be higher on account of fraudulent votes. Second, voters may turn out in greater numbers in constituencies where machines were used as the Election Commission heavily publicised the machines. Finally, if electronic voting was not systematically different from paper ballot we should not expect any changes in the election outcomes. Voting procedures with electronic machines used in India

¹⁰Supra, Note-6.

emulated the paper ballot system. [...] The interface of the devices was similar to a paper ballot. Under the new system, voters had to press the button against their favourite candidate as opposed to using a stamp on a ballot paper. [...]

These estimates suggest that electronic voting machines might have reduced bogus votes. Given the average winning margin for the period of 1976-97 (pre-EVM period) was 15.8 percent, a drop in turnout by 3.18 percentage points could affect election outcomes substantially.

These results [...] taken together suggests that with electronic voting the likelihood of participation in election improved for the vulnerable voters and this was mainly due to a decline in electoral frauds.

Under the paper ballot system, voters applied a stamp against the election symbol of their preferred candidate to cast their vote. An unclear or multiple stamping may lead to rejection of the ballot. Unless a voter consciously chooses to waste her vote by marking the ballot in a confusing manner, rejected votes generate inefficiencies in the electoral system. Electronic 16 voting could prevent the total number of rejected votes substantially as voters had a single chance to push only one button indicating their preference. We analyse the effect of electronic voting on rejected votes for all state elections between 1976-2007 [...].

These results suggest that voting machines almost eliminated all rejected votes leading to a 2.7 percent increase in the number of valid votes at the baseline. Being a multi-party system with narrow winning margins an increase in valid votes can potentially change election outcomes”.

Further this report also found that EVM’s had increased the competitiveness of elections and resulted in a decline in both the winning margin and vote share of winning candidates. The basis for these findings is reported thus:

“Since there is no objective measure(s) available to rank constituencies by their likelihood of frauds, we use re-poll orders issued by the Election Commission. The Election Commission appoints observers in every constituency to monitor the elections to ensure free and fair voting. Based on negative reports submitted by these observers, the Commission may declare the results from a particular polling booth void and can issue orders for re-poll. The re-poll orders are consistently available only for the 2004 parliamentary elections.

The heterogeneity in the effects of voting machines strengthens our earlier conclusion that drop in voter turnout reflects reduced electoral malpractices.

First, we looked at the impact of EVMs on electoral fraud. Electoral fraud is very difficult to detect. However, it is well documented in India that prior to the EVMs, in many constituencies, under the paper ballot system, polling booths were captured, and ballot boxes were stuffed with fake ballots which resulted in an unusually high voter turnout. Our estimates show that voter turnout and rejected votes declines

significantly with the use of EVMs in Indian assembly elections. Moreover, independently collected post-poll survey data shows that the introduction of EVMs led to greater participation in the electoral process by the marginalised and vulnerable voters such as women, scheduled caste, and tribe. They are also likely to report lesser instances of rigging or intimidation. We also found evidence that the decline in voter turnout with the use of EVMs was more pronounced in those states where elected legislative members had more serious criminal charges against them and where the Election Commission was more likely to issue re-poll orders. These results along with the post-poll survey data result, strongly suggests that introduction of EVMs reduced electoral fraud. We also have strong evidence that introduction of EVMs made the electoral process more competitive - it led to a decline in the winning margin and the vote share of the winning candidate.

Electoral goals often determine the distribution of discretionary grants and public goods. Fair and competitive elections provide the electorate a means to improve the responsiveness of the elected officials by making them more accountable. Therefore, we study the impact of EVMs on the provision of electricity at the level of the constituency. We know that the constituencies using voting machines have better provision of electricity than their counterparts using paper ballots. The provision of electricity improves over time, and the effect is strongest for the year just before the subsequent election. Since the introduction of the machines may have changed both the composition of the voters and the characteristics of the elected politicians, it is challenging to identify the exact mechanisms.

Maintaining law and order is a fundamental responsibility of the state. In a rigged electoral system, politicians fail to provide security to common people because they depend on criminal elements in the electoral process. Politicians, therefore, end up supporting and protecting criminals instead of being able to prevent them. Given that introduction of EVMs in elections was motivated by electoral fraud, we find it critical to extend our analysis to the effect EVMs might have on law and order within a constituency. Our analysis suggests a very strong link between the introduction of EVMs and decline in crime. In particular, we find a significant decline in crime related to murder and rape. Furthermore, it is noteworthy that this effect is stronger in states where a large proportion of legislators have serious criminal charges against them".

The above cited working paper by researchers of Maastricht University and The Hamburg University of Technology¹¹ has noted the impact of EVM's in Indian elections as follows: -

"India is the biggest democracy in the world and the management of elections is a huge task. This year's elections were done in nine phases from 7 April to 12 May 2014. The ECI estimated 814.5 million voters and set up approximately 930,000 Polling Stations all over the country, for people to cast their vote (ECI, 2014c). Casting and counting votes used to be done manually in India. Before the implementation of an electronic voting system, India was using a paper ballot

¹¹ *Supra*, Note-10.

system. In manual elections of the previous kind, "a nationwide ballot could consume around 8,000 tonnes of paper and 400,000 phials of indelible ink and require some 2.5 million strongboxes to store them under heavy security until votes were counted" (Kumar & Walia, 2011). Indelible ink is still used today, to mark a person's finger after voting.

The counting of votes could take several days or weeks and the number of invalid votes was relatively high. For example, in 1999 there were 7,098,879 votes declared invalid, whereas in 2004 the number was 101,625 [...]. Overall the expenses for printing ballot papers, storage, transportation and hiring personnel for counting votes were becoming higher with every election and counting votes took a lot of time and effort. Those were the main incentives for the ECI to think about changing the system".

General Elections (A)	1999 (B)	2004 (C)	2009 (D)
Total seats (E-Voting)	543 (45)	543 (543)	543 (543)
Eligible electorate	619.55 million	671.49 million	716.99 million
Actual turnout	371.67 million	389.95 million	417.04 million
Polling stations	774,651	687,402	834,919
Number of EVMs used	-	1.075 million	1.368 million
Total invalid votes	7,098,879 (1.91%)	101,625 (0.043%)	198,705 (0.048%)
- of them EVM votes	-	67,121 (0.017%)	77,342 (0.019%)
Quantity of paper saved	-	8,000 tons	10,000 tons

Not only was the paper ballot system perceived as expensive and inefficient, it also had major security problems. One of the major problems is called booth capture. Often it happened that criminal groups, delegated by political parties, captured a polling station and literally stuffed the ballot box with large numbers of votes for the favoured candidate. Moreover the stealing of votes used to be a common practice. One of our interviewees, who comes from Bhadgaon Besar, a small village in the Himalayan mountains, said: "I remember very well that in the villages those ballot papers were misused by wrong people " (Bhatt, 2014, interview). He explained that it is a common practice in India that another person casts one vote. And not only in small villages but also when he moved to a bigger town called Mussoorie he remembered, "once somebody else was voting for me and my vote was misused" (Bhatt, 2014, interview). As we will explain later, the problem of booth capture was addressed in the design of EVM and is technically much more difficult than in the

paper ballot system. Hence in technical terms, cheating the system in this way became more difficult, however, with the electronic system, there are new potential threats for election fraud.

CLOSURE OF THE EVM CONTROVERSY

In the decades since 1970's there has been steady, irreversible movement towards the total adoption of electronic voting. As already noted in the sections above, this progress has occurred despite the controversies surrounding the use of EVM's in total substitution of the paper ballot. As of today, however, most of these controversies have come to some form of resolution or attained some status. In a working paper published by the Maastricht University and Hamburg University of Technology¹² this issue has been discussed as follows: -

"Different relevant social groups had different perspectives on the alleged tamperability and security problems with EVMs. Moreover, the kinds of remedies that have been proposed by them also differ and it is worth looking at them. In the SCOT model, closure of a technological controversy does not mean to 'solve' a problem in the common sense of that word, but rather look at whether relevant social groups see the problem as being solved. When presidents and heads of political parties raised concerns about EVM security towards the ECI in April 2010, they considered it might be necessary to revert to the paper ballot system [...]. They argued, "many democracies like Germany, Ireland and Holland and the United States of America have either banned use of EVMs or imposed stringent safeguards for their use" [...]. Also, VeTA argued that reverting to the paper ballot could be a solution to the problem. From their perspective, the paper ballot system is the most transparent and verifiable way of voting and this is the reason why other countries are using paper ballots. The ECI responded that Indian EVMs are not comparable to any other EVM employed elsewhere, because they are stand-alone machines, which cannot be networked and do not have an operating system [...]. They did not consider reverting to the old paper-based system an option. As mentioned before both manufacturers ECIL and BEL stayed completely out of the public debate around EVM security. Their way of closing the debate was rather rhetorical than technical in nature. Instead of responding to any of the technical vulnerabilities detected in a technical sense, they argued that the concerned people should just trust them and their cooperating companies. The proposition to just trust everyone who is involved in manufacturing EVMs was also made by the technical expert committee of the ECI. At the beginning of the controversy the ECI generally simply neglected that there were any security flaws in the system and stayed with the frame of 'the perfect EVM'. They also argued that there are much more advantages to the electronic system compared to the paper system (concerning invalid votes, paper saving, booth capture, the efficiency of counting etc.). In terms of security, the general assumption made by the ECI is that the risk of EVM being manipulated is very low. At a later stage of the controversy, the ECI acknowledged that the alleged security flaws and ways to cheat the system are at least possible in theory. However, in practice elections in India

¹²Maximilian Herstatt & Cornelius Herstatt, *India's Electronic Voting Machines (EVMs): Social construction of a "frugal" innovation*, Working paper No. 86, Maastricht University Hamburg University of Technology, July 2014.

have never been manipulated and hence there are no reasons to adopt any changes. After continuous discussions with concerned people and activist groups, the ECI “finally realised that the problem is real” [...]. In the 2014 General Elections for the first time, a paper trail (VVPAT) was added to the EVMs. Although this paper trail is only introduced on an experimental level, this has been a relief for most of the people concerned. We argue that the interpretative flexibility of EVMs has diminished to the extent that almost everyone agrees on the EVM in its current use. Hari Prasad said that he and his team are still fighting and Rob Gonggrijp: “in my opinion, India is trying to do as little as possible in terms of actual change, merely experimenting with paper trails here and there” [...]. However, we sense that the general opinion about the current EVM is positive. All of the 25 Indian citizens interviewed in this research have been overly positive about EVMs and generally regarded the security as much higher compared to the old ballot paper system. And although there have been instances of EVM malfunctioning in the current elections, those instances are so marginal that they can almost be neglected. Hari Prasad is optimistic that the EVM with paper trail will succeed, although the federal government did not allocate the necessary funds yet to implement the VVPAT on a large scale.

[...] In many respects, the electronic voting system has advantages over the paper ballot system. Yet in terms of transparency and verifiability, VeTA and the security research team claim that the paper ballot system had advantages. More radically it has been argued by them that paperless electronic voting will never be secure. Initially, the ECI denied all their claims and arguments and was reluctant to make any changes. However, in the 2014 elections, a paper trail was added to the system on an experimental basis. This decision was decisive for closure to occur in the controversy. Yet the controversy has not only been closed in technical terms. Many of the allegations that were made about EVM malfunctions and manipulation possibilities were simply answered by neglecting them. VeTA and the security research team have made a number of technical claims in terms of security flaws. Generally, the way the ECI and manufacturers responded was not with technical language. Rather everything that has to do with the inside of the technology was concealed and kept secret. Keeping technical details like the source code secret (known by only three or four people) was interpreted differently among RSGs. ECI, its technical expert committee and manufacturers believed the secrecy of technical details was necessary to prevent reverse engineering and to conserve property rights. In their eyes, this was a good base for a trustworthy security system. However, VeTA and the security researchers argued that this is a major security flaw. Looking at the present situation of electronic voting in India I think it is fair to say that the EVM has stabilised and the controversy has been closed, although there are still some isolated individuals who fight for their voices to be heard”.

CHAPTER-2: PRESENT INDIAN SCENARIO

The present Indian scenario w.r.t EVM use has been the subject of many studies. The method of voting on EVM's has been recorded by researchers of Maastricht University and Hamburg University of Technology as follows¹³: -

VOTING ON AN EVM

"Before voting, eligible voters have to enrol with the ECI. S/he is issued a Voter ID card known as Voter ID card or Personal Identification card. S/he has to carry and show that card at the time of voting. Once found valid, voting is permitted by the Presiding Officer of the booth" [...]. When the voter enters the Polling Booth and is in front of the machine, a green light flashes on the Control Unit [...], which indicates the machine is ready to receive a vote. After the voter casts her vote, a red light flashes and there is a loud beep sound (12 seconds long). The next vote can only be cast after the presiding officer resets the 'Ballot' button [...]. Once everybody casts their vote a seal consisting of string, paper and wax [...] are opened and the presiding officer presses the black close button [...]. From now on no more votes can be cast and the machine is ready for counting. Armed escorts are transporting the polled EVMs to "strong rooms with a double lock system and guarded 24x7 by armed police" [...]. Strong rooms are supposed to be watched round the clock and monitored by security cameras. On the counting day, a second seal is opened and the person presses the result button [...]. On the display the EVM will show the total number of votes cast, the number of candidates and the number of votes for each candidate [...]"

ELECTRONIC VOTING MACHINE (E.V.M)

What is an Electronic Voting Machine?

Electronic Voting Machine (E.V.M) in India consists of a Ballot Unit, which consists of buttons in front of the name of respective Candidates or Political Parties, for the voters and a Control Unit which is operated by the booth officer. M.B. Haneefa in 1980 made the first Indian Electronic Voting Machine, two PSUs in India that manufacture the EVM which are 'Bharat Electronic Limited' and 'Electronics Corporation of India Limited. In the By-elections of 1982 of the North Paravur Assembly Constituency of Kerala EVMs were first time used for polling.

ISSUES WITH E.V.M'S

Electronic Voting Machines in recent times in India have become the topic of debate. As there have been various reports on EVM, it can tamper easily and the votes of one political party or candidate can be easily transferred to another. Although the Election Commission of India has denied from time to time the possibility of tampering with EVMs and also has given reports on EVM can't be tampered with and once challenged publicly to temper the EVM for a prize.

¹³Supra, Note-10

But besides all these efforts by the Election Commission to maintain the public faith in EVM, many scenarios have aroused which made the public doubt the authenticity of EVMs. Saurabh Bharadwaj of Aam Aadmi Party an M.L.A from Greater Kailash Constituency has given a live presentation of E.V.M tampering at the Delhi Legislative Assembly in May 2017.

Apart from India, countries like Germany, Ireland, U.S.A. and Italy have also doubted the transparency of EVM machines from time to time and even banned the use of these machines in their elections. Meanwhile, America decided to use the Paper Trail System with EVMs to bring transparency, which would be discussed later in this Article; according to the Indian Scenario.

SOLUTION FOR E.V.M TAMPERING

Use of Voter Verifiable Paper Audit Trail (VVPAT) machines; is the most effective solution to the problem of increasing distrust among the public and the Political Parties towards the E.V.M.

HOW DOES VVPAT WORK?

Voter Verified Paper Audit Trail is a machine used with E.V.M.; it is like a printer which shows, the person voting, a paper slip for 7 seconds which contains the following information:

- 1) Serial Number of the contesting candidate;
- 2) Name of the Candidate;
- 3) Election symbol of the Candidate's Party.

This Paper Slip gets cut after 7 Seconds automatically and falls into a closed compartment, Hence, keeping the privacy of the vote intact.

In India, VVPAT machines were first used in by-elections of an Assembly Constituency of Nagaland in 2013 as a pilot project, which was termed as successful by Election commission.

STATUTORY POSITION W.R.T. EVM'S

Article 324 (1) vests in the Election Commission of India, the powers of superintendence, direction and control of the elections to both Houses of the State Legislature. Detailed provisions are made under the Representation of the People Act, 1951 and the rules made thereunder.

Electronic Voting Machine was introduced in India to solve the problem of Ballot Box capturing and casting false votes, which was a common scenario in India while using the Ballot Paper, and to conduct a fair election. Hence, the Indian Parliament amended the Representation of the People Act and introduced Section 61A in The Representation of the People Act, 1951, which lays down the provisions for the use

of Electronic Voting Machine by the Election Commission of India to Conduct General and State election in India.

Section 61A¹⁴ reads as under: -

“61A. Voting machines at elections. —Notwithstanding anything contained in this Act or the rules made thereunder, the giving and recording of votes by voting machines in such manner as may be prescribed, may be adopted in such constituencies or constituencies as the Election Commission may, having regard to the circumstances of each case, specify. Explanation. -For the purposes of this section, “voting machine” means any machine or apparatus whether operated electronically or otherwise used for giving or recording of votes and any reference to a ballot box or ballot paper in this Act or the rules made thereunder shall, save as otherwise provided, be construed as including a reference to such voting machine wherever such voting machine is used at any election.]”

LAW AGAINST TAMPERING OF E.V.M'S / BALLOT PAPERS

Section 135 of the Representation of the People Act, 1951: If the Presiding officer of a polling station has reason to believe that any person has removed ballot paper or EVM out of the polling station, such officer may arrest or direct a police officer to arrest such person and may search such person or cause him to be searched by a police officer. On the orders of the Presiding Officer, Police can arrest the offender. 1 year's imprisonment or fine or both.

Sec 135A of the Representation of the People Act, 1951: Booth capturing is an offence. `Booth capturing' includes -

1. seizure of a polling station or a place fixed for the poll by any person making polling authorities surrender the ballot papers or voting machines;
2. or allowing only his or their own supporters to exercise their right to vote and prevent/coerce others from free exercise of their right to vote⁶;
3. Seizure of a place for counting votes. Cognizable offence 3-5 years imprisonment and fine, if the offence committed by a person in govt. service, and One to Three years and fine for others.

Section 136 of the Representation of the People Act, 1951: If any person fraudulently defaces or fraudulently destroys any ballot paper or EVM or the official mark on any ballot paper or EVM or puts into any ballot box anything other than the ballot paper, or pastes any paper, tapes etc. on the symbol/names/ballot button of EVM for the purpose of the election commits an offence. Cognizable 2 years imprisonment or fine or both, if the offence is committed by any officer or clerk employed on election duty, and 6 months imprisonment or fine, for others.

¹⁴Representation of the People Act, 1951.

Now the question arises in case tampering with an Electronic Voting Machine is proved during polls, will the election be declared void or voidable?

The tampering with Electronic Voting machines is considered to be corrupt practice and the election should be held void according to section 100 of the Representation of the People Act, 1951. Which is read as under Section 100(1)(d) in The Representation of the People Act, 1951

(d) that the result of the election, in so far as it concerns a returned candidate, has been materially affected—

(i) by the improper acceptance or any nomination, or

(ii) by any corrupt practices committed in the interests of the returned candidate 5 [by an agent other than his election agent], or

(iii) by the improper reception, refusal or rejection of any vote or the reception of any vote which is void, or

(iv) by any non-compliance with the provisions of the Constitution or of this Act or of any rules or orders made under this Act, 2[the High Court] shall declare the election of the returned candidate to be void.] 6[(2)] If in the opinion of 2[the High Court], a returned candidate has been guilty by an agent other than his election agent, of any corrupt practice 7[***] but 2[the High Court] is satisfied—

(a) that no such corrupt practise was committed at the election by the candidate or his election agent, and every such corrupt practise was committed contrary to the orders, and 8[without the consent], of the candidate or his election agent; 9[***]

(b) that the candidate and his election agent took all reasonable means for preventing the commission of corrupt 10[***] practices at the election;

and

(c) that in all other respects the election was free from any corrupt 11[***] practice on the part of the candidate or any of his agents, then 12[the High Court] may decide that the election of the returned candidate is not void.

Fresh Election must be conducted on proof of Corrupt Practices During the Poll;

According to Section 58 of the Representation of the People Act, 1951. reads as under:

Section 58¹⁵ A fresh poll in the case of destruction, etc. of ballot boxes. -

(1) If at any election —

(a) any ballot box used at a polling station or at a place fixed for the poll is unlawfully taken out of the custody of the presiding officer or the returning officer, or is

¹⁵Supra, Note-12.

accidentally or intentionally destroyed or lost, or is damaged or tampered with, to such an extent, that the result of the poll at that polling station or place cannot be ascertained; or

(aa) any voting machine develops a mechanical failure during the course of the recording of votes, or

(b) any such error or irregularity in the procedure as is likely to vitiate the poll is committed at a polling station or at a place fixed for the poll, the returning officer shall forthwith report the matter to the Election Commission.

(2) Thereupon the Election Commission shall, after taking all material circumstances into account; either-

(a) Declare the poll at that polling station or place to be void, appoint a day, and fix the hours, for taking a fresh poll at that polling station or place and notify the day so appointed and the hours so fixed in such manner as it may deem fit, or

(b) If satisfied that the result of a fresh poll at that polling station or place will not in any way, affect the result of the election or that the mechanical failure of the voting machine or the error or irregularity in the procedure is not material, issue such directions to the returning officer as it may deem proper for the further conduct and completion of the election.

(3) The provisions of this Act and of any rules or orders made thereunder shall apply to every such fresh poll as they apply to the original poll.

In the case of **Smt. Indira Nehru Gandhi v. Raj Narain Singh**¹⁶:-

“Free and fair elections necessarily postulate that if the success of a candidate is secured in elections by means which violate the principle of free and fair elections, the election should on that account be liable to be set aside and be declared to be void”.

In the case of **“All India Anna Dravida Munnetra Kazhagam vs The State Election Commissioner**¹⁷” on 12 January 2007, the Madras High Court said that;

“[...] on being proved that the Ballot Box was captured and the votes were tampered with during the poll, in a particular election then, that particular election should be void”.

Hence, according to Indian Laws, on proving that ‘tampering of E.V.M.’ was done during the poll, the election would be considered void.

Till 2013, an immunity was given to MP’s and MLAs under section 8 clause 4 of being disqualified from their membership but the Supreme Court in one of its 2013 judgments had struck down this controversial section.

¹⁶Smt. Indira Nehru Gandhi v. Raj Narain Singh, 1975 AIR 2299.

¹⁷W.P. No.: 39400 of 2006, High Court at Madras, 12.01.2007.

CHAPTER-3: JUDICIAL REVIEW OF ELECTRONIC VOTING IN INDIA

LEGAL CHALLENGES W.R.T EVM'S.

The Preamble of the Constitution of India stipulates that India is a Republic & Democratic country. This makes elections in India an inherent part of politics and they have been conducted since Independence almost every year at the block level, State level or National level (General elections). In India, elections give no less enthusiasm to people than any festival. Hence, to celebrate this festival of Democracy the main instrument is the Ballot Paper through which the voters cast their votes and elect their representatives. But the greed of getting elected and having power by some election candidates gave rise to scenarios like 'Booth Capturing' and 'Stealing of Ballot Boxes'. Hence, to tackle this problem of 'Booth Capturing' the legislature started a more secure medium i.e. Electronic Voting.

LEGAL INTERVENTIONS AND COURT CASES

Since 2001, the issue of possible tampering of EVM has been raised before various Courts. The ECI in its status paper¹⁸ has noted some of the landmark cases. Some of these are mentioned below:

Karnataka High Court (1999)
Madras High Court (2001)
Kerala High Court (2002)
Delhi High Court (2004, 2021)
Bombay High Court (Nagpur Bench] (2004, 2018)
Uttarakhand High Court (2017)
Madhya Pradesh High Court (2018)
Gujarat High Court [2019]
Supreme Court of India (2013, 2017,2018, 2019)

¹⁸Supra, Note-1.

KARNATAKA HIGH COURT (1999)

The Honourable Karnataka High Court held that *"This invention is undoubtedly a great achievement in the electronic and computer technology and a national pride"*. The order was delivered on a plea filed in 1999 by a defeated candidate who had challenged the role of EVM machines in Yelahanka Parliamentary Constituency. The court studied the safety features and examined BEL scientists and ruled that machines were tamper-proof and any attempt to doctor them cannot be kept away from the public eye.

MADRAS HIGH COURT (2001)

The Honourable Madras High Court also categorically ruled out any question of tampering of the EVMs. The following observations made by the Madras High Court may be taken note of: *"There is also no question of introducing any virus or bugs for the reason that the EVA/18 cannot be compared to persona/ computers. The programming in computers, as suggested, has no bearing with the EVAs. The computer would have inherent /limitations having connections through Internet and by their very design, they may allow the alteration of the programme but the EVMs are independent units and the programme in EVMs entirely a different systerrt."* Both the Karnataka High Court and the Madras High Court observed that use of EVMs in election has several advantages over the system of ballot paper/ballot box election,

KERALA HIGH COURT 2002

In one of the cases, the Honourable High Court of Kerala in its order dated 6th February, 2002 had recorded its appreciation on the efficiency of the EVM mechanism. The judgement of the Kerala High Court in the said Election Petition was upheld by the hon'ble Supreme Court in Civil Appeal (AIR 2003 SC 2271).

DELHI HIGH COURT 2004 - 2021

In 2004, this matter was placed before the Honourable Delhi High Court by advocate Pran Nash Lekhi who had alleged that EVMs were tampered with to favour UPA in the election results. But HC found no merit in the petition. In this context, High Court of Delhi in its Order dated 03.08.2021 dismissed plea seeking to stop the use of EVMs and imposed a fine of Rs. 10,000 on the petitioner terming the petition as a 'Publicity Interest Litigation' based on hearsay and 'baseless allegations and averments.

BOMBAY HIGH COURT NAGPUR BENCH 2004 - 2018

The Honourable Bombay High Court (Nagpur Bench) examined certain witnesses who claimed to be experts in the field of electronics and electronic gadgets. These witnesses, however, admitted before the Court that tampering of EVMs was not possible unless the person knew entire things and had free access to the machines. In EP No. 15 of 2014, the Bombay High Court ordered a detailed forensic examination

of the EVMs from CFSL, Hyderabad for checking any manipulation etc. The CFSL report clearly ruled out any tampering, alteration or manipulation in the EVMs. The said report was accepted by Hon' ble High Court and petition was dismissed vide its order dated 23.02,2018,

UTTARAKHAND HIGH COURT (2017)

The Honourable Uttarakhand High Court in its judgement dated 2nd June, 2017 has observed as under:

"Prima facie, it is evident from a combined reading of the entire press release of ECI that this system is seal proof. The EVMs are not backable. There cannot be any manipulation at the manufacturing stage. The results cannot be altered by activating a Trojan Horse through a sequence of key presses. The ECI-EVIVIs cannot be physically tampered with. The EVMs use some of the microcontrollers, dynamic coding of key codes, date and time stamping of each and every key press etc. These EVMs also cannot be tampered with during the course of transportation or at the place of storage. There are checks and balances to ensure tamper-proofing of EVMs".

MADHYA PRADESH HIGH COURT AT JABALPUR 2018

In WP Na. 28295/2018, regarding counting of all WPM slips along with the counting of votes through EV since the ongoing State Assembly election, the Honourable Madhya Pradesh High Court (Jabalpur Division Bench) vide its order dated 07.12.2018 had dismissed the WP, stating that we do not find any merit in the present and the same is accordingly dismissed'.

HIGH COURT OF GUJARAT 2019

"...It will be evident from the extensive reproduction of the status report on EVMs/VVPATs, the system of registering votes of the voter and reflection of his vote has become more transparent and apparent to regain the voter's confidence in the system. What essentially was the object of introduction of the VVPATs was the restoring of the voter's confidence by logging and registering his vote correctly in the EVM. The Voter Verifier Audit Trail as the name suggests assures the voter of his vote having been correctly recorded in the system." Once the object of the audit of the voter's vote, from his perception is achieved, who is the end consumer of the franchise, the mere apprehension voiced by the candidate pales into insignificance".

SUPREME COURT OF INDIA 2013, 2017, 2018 AND 2019

In Oct 2013, to bring about greater transparency, the Honourable Supreme Court allowed ECI to introduce VVPAT in a phased manner.

The Hon'ble Supreme Court in its judgement of 2103; Dr. Subramanian Swamy vs. Election Commission of India¹⁹, it was held that;

"29. From the materials placed by both sides, we are satisfied that the "paper trail" is an indispensable requirement of free and fair elections. The confidence of the voters in the EVMs can be achieved only with the introduction of the "paper trail". EVMs with VVPAT system ensure the accuracy of the voting system. With an intent to have fullest transparency in the system and to restore the confidence of the voters, it is necessary to set up EVMs with the VVPAT system because voting is nothing but an act of expression which has immense importance in democratic systems. Vide order dated 17.01.2012 passed by the Division Bench of the High Court of Delhi at New Delhi in W.P.(C) No. 11879 of 2009 whereby the High Court disposed of the petition by disallowing the prayer made by the appellant herein for issuance of a writ of mandamus directing the Election Commission of India (ECI)-Respondent herein to incorporate a system of "paper trail/paper receipt" in the Electronic Voting Machines (EVMs) as a convincing proof that the EVM has rightly registered the vote cast by a voter in favour of a particular candidate.

3) Being aggrieved of the above, the present appeal has been filed by way of special leave.

Writ Petition (Civil) No. 406 of 2012

One Rajendra Satyanarayan Gilda has filed this Writ Petition, under Article 32 of the Constitution of India, praying for issuance of a writ of mandamus/direction(s) directing the Union of India, the Chief Election Commissioner and the Technical Experts Committee-Respondent Nos. 1-3 herein respectively to effect the necessary modifications in the EVMs so as to allow the voters to verify their respective votes and to attach the printers to the EVMs with a facility to print the running record of the votes for the purpose of verification by the voters in the process of voting. He also prayed for a direction to frame guidelines and to effect necessary amendments in the Conduct of Election Rules, 1961.

In view of the pendency of the appeal filed by Dr. Subramanian Swamy, this Court issued notice in the writ petition and tagged with the said appeal.

Though initially the ECI was a little reluctant in introducing "paper trail" by use of VVPAT, taking note of the advantage in the system as demonstrated by Dr. Subramanian Swamy, we issued several directions to the ECI. Pursuant to the same, the ECI contacted several expert bodies, technical advisers, etc. They also had various meetings with National and State level political parties, demonstrations were conducted at various places and finally after a thorough examination and full discussion, VVPAT was used successfully in all the 21 polling stations of 51-Noksen (ST) Assembly Constituency of Nagaland. The information furnished by the ECI, through the affidavit dated 01.10.2013, clearly shows that the VVPAT system is a successful one. We have already highlighted that VVPAT is a system of printing paper

¹⁹Subramanian Swamy v. Election Commission of India & Anr, 2013 10 SCC 500.

trail when the voter casts his vote, in addition to the electronic record of the ballot, for the purpose of verification of his choice of candidate and also for manual counting of votes in case of dispute.

Held: -

From the materials placed by both sides, we are satisfied that the "paper trail" is an indispensable requirement of free and fair elections. The confidence of the voters in the EVMs can be achieved only with the introduction of the "paper trail". EVMs with VVPAT system ensure the accuracy of the voting system. With an intent to have fullest transparency in the system and to restore the confidence of the voters, it is necessary to set up EVMs with the VVPAT system because voting is nothing but an act of expression which has immense importance in democratic systems".

Further, on 9th August, 2017, Hon'ble Supreme Court of India while deciding the bunch of Petitions on 100% use of VVPAT²⁰, observed that

"The above statement of the Election Commission of India contained in the counter affidavit acknowledges that all prayers made in the group of petitions, stand fulfilled and satisfied. It is also apparent that the Government of India has sanctioned funds for the purchase of the VVPAT units, needed during the course of the elections, which are to take place in the immediate future. The position expressed leaves no room for any doubt that all future elections will be held by using VVPAT. The above stance is reiterated during the course of hearing by the learned counsel representing the Election Commission of India.

In view of the above, we are of the considered view that the present bunch of matters does not require any further adjudication at our hands. All the cases clubbed together, are accordingly disposed of in terms of the counter affidavit filed by the Election Commission of India, duly supported by the Government of India".

In WP (Civil) No. 1332/2018, regarding use of ballot papers, the Honourable Supreme Court of India vide its order dated 22.11.2018 had dismissed the WP, stating that 'we are not inclined to entertain the writ petition²¹.

Supreme Court of India in its Order dated 08.04.2019 stated that²²

(i) "We are certain that the system ensures accurate electoral results"

(ii) "Verification of VVPAT slips of 5 Stations per Assembly Constituency or Assembly Segment in Parliament Constituency would lead to greater satisfaction."

Review Petition against above order dismissed on 07.05.2019.

²⁰Ms. Reshma Vithalbhai Patel v. Union Of India & Ors., SLP (Civil) No. 13598 of 2017, Order Dated: 06.07.2017.

²¹ Nyaya Bhoomi v. Election Commission Of India, W.P.(Civil) No. 001332 of 2018, Order Dated: 22.11.2018.

²²N.Chandrababu Naidu v. Union Of India & Anr., W.P. (Civil) No. 000273 of 2019, Order Dated: 08.04.2019.

The Hon'ble Supreme Court on 21.05.2019 dismissed a PIL seeking counting of VVPAT slips of all EVMs while rebuking the petitioner NGO for making a "mockery of democracy" by moving the court despite a clear ruling by the apex court directing counting of VVPAT slips of five polling stations per assembly segment.

Analysis: All the aforementioned Honourable High Courts as well as Honourable Supreme Court after going through various aspects of the technological soundness and the administrative measures involved in the use of EVMs/VVPATs have held that the EVMs/VVPATs are credible, reliable and totally tamperproof.

CHAPTER-4: ARGUMENTS FOR AND AGAINST ELECTRONIC VOTING

There is substantial literature from primary sources that documents the arguments both for and against the adoption of electronic voting methods. While the ECI itself has maintained a vast compendium of such literature pertaining to India, there are also authoritative foreign sources that have recorded and addressed these issues. Since this analysis has already reproduced the arguments for and against the use of EVM's in India in detail in the preceding chapters²³ It will be beneficial to analyse and reproduce similar arguments from international jurisdiction and sources. The similarity of issues, the difference in approach towards resolution and variety of points of view will aid in constructing a holistic perspective on the subject. One such source is the report of the inquiry conducted by the Parliament of Victoria, Australia²⁴, which extensively recorded the various arguments for and against the electronic voting. Some of these arguments, which include stakeholder consultations, are reproduced below.

ARGUMENTS FOR ELECTRONIC VOTING

- "Enfranchising vision impaired, elderly electors and overseas and interstate electors, with a secure ballot;
- Election logistics, including providing faster and more accurate election results;
- Secure handling of ballot materials; and
- Opportunities to reduce informal voting.

The following section explores these arguments in relation to evidence from inquiry participants. This discussion backgrounds more specific proposals about electronic voting and election technology in Chapter Five.

²³See chapter on *Judicial Review of Electronic Voting in India* and Chapter on *Background & History of EVM's in India*.

²⁴Report of Inquiry into Electronic Voting, *Electoral Matters Committee, Parliament of Victoria, Australia*, May 2017.

ENFRANCHISING VISION IMPAIRED ELECTORS AND ELECTRONIC VOTING

As noted earlier regarding the development of iVote, electronic voting is theoretically meant to provide electors with vision impairment an opportunity to cast a secret ballot independent of assistance from electoral officials.

The VEC's submission explained some of the key benefits of electronic kiosk voting in relation to vVote. Since 2006 over 1,100 Victorians with disabilities or insufficient literacy skills have cast an electronic vote. The VEC noted that, "as a primary benefit, electronic voting provides a facility for electors who are blind or have low vision, motor skill impairments or language barriers to independently cast a secret vote. At Victorian State elections, this capability has only been available in person at a VEC kiosk in designated electronic voting locations". Craig Burton, a former VEC IT Manager and former manager of vVote, said that while "vVote was only used for a small catchment of electors, I believe its use can be expanded but that VEC needs support to both use it, understand it and to have it fully supported by its poll staff".

However, some inquiry participants disputed these benefits in relation to electronic kiosk voting. The committee heard from Vision Australia regarding the organisation's experience with Victoria's electronic voting system, vVote. While Vision Australia supports the VEC's efforts to provide electronic kiosk voting, Vision Australia considers the form of electronic voting utilised at the 2010 and 2014 Victorian state elections to be ineffective, and argued that as a result Victoria has "regressed since the 2010 state election...falling well behind other states in providing accessible voting for people who are blind or have low vision".

Vision Australia argued that electronic kiosk voting failed to provide vision impaired electors with a reasonable voting avenue on a number of fronts. Firstly, vVote requires, according to Vision Australia, a high level of familiarisation with the system, and users were not given sufficient time to develop this awareness of the system. As a result, many of the 200 vision impaired electors who voted at the 2014 Victorian state election had to seek assistance from an electoral official, thus rendering their vote 'open' or not secret. Secondly, Vision Australia noted that the low take up of vVote in 2010 and 2014 may be directly related to the limited number of locations available for accessible vision impaired electors, as well as overall concerns amongst the vision impaired community about the restricted franchise for vVote; Vision Australia said in its submission that the restricted franchise prevented family members and friends from voting together, thereby reducing the social aspect of Australia's democratic voting process. As a solution, Vision Australia called for a nationally consistent approach to electronic voting. At the public hearings and in their submission, Vision Australia identified remote voting as having great potential to alleviate many of the issues discussed above. In particular, Vision Australia nominated NSW's iVote system as the organisation's preferred model, and that vision impaired usage figures – in 2015, 5,296 vision impaired electors used iVote compared to the 200 vision impaired electors who used vVote at the 2014 Victorian state election – make a strong case for iVote to be adopted throughout Australia.

Enfranchising elderly electors During the inquiry the committee heard from National

Seniors about electronic voting. In general, National Seniors suggested that electronic kiosk voting offered the greatest potential benefits to older electors, given that many older electors might prefer to vote in polling places and receive assistance from electoral officials if they were unfamiliar or uncomfortable with the voting technology available. National Seniors also recommended that any remote voting system should have high standards of verifiability and security, and that electronic voting should not replace ordinary paper-based voting mechanisms or the traditional Election Day experience.

ENFRANCHISING OVERSEAS AND INTERSTATE ELECTORS

Throughout the inquiry the committee learnt that many overseas and interstate electors find it difficult to participate in Victorian state elections. As noted earlier, at any given time in November – the time of a Victorian state election – the VEC estimates that there could be as many as 90,000 Victorians outside the state, with at least 40- 50 percent of this figure part of the eligible voting cohort.¹⁰⁵ The committee also heard specific evidence about the significant costs associated with establishing overseas and interstate voting facilities for Victorian state elections. Advocates for the Australian diaspora, such as Advance.org and the Southern Cross Group, have long advocated for electronic voting as a means to provide those outside Australia.

ELECTION LOGISTICS

Electronic voting presents a number of benefits for election logistics and management. During the inquiry the VEC told the committee about some of the logistical challenges it faces administering Victorian state elections. The VEC advised that one of its key functions during an election period is to provide “the urgent physical transfer of ballot material...which is reliant upon postal and courier services, which are proving less responsive”.¹⁰⁶ The VEC noted that a remote voting solution might negate the need for Australian electoral commissions to establish overseas and interstate voting centre facilities – evidence about the VEC’s overseas and interstate overseas voting arrangements is discussed further in Chapter Five.

SECURE HANDLING OF BALLOT MATERIALS

Following the 2013 federal election and the loss of 1,375 votes leading to the 2014 Western Australian Senate re-election, advocates for electronic voting in Australia have argued that both kiosk-based and remote electronic voting solutions could circumvent some of the problems associated with the physical handling of large numbers of ballot papers associated with an Australian general election. During the inquiry the committee heard from the NSW Electoral Commission, Ian Brightwell former IT Manager at the NSW Electoral Commission who stated that paper voting processes were not necessarily ‘foolproof’ and that the chances for a vote to be lost in the context of a paper count are higher than commonly assumed.

Electronic voting also offers some benefits in terms of voting reliability for postal electors who manage to vote but do not have a vote admitted to the election count as a result of postal delays. As part of the briefing with the NSW Electoral Commission in November 2016, and during a Victorian Parliamentary Library presentation in May 2016, Mark Radcliffe, IT Manager, NSW Electoral Commission, explained that iVote has a higher success rate than postal voting in admitting final votes cast from overseas. For instance, at the 2015 NSW state election, 5,856 postal votes were sent overseas but only 129 entered the final election count.

The committee notes that during the Commonwealth JSCEM's inquiry into the 2013 federal elections, several participants in that inquiry noted that the paper ballot process relied on the competence of 'tiny groups' of people. Ralph McKay, who also made a submission to this inquiry, said that "many links in the paper vote processing chain, including movement and storage of ballots, rely on... sometimes just one person", and that large-scale paper systems are inherently insecure.

Further evidence about the loss rates associated with different vote types is discussed in Chapter Five. The committee also notes there is debate about the relative benefits of electronic voting, particularly remote voting, in relation to election logistics. Some evidence from computer scientists suggests that the problems associated with paper voting are in fact similar to electronic voting systems. Professor Rajeev Gore and Dr Vanessa Teague wrote in this submission to the inquiry about lost vote rates at the 2013 federal election:

"Paper processes are not perfectly secure or reliable, but neither are computers. For example, the lost vote rate in the 2013 West Australian Senate race (1370 out of 1,348,797, slightly over 0.1 percent) was about the same as the demonstrated vote misrecording rate in Australia's largest Internet voting trial, the NSW iVote project (43 misrecorded electronic votes out of 46,864, slightly under 0.1 percent)...The WA Senate incident received much more attention because it impacted an election outcome, not because the system was inherently much less reliable. Even more importantly, the paper-based Senate process retained paper evidence of the 99.9 percent of votes that weren't lost; the iVote system produced no meaningful evidence of the correctness of any of the votes. Reliability, privacy and verifiability must be designed into electronic voting processes as carefully as they are designed into our existing paper-based processes".

POTENTIAL TO REDUCE INFORMAL VOTING

There has been a gradual increase in informal voting at the past three Victorian state elections. As documented in the committee's report on the 2014 Victorian state election, the rate of informal voting for the Legislative Assembly was 5.22 percent, the highest ever rate of informal voting for a Victorian state election. Informal voting was also highest in Districts where there were a high number of candidates contesting the election, and in Districts with high proportions of electors from non-English speaking backgrounds. As examples, Frankston District, which had 14

candidates, recorded an informal voting rate of 8.88 percent, and Dandenong District with high levels of non- English speaking voters, recorded 8.3 percent.

Electronic voting can potentially help reduce intentional and unintentional informal voting as these systems typically include a 'failsafe' mechanism which alerts electors when they have voted informally, providing an opportunity to amend their ballot. Electronic voting also theoretically provides electors from non- English speaking backgrounds a better opportunity to cast a formal vote as the system often provides language support and voting instructions in languages other than English. At the 2014 Victorian state election vVote provided instructions in 14 languages. Several inquiry participants supported electronic voting on these grounds, including the VEC, the NSW Electoral Commission and Ian Brightwell. It is important to note vVote and iVote also allow electors to cast an informal vote deliberately".

ARGUMENTS AGAINST ELECTRONIC VOTING

The arguments against electronic voting have also been addressed in the report of inquiry by the Parliament of Victoria²⁵. The observations of the inquiry committee are reproduced below.

During the inquiry the committee also considered several arguments against electronic voting, including;

- The safety and security of electronic voting systems, particularly remote voting systems, and specific concerns about vVote;
- The cost of electronic voting systems; and
- The impact of electronic voting on Australia's democratic and electoral practices, including the traditional model of Election Day in Australia. The following section explores these arguments and related evidence from inquiry participants. This discussion backgrounds more specific proposals about electronic voting and election technology in Chapter Five.

SAFETY AND SECURITY

One of the most common themes in the evidence about electronic voting, focusing on remote voting, during this inquiry was that electronic voting systems are not secure. These comments mainly addressed remote voting, although some also relate to vVote at the 2014 Victorian state election. General concerns about security and integrity Several inquiry participants told the committee that remote voting could not replicate the security and safety of a paper- based voting system, and that adopting such a system would have serious consequences for Victoria's electoral integrity. In terms of general comments, in their submission, Professor Gore and Dr Teague said that "secure and usable remote electronic voting, i.e. Internet voting remains an

²⁵ *Supra*, Note-24.

unsolved problem. There are various software products available that claim to provide security and verifiability, but experience in other states, particularly NSW, has shown serious problems relating to reliability, security and verifiability”.

Loss of trust was a major issue for some inquiry participants. In his submission, Christopher Glerum also said that “electronic voting...as a primary means of voting...[loses] the essential elements of democratic voting. Trust and anonymity are both at stake. This system asks the general public to trust that the machine is coded correctly, trust that it is audited frequently and expertly and trust that human error does not occur”. Similarly, Craig Burton, a former IT Manager at the VEC in which capacity he helped design the VEC’s vVote interface, argued that remote voting should never be used for “high- stakes public elections”. According to Burton, kiosk voting systems, such as vVote, provide a safe, controllable electronic voting suitable for Australian elections. Remote voting also presents challenges in terms of a user’s capacity to interact safely with the internet environment. In his submission, Dr Chris Culnane noted that it was unrealistic to expect electors to ensure their computers were completely free of viruses and malware that could permit malicious hacking. He argued that:

“Remote voting delegates the provision of secrecy to the voter themselves. The carefully constructed protections offered in a polling place no longer exist, it is left to the individual to enforce their own secrecy. Internet voting makes the challenge even harder, requiring the voter to not only secure the environment in which they cast their vote, but also to secure the computer and internet connection they will use for voting. Evidence suggests that users are not capable of securing their devices, and Australia particularly faces serious challenges. A report from Trend Micro showed that Australia ranks 3rd globally in terms of the number of users clicking malicious links, equating to 22 million malicious links being clicked in the 4th quarter of 2015 alone. In the face of such a challenging security environment, it is currently inconceivable to believe that the average user has the capability to secure their machine”.

VERIFIABILITY AND TRANSPARENCY

Verifiability can be defined in several ways. In their submission, Professor Gore and Dr Teague defined verifiability as follows:

“For each election, each voter should get good evidence that their vote is cast in the way that they intended, and scrutineers and the public should get good evidence that all the votes are properly input and accurately tallied. E- voting should provide a printout for voters to verify (a voter- verifiable paper trail), or some other form of direct verification (like the vVote system)”.

During the inquiry several inquiry participants questioned whether remote voting could provide verifiability. In this submission, Professor Gore and Dr Teague suggested that “no Internet voting solution exists that provides a degree of security and verifiability as good as postal voting for those who can fill in their own postal vote”. Professor Gore and Dr Teague also outlined, in their view, the four major technical challenges for remote voting related to verification. These are:

- Cast- as- intended (voter) verifiability, as a way of showing that a person’s vote is as they intended it to be;
- Voter authentication. This means ensuring that the person casting the vote is the eligible voter they claim to be;
- Verifying the votes are counted as cast and reported or tallied correctly; and
- Privacy, involving observation of the person voting and electronic observation of the vote they have cast. Both aspects are obviously difficult in a remote voting context when a user’s home computer is used to vote. The committee notes efforts to create remote voting systems with end- to- end verifiability; the Helios protocol is a good example. However, as noted by Professor Gore and Dr Teague, Helios can currently provide verifiability for simple counting processes but not the complex calculations involved in preferential voting. During the inquiry the committee also received specific evidence about NSW state elections and iVote’s verification systems. These are addressed below. Security of remote voting and hacking concerns One of the major concerns about remote voting, and to a lesser extent kiosk voting, is that electronic elections are more vulnerable to malicious activity than paper- based elections, and that this activity might ultimately affect the result of the election in favour of one candidate. The committee notes that Victorian elections are conducted peacefully, safely and with electors participating without the threat of violence or coercion. Yet, electronic elections present a different set of challenges. These challenges are summarised in Craig Burton’s submission to the inquiry; “It is hard for a single person to affect a paper election outcome. On the other hand it is too easy for a single developer or operator to interfere in (or halt) an automated election. Computer issues during elections should not be treated like simple admin [sic] issues because a small technical hitch can have dire implications...Physical world risks and computer risks cannot be compared, even if it looks like they can. Errors

in manual elections are usually random and do not favour candidates. Errors or fraud in software can systemically (not randomly) damage elections".

The committee notes that during this inquiry, there were allegations that several high- profile elections involving electronic voting were affected by malicious IT attacks. The highest profile of these attacks were allegations, aired in late 2016, that the Russian government interfered in the 2016 United States election, with the goal of undermining candidate Hilary Clinton and affecting her electability. Earlier in 2016, the Office of the Director of National Intelligence (DNI), representing 17 intelligence agencies, and the Department of Homeland Security (DHS) jointly stated that Russia "hacked the Democratic National Committee (DNC)" and leaked its documents to Wikileaks, with a view to again undermining Clinton.

During this inquiry the committee visited Estonia. Prior to iVote at the 2015 NSW state election, Estonia was home to the world's largest remote voting application, with nearly 25 percent of electors casting their vote remotely at the 2012 Estonian elections. As part of the tour the committee considered evidence from 2014, when a group of international computer scientists alleged that Estonia's remote voting system was vulnerable to hacking; subsequent media reports allege the system is not suitable for European elections and vulnerable to geopolitical interference from Russia".

The issues pertaining to hacking, impersonation and electronic voters fraud are addressed further in Chapter Four of the report of inquiry by the Parliament of Victoria²⁶. The observations of the inquiry committee are reproduced below.

"Hacking was also a major concern for the Commonwealth JSCEM during its inquiry into the 2013 federal election. In finding that it could not support electronic voting for federal elections without compromising Australia's electoral integrity, the Commonwealth JSCEM noted that the threat of hacking was a key consideration for the committee, noting that "the weight of evidence tells us that at present...electronic voting can be hacked, and an election outcome changed". During this inquiry the committee was also told that hacking can occur in a non- malicious context, as discussed below. Concerns about kiosk voting While several inquiry participants, such as Professor Gore and Dr Teague, Dr Chris Culhane and Craig Burton considered kiosk voting a superior electronic voting mode, the committee received some evidence about the vulnerabilities of kiosk voting. In their submission Dr Wen and Associate Professor Buckland discussed vVote at length. They noted that: "E- voting systems used in large- scale public elections in Victoria, other Australian jurisdictions and overseas have all suffered from critical failings and unacceptable risk, especially in terms of quality and security. Moreover none of these systems provides verifiability, which is a key security requirement. The Victorian vVote project was a commendable attempt at designing a system to address this shortcoming in verifiability, but it was unsuccessful". Dr Wen and Associate Professor Buckland's evidence about vVote is considered in detail in Chapter Five. Cost Most evidence the committee received about electronic voting related to the cost of electronic voting kiosks. While this is addressed in Chapter Five in relation to vVote, some preliminary comments are relevant here. One of the major criticisms of kiosk voting is that it is costly to roll out to a non- restricted franchise. Kiosk voting involves a substantial investment in the electronic voting machines which comprise the solution, and much of this technology is 'election specific' in that it can only be used at one election cycle before the technology needs updating. This is particularly the case at Victorian state elections, which are held every four years. During the inquiry the committee heard from several inquiry participants about the cost- prohibitive aspects of vVote. The VEC told the committee that while kiosk voting has been successful at Victorian state elections and has helped establish that electronic voting can be deployed to assist electors with barriers to voting, the overall impact of kiosk voting has "been out of proportion to the votes taken". Noting cost, the VEC also said:

"Deploying and supporting the kiosks, which requires specialist business and technical knowledge, has added additional overheads and risk to a business environment already managing critical processes and high volumes within short timeframes". The Western Australia Electoral Commission's submission also referred to cost and the "tyranny of distance" in relation to rolling out kiosk voting.

The submission noted: "Despite these advantages, the tyranny of distance renders the deployment of electronic voting machines impracticable on any significant scale

²⁶ *Supra*, Note-24.

in larger jurisdictions such as Western Australia, Queensland and New South Wales...Victoria occupies the middle ground with regard to area, but is at the high end when it comes to elector numbers - 3,806,301 in 2014 - and polling places - 1786 - suggesting that the widespread roll out of voting machines in polling places would be equally problematic". In contrast, submissions from the VEC, the NSW Electoral Commission and the Western Australian Electoral Commission suggested that remote voting presented a cost- effective electronic voting solution. The issue of cost is explored further in Chapter Five.

Impact of electronic voting on Australia's electoral practices Elections are more than just the casting of the vote. As noted by the committee during its inquiry into the 2014 Victorian state election, they involve important rituals and traditions and have an important social function; in his submission Professor Graeme Orr discussed the important, in- person, aspects of voting together at a polling place. To this end, several inquiry participants suggested that electronic voting might have a negative impact on Australia's electoral practices. In his submission, Professor Orr noted that while he was not necessarily opposed to electronic voting as a means to assist those electors who cannot make it to a polling place to cast their vote, he cautioned against allowing everyone to vote electronically when Australian elections already provide ample opportunities for flexible voting in person, such as early voting, and postal voting. Professor Orr suggested that if Australia embraced direct democracy involving regular plebiscites, then remote voting would be essential. But the burden associated with a three- year or four- year election cycle did not justify the rapid expansion of electronic voting.

Another issue addressed in submissions related to the integrity of electronic voting systems, and their suitability as a voting mechanism for members of the community who require assistance to vote, such as the vision impaired. In his submission Dr Chris Culnane said that "the problem with remote voting, online or postal, is that it undermines the democratic rights of the most vulnerable members of our society". He noted that remote voting, like postal voting, also theoretically enabled coercion in the context of a person voting at home being influenced, or told to vote in a certain way, by a third party, friend or family member. In their submission, Professor Gore and Dr Teague offered a similar perspective:

"For voters who need assistance filling in their paper vote, the verifiable polling- place electronic voting solutions...provide superior security and verifiability to any Internet voting solution not available, or likely to be available in the near future. Disabled voters' democratic rights are not improved by providing an accessible remote voting solution that does not protect the integrity of their vote as well as an alternative method".

CHAPTER-5: TYPES OF ELECTRONIC VOTING

Many variations of Electronic/Digital voting are observed globally. It is instructive to conduct a comparative analysis of the different types. This comparative analysis has been attempted in the following chapter. However prior to making any comparisons it is important to broadly take note of the different types of electronic voting. An authoritative study on the subject has been conducted by the Election Commission of India²⁷. The broad categorisation of the processes of Electronic Voting, as observed by the ECI, are reproduced below.

“The process of electronic voting can be of three types:

(i) Direct Recording Machines placed at designated polling station,

(ii) Internet Voting

- Remote Online Voting
- At Designated Polling Stations

(iii) Optical Scanners

- Stand-alone
- Networked for centralised counting of results

EVMs used in India fall under the first type of stand-alone direct recording machines with no possibility of any kind of network connectivity where voters cast their votes at an assigned polling station on the day of election under strict administrative security ensured by the ECI.

Even though ECI EVMs are also direct recording machines ECI EVMs are completely different from any of the EVMs used internationally either for direct recording or for internet voting or for optical scanning”.

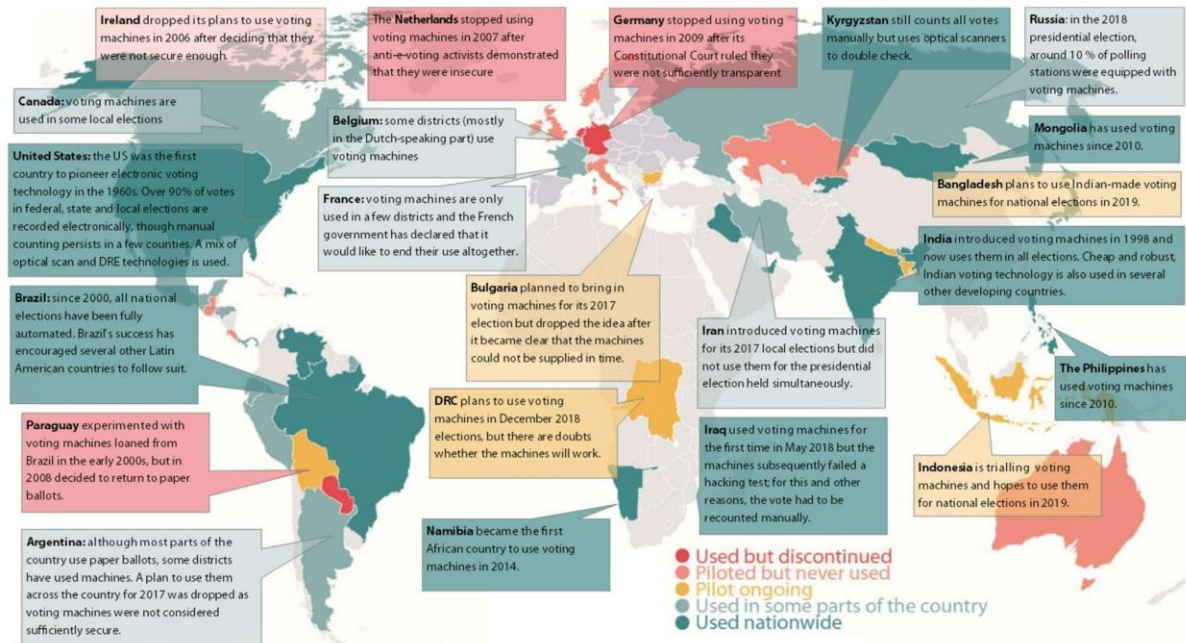
A geographical representation of the international use of Electronic/Digital/Internet voting has been provided in a study by the European Parliamentary Research Service²⁸ (EPRS). This representation in the form of two maps, one depicting the distribution of EVM's and the other depicting the use of internet voting, are reproduced below.

²⁷ *Supra*, Note-1.

²⁸ Martin Russel & Lonel Zamfir, *Digital Technology In Elections*, European Parliamentary Research Service, September 2018.

COUNTRIES THAT USE ELECTRONIC VOTING

(Use of optical scanning or direct recorded electronic technology to record and/or count votes in politically binding elections)

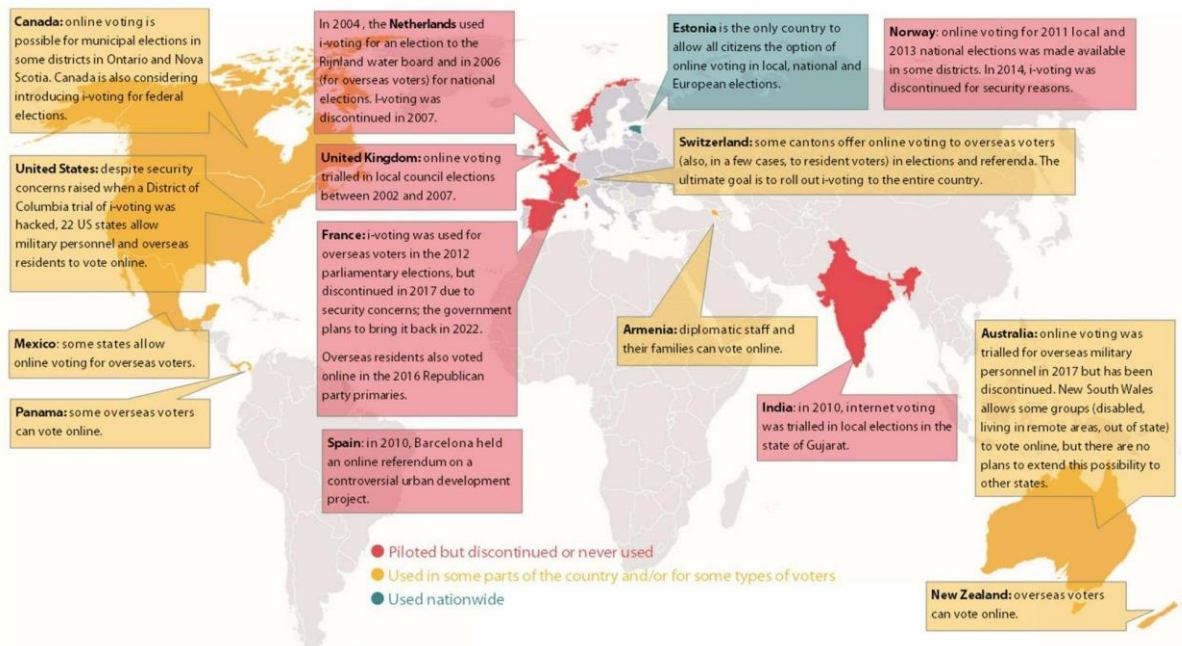


Electronic voting has fallen out of favour in most European countries, but is gaining ground in Latin America, as well as the Middle and Far East.

Source: [International Institute for Democracy and Electoral Assistance](#), [International Foundation for Electoral Systems](#).

COUNTRIES THAT USE INTERNET VOTING

(Use of internet voting away from polling stations in politically binding elections)



Several countries have experimented with internet voting, but only Estonia has used it extensively.

Source: [International Institute for Democracy and Electoral Assistance](#), [International Foundation for Electoral Systems](#).

The above quoted paper takes note of the fact that in 2010, internet voting was trialled in local elections in the State of Gujarat. However, literature on this subject is insufficient and conspicuously absent from the digital archives of the Election Commission of India. Consequently, in order to study the issues involved with i-voting, its advantages and disadvantages, recourse must be taken to international sources on the subject. In the above cited study by the EPRS²⁹, contains a number of observations with regard to the issues of i-voting. These observations are reproduced below.

INTERNET VOTING IN ESTONIA

Estonia is the only country in the world to offer internet voting to all categories of voters in national elections (it is also available for local and European elections). Despite continuing cybersecurity concerns, online voting has become highly popular, representing 32 % of votes cast in 2017 local elections. Estonia offers particularly favourable conditions for i-voting:

ID cards come with a chip and a card reader, making them suitable for online authentication; the country ('e-Stonia') prides itself on being one of the world's most advanced digital societies, in which online services are highly trusted and have become the default option.

²⁹ *Supra*, Note-28.

ONLINE VOTING POTENTIALLY IMPROVES VOTER TURNOUT

Since 1980, the average percentage of citizens turning out to vote in national parliamentary elections across the world has declined from 76 % to 66 %. In EU countries, a similar decline can be seen in turnout for elections to the European Parliament. Insofar as they reflect scepticism towards democratic institutions, these trends are worrying. In this context, internet voting could, at least in theory, help to boost turnout by making voting more convenient for those who find it difficult to get to a polling station. In many countries (for example, the USA), young people are particularly reluctant to vote and online voting might be a more appealing option for them.

Whether this happens in practice is unclear, as limited data are available. In Estonia (see Figure 1), the only country to have used this technology at national level over a longer period, i-voting has certainly proved popular. Since 2005, the first time that the technology was used, when just 2 % of votes were cast online, the share of i-votes has steadily increased to reach 32 % in the most recent local elections (2017). However, the effect on overall turnout is much less clear; participation in 2009 local and European elections rose considerably, but most of the initial gains have since been lost, perhaps suggesting that the ability of i-voting to draw in new voters declines once the novelty effect wears off. Results from other countries are equally inconclusive. In 2007, the UK trialled i-voting in municipal elections; the percentage of voters choosing to vote online was mostly quite low (as little as 3.4 % in one case). Around one quarter of online voters declared that they would not have voted if online voting channels had not been available. However, with only five local councils participating in the trial and a lack of comparable data from a longer period, it is impossible to say whether overall turnout benefited. A 2017 study on Switzerland also failed to find any significant impact.

SAVING MONEY

In countries such as Switzerland and Estonia where internet voting has been trialled, it has been offered as an alternative rather than a replacement for traditional voting. Expenditure on internet voting systems is therefore additional to polling station operating costs. Conversely, these additional costs can easily be offset: if enough people vote online, fewer staff are needed at polling stations to receive voters and count ballots. In 2007, Estonia's national electoral committee put the costs of developing and implementing i-voting over four years at just €400 000; it also estimates that in 2017, i-voting saved 11 000 working days; the net cost savings are therefore considerable. From a financial point of view, i-voting is a particularly attractive option for countries which hold frequent elections or referenda (such as Switzerland).

A CONVENIENT WAY OF VOTING

Internet voting is a convenient solution for voters who are physically unable to reach polling stations. Some US states allow armed forces personnel and overseas voters to vote online. The Australian state of New South Wales allows this option for voters who are out of state on polling day, as well as certain categories of disabled person and those who live more than 20 kilometres from the nearest polling station.

THE MAIN ARGUMENT AGAINST I-VOTING: SECURITY RISKS

Despite all the potential advantages, i-voting has made very little headway, mainly due to the risk of hacking. Many personal computers or mobile devices used to vote online are poorly defended; in 2014, an estimated one-third were infected with malware, potentially enabling ill-intentioned persons to spy on voters or worse, vote for them. An even bigger risk is that hackers could attack electoral authorities' servers to manipulate the results. Even very well-defended systems are not invulnerable: hackers have found security flaws in systems belonging to Google and Microsoft, and even the Pentagon. Although there is no evidence that Estonian internet voting has been compromised, it would be an obvious target for Kremlin-linked hackers. In 2014, cybersecurity experts therefore recommended that Estonia discontinue i-voting, arguing that i-voting could not be made safe. Australia's electoral authorities have ruled out i-voting for federal elections given the risk of 'catastrophically compromising our electoral integrity'. Security objections can also be made against postal voting, used by many countries as a solution for voters unable to vote in person (or even, in the US states of Oregon, Washington and Colorado, as the main voting method). However, while there is a risk of individual postal votes falling into the wrong hands, it would be very difficult for election fraudsters to intercept such large numbers as could be possible with votes sent over the internet.

Advocates of i-voting argue that even if it cannot be made fully secure, risks can at least be reduced to an acceptable level, in the same way as online banking and

shopping. However, large-scale electoral fraud has the potential to undermine trust in democracy – a more serious consequence than the economic losses caused by financial fraud. Moreover, it is far more difficult to detect: online bank clients are more likely to notice money missing from their accounts, than any direct impact of their vote being hijacked, and in the absence of a paper back-up, election workers cannot audit the results. To remedy this defect, since 2013, Estonians can check that their votes have been cast as intended, using E2EVV technology (see above). Voter verification cannot prevent fraud, but it can at least help to detect it. However, there are limitations, critics point out the verification software is not fully secure, and in any case only a small minority of voters (4 % in 2017 local elections) bother to check.

OTHER PROBLEMS WITH I-VOTING

I-voting potentially compromises ballot secrecy, as it is impossible to guarantee that nobody is watching voters as they submit their ballots. It therefore opens the door to voter coercion or even vote buying. To exclude this possibility, Estonia allows citizens to re-cast their votes an unlimited number of times during a seven-day period, or, after the expiry of that period, to override their internet choice by voting in person. Internet voting potentially discriminates against persons who are less comfortable with digital technology or lack access to high-quality internet services. It also removes the traditional symbolism of voters heading for polling stations as a public expression of citizenship. However, neither of these arguments applies where i-voting merely complements rather than replaces voting in person – which is still the preferred option, even in Estonia.

EU position: EU electoral monitoring guidelines emphasise the need for observers to assess the use of technologies such as biometric identification and electronic voting machines – but also acknowledge that a full technical analysis is likely to exceed their capacity. The EU election observation mission reports vary in their assessments of digital electoral technologies. EU observers in Peru praised the country for its 'largely successful' partial introduction of electronic voting in 2016; however, at the 2017 Kenya election, they were more critical, noting that technology was 'extremely controversial', and emphasising the need for digital systems to be 'tried and tested, secure and publicly accountable'. European Parliament resolutions of November 2015 on reforming EU electoral law and of March 2017 on e-democracy in the EU recognise the potential of technology to enhance democracy by enabling certain groups (for examples, expatriates or disabled people) to vote, but also insist on the need to prevent fraud and ensure voter secrecy".

The i-voting method and surrounding issues have also been the subject of detailed study. The observations of the inquiry committee of the Parliament of Victoria, Australia³⁰, cited above, have been reproduced below for the purpose of evolving a detailed and holistic picture on the subject of i-voting, with Estonia as a reference point of success and the reasons therefore.

REVIEW OF ESTONIA'S INTERNET VOTING

ORGANISATIONS WITH WHOM THE COMMITTEE MET

The committee met with the Estonian National Electoral Committee, and the Estonian National Electronic Voting Committee. The committee also considered the Estonian Committee's recent report on "e- Voting in Estonia", which comprehensively analyses Estonia's remote voting system.

ESTONIA'S ELECTORAL SYSTEM

The Riigikogu, the Parliament of the Republic of Estonia, is composed of 101 members directly elected by universal adult suffrage for a four- year term of office. Elections to the Riigikogu are carried out by a three- stage proportional representation system. Political parties present lists of candidates in twelve multi- member districts, where independent candidates may also run for office. In addition, parties submit a national list of candidates, with candidates in both the parties' national lists and their corresponding district lists. District lists are open, and electors vote for a particular candidate in a district list rather than for a party. Since 2007, electors may cast electronic votes or e- votes in Riigikogu elections, using internet- connected personal computers or a mobile phone equipped with an ID card reader.

THERE ARE A NUMBER OF DIFFERENT ELECTIONS HELD IN ESTONIA:

³⁰ *Supra*, Note-24.

- Parliamentary elections, which are held every 4 years;
- Local government elections, which are held every 4 years;
- European Parliament elections, which are held every 5 years. Estonia elects 6 Members of the European Parliament;
- Referenda. If a referendum fails, Parliament has to dissolve itself;
- Consulting referendums; and
- Presidential elections every 5 years.

THE ELECTORAL SYSTEM IS GOVERNED BY A NUMBER OF PIECES OF LEGISLATION:

- Riigikogu Election Act;
- Local Government Election Act;
- European Parliament Election Act;
- Referendum Act;
- President of the Republic Election Act; and
- Electoral Administration Act.

IN CONTRAST TO AUSTRALIA, ESTONIAN ELECTIONS ARE ORGANISED BY A NUMBER OF DIFFERENT ELECTORAL COMMITTEES, INCLUDING:

- The National Electoral Committee;
- The Internet Voting Committee;
- County Electoral Committee;
- City/Municipality Electoral Committees
- Polling Station Electoral Committees

The committee learnt that Estonia is currently reforming its electoral administration. From September 2017, the role of the National Electoral Committee will be to set the broad policy and management framework for elections, and to deal with complaints. There will be seven members of the Committee, appointed for a four- year term, one of whom will be an IT auditor. A State Electoral Office will also be established to professionalise Estonia's electoral administration and electoral processes. The Office will have responsibility for:

- Conducting and development of electronic voting;
- Election management at the national level;
- Procurement of election material, IT development;
- Supervision of lower level electoral administrators; and

- Training of election administrators.

HISTORY OF ELECTRONIC VOTING IN ESTONIA

In 2005 Estonia became the first country to have nation-wide local elections where people could cast binding votes over the internet. This was followed by successful implementation of e-voting at local, national and European elections. Since 2007, all Estonian electors may cast electronic votes or e-votes in elections for the Riigikogu using internet-connected personal computers or mobile phones equipped with an ID card reader. The committee notes that the first Estonian elections to use remote voting were affected by what is commonly regarded as one of the world's largest ever examples of electronic state warfare which affected most aspects of the country's critical information technology infrastructure. In April 2007 a series of cyberattacks crashed the websites of many Estonian organisations, including the Estonian Parliament, banks, newspapers, news broadcasters and other critical infrastructure. The hacking occurred at the same time of Estonia's disagreement with Russia about the relocation of the Bronze Soldier of Tallinn, a war grave marker.

As of 2016, Estonia has held eight elections over ten years, where people could cast legally binding votes over the internet. Digital ecosystem in Estonia The committee learnt that communication and information technologies are heavily integrated in Estonia, creating the right conditions for take up of remote voting. This is called the Estonian digital ecosystem. In a report on e-Voting in Estonia, the ecosystem is defined as "an intertwined ecosystem of institutional, legal and technological frameworks that jointly facilitate independent and decentralised application development by public and private institutions to offer public services digitally". In the report's foreword, Toomas Hendrik Ilves, President of the Republic of Estonia, noted that Estonian society was heavily interconnected and computerised. He wrote that: "30 percent of participating voters cast their ballot online, nearly 100 percent of prescriptions and tax returns are done online, as are almost all banking transactions. Estonians have given more than 270 million digital signatures. Common e-services such as a universal electronic ID for both public and private sectors are widely used and the whole of ICT infrastructure in a country should be regarded as an "ecosystem" in which everything is interconnected".

Further, the committee notes that the number of online public services that government offices offer to their "customers" are widely accepted and used by Estonian citizens and residents. Digital identification, "the foundation stone of modern digital democracy, is compulsory for all citizens". In 2014 digital IDs were used more than 80 million times for authentication and 35 million times for digital transactions, significant numbers in a country with a population of only 1.3 million. According to the Estonian National Electoral Committee, ninety-five percent of all personal income tax declarations are filed online in less than ten-minutes".

The Estonian National Electoral Committee informed the committee that there are a number of characteristics of Estonian society that made it a good candidate for electronic voting, related to software development. Estonia prides itself on being a

leader in digital technology applications. Four out of the five founders of Skype were Estonian. Estonia also allows non- citizens to be e- residents. This is attractive as there is no income tax for profits generated and then reinvested in Estonia.

The committee learnt that increasing electoral participation was not a motivation for electronic voting. Culturally, encouraging turnout in Estonia is considered inappropriate given Estonia's independence from the Soviet Union, and a belief people should be free to do what they choose and not influenced to vote by the government. Incidence of electronic voting Electronic voting has grown incrementally since its introduction in Estonia in 2005.

[...], the 2005 Estonian local government elections had low internet voting turnout, with less than 2 percent of votes cast online. Remote voting increased on average 4.3 percentage points at each election between 2005 and 2015. The highest remote voting turnout was at the 2014 European Parliament elections; 31.4 percent of votes were cast online, and 30.4 at the 2015 Riigikogu elections.

ESTONIA'S ELECTRONIC ID CARD

Estonia's success making their public services available online is first and foremost based on the widespread use of electronic identification cards.

THE ESTONIAN NATIONAL ELECTORAL COMMITTEE EXPLAINED:

"Since 2002 about 1.2 million of these credit- card sized personal identification documents have been issued, allowing citizens to digitally identify themselves and sign documents or perform actions. ID- cards are compulsory for all citizens and they are equally valid for digital and physical identification. Due to their convenient size (unlike a passport they fit into a regular wallet) they are often used as the only identification document that people carry around. Physically, they are valid for identification in Estonia, but more importantly, they are also valid for travel in most European countries. Thus, in addition to their primary functionality – digital identification – ID- cards can be effectively used as replacements for traditional identification documents".

HOW THE SYSTEM WORKS

To vote, Estonian electors need access to a computer with an internet connection and a "smart- card reader", which are inexpensive and widely available. Citizens may also access e- voting in public libraries, community centres and anywhere with a secure internet connection. As of 2011, citizens can also electronically identify themselves with a so-called "Mobile- ID". This is a SIM card with security certificates and two pin codes. With Mobile- ID "setup citizens can officially identify themselves using only their mobile phone. The ID card is however still the most widespread method of digital identification".

Remote voting is available during the advance voting period, or early voting period, via a website hosted by the Estonian National Electoral Committee (from 2005 to 2011). Advance voting is available for seven days for in person advance voting, and 10 days for remote voting.

To vote online; "...people are required to insert their digital ID card into a smart reader connected to an internet equipped computer. They then need to download a voting app which is a standalone program for Estonian remote voting. Using their ID- card and a four- digit pin, the user has to first verify their identity, after which the system checks whether the voter is eligible according to age and citizenship to vote in the election. If affirmed, the e- voting system displays the list of candidates in the voter's district. Voters can then browse the list of candidates and decide for whom to vote for. In order to cast a remote vote, the voter has to choose a candidate and provide a separate five- digit pin to vote.

When certified correctly, the electronic vote is cast and sent to the server where it will be counted at an appropriate time, i.e. as prescribed by the procedures for online voting".

A voter can vote again as many times as they like until the close of voting; the system will record their last vote. This provision is designed to prevent coercion. Verification In 2013 Estonia introduced the feature of individual vote verification to the e- voting system. This gave individual voters the ability to verify whether their e- vote was: cast- as- intended and recorded- as- cast. This option has now been available in three consecutive elections, the 2013 local government elections, 2014 European Parliamentary and 2015 national elections. As noted in Chapter Two, vote verifiability is a crucial element in ensuring a so-called end- to- end (E2E) verifiable voting system. E2E verifiable systems add another layer of security and should ensure the integrity of the voting process. The definition of an E2E verifiable voting system is quite strict. The Estonian National Electoral Committee notes "it does not yet meet that of a fully implemented E2E system; it does however give individual voters the possibility to check if their vote was cast and counted as intended".

Verification is based on a QR code. A voter can download a separate program "from Google Play and check that the system has correctly recorded how they voted by scanning the QR code. This can only be done for approximately 30 minutes after voting. If the vote has been recorded incorrectly, the voter can phone a hotline to notify the election officials that their vote has been recorded incorrectly. If required, electoral officials will then inspect the computer used to cast the vote".

Verification rates have been low in Estonia and are similar to NSW's iVote verification rates. At the 2015 Estonian elections 4.7 percent of voters verified the vote. The Estonian National Electoral Committee was sufficiently satisfied that there was no large-scale manipulation of votes. The committee also notes that the number of verifications in 2015 was roughly the same as the total number of remote votes at the 2005 Estonian local government election.

USER PERCEPTIONS

The Estonian National Electoral Committee's report does not feature commentary about user perceptions of Estonia's remote voting system, other than to say that there is widespread support for remote voting amongst many age groups. Beyond this, comprehensive survey data does not exist to provide detailed insights.

IMPACT OF REMOTE VOTING ON VOTER TURNOUT

The committee notes that there is a vast literature addressing the turnout effects of Estonia's remote voting system. In general, remote voting turnout has followed a linear trend, rather than an exponential one. This means that the conversion from paper- ballot voters to e- voters was almost constant over time, i.e. there were no rapid growth periods at certain thresholds.

Quantitative research by the Estonian National Electoral Committee also found particular demographic patterns for remote voting in Estonia. During the first three elections with electronic voting in 2005, 2007 and 2009, remote voting was predominantly used by "younger tech savvy people...and a substantial non- random segment not using it".¹⁷³ The data showed "that in the first three e- enabled elections, e- voters were indeed clearly distinct, they were younger, with better computer skills and mostly ethnic Estonians".¹⁷⁴ However, from the third election onwards compositional differences "started to disappear, meaning that e- voters became progressively less distinct from regular paper voters". In 2016 the Estonian National Electoral Committee concluded that: "by now we effectively cannot differentiate between e- voters and paper voters based on a list of socio- economic characteristics and can safely say that remote voting has become a tool of the masses, with all quite heterogeneous social groups engaging in this type of voting".

WHY HAS ELECTRONIC VOTING BEEN SO SUCCESSFUL IN ESTONIA?

During its meetings in Estonia the committee learnt that four characteristics in Estonia have contributed to the success of electronic voting. These are:

- Widespread internet penetration; 80 percent of the Estonian population has access to the internet and associated access to a smart card reader;
- That the legal framework for remote voting developed incrementally, giving Estonia's electoral authorities ample opportunity to 'stage' the system's development, consult with relevant stakeholders and inform the public at relevant stages about the system and what remote voting would involve;
- Estonia's unique digital identification system, and the broader Estonian digital ecosystem; and
- Strong political support for remote voting from the earliest stages of its adoption".

CHAPTER-6: REVIEW OF INTERNATIONAL DIGITAL / ELECTRONIC VOTING

The election commission of India has maintained a credible data store with regard to the adoption of Digital/Electronic voting methods worldwide. The above cited status paper on EVM's in India³¹ contains a high level international comparison which is reproduced below.

INTERNATIONAL COMPARISON

"A point is raised from time to time that several foreign countries have discontinued the use of voting machines and why India is using EVMs. With the rapid advances in technology over the years, Election Management Bodies, professionals, experts, and activists (particularly Green Activists) have mooted the idea of using paperless electronic voting methods in different parts of the world in order to overcome the disadvantages of manual marking of paper ballots. The marriage between technology and election management goes back to at least 1892, when the first 'lever voting machine' was used in New York, after using the paper ballot for a long time. In the 1960s, punch-card machines were introduced in the USA, and the first AVM was introduced there in 1975. Electronic Voting has moved quite ahead since then [...]"

THE NETHERLANDS

Electronic Voting was used in The Netherlands between 1990-2007. The voting machines were manufactured by a private Dutch-company called NEDAP (Nederlandse Apparaten Fabric* NV). In 2006, the government ordered an independent testing of the voting machines. Two independent commissions, The Voting Machines Decision-making Commission and the Election Process Advisory Commission (EPAC) were also established on December 19, 2006 and January 18, 2007, respectively, to review the security and reliability features of NEDAP machines.

Following the observations of the two Commissions, the use of NEDAP machines and electronic voting was discontinued in 2007 on the following grounds:

- The Ministry of Interior and Kingdom Relations (0110.) of The Netherlands lacked adequate technical knowledge vis-à-vis the NEDAP machines, leading officials to depend on external actors for the conduct of elections.
- Technology vendors became part of the decision making process and the ministry was not in a position to exercise effective oversight.
- The Dutch Organization for Applied Scientific Research (Toegepast Natuurwetenschappelijk Onderzoek, TIRO) certified and tested these machines following "outdated standards" which were not immune to modern IT and security threats.

³¹ *Supra*, Note-1.

- Moreover, the certification and testing reports were not made public, depriving independent experts to verify the analysis.
- The legal framework, particularly the necessary security requirements, was inadequate to deal with the specificities of the electronic voting process.

GERMANY

In Germany, the e-voting machines manufactured by NEDAP were used in between 2005

- 2009 before it came under criticism and finally discontinued. The Bundesverfassungsgericht (the Federal Constitutional Court of Germany) ordered the discontinuation of the use of NEDAP machines in 2.009 because of the below-mentioned reasons:
- The use of Nedap electronic voting machines violated the principle of the public nature of elections (Article 3g in conjurictio-n with Article 20.1 and 20.2 of the Basic Law) that requires that all essential steps in the elections are subject to public earning ability unl es s other constitutional interests justify an exception,
- It also observed that "it must be possible for the citizen to check the essential steps in the election act and in the ascertainment of the results reliably and without special expert knowledge".

IRELAND

NEDAP machines were used in Ireland between 2002 and 2004. The use of these machines were questioned following which two independent commissions were set up. The two Commissions on the Secrecy, Accuracy and. Testing of the Chosen Electronic Voting System, concluded the NEDAP machines could not be used in elections ill Ireland on the following grounds:

- Inadequate technological safeguards
- Insecure transfer of data by the use of Gds
- Absence of a comprehensive independent end-to-end testing, verification and certification by a single accredited body
- Inconsistencies in physical security of machines across constituencies
- Absence of a clear policy guideline via-a-vis storage, transport, set-up, use and disposal °Noting equipment; and

- Absence of comprehensive electronic register to record the identity, location and movement of the electronic voting devices”.

A more detailed, country wise analysis of some prominent democracies’ attempts at adoption of electronic/digital voting methods is contained in the report of the inquiry committee of the Parliament of Victoria, Australia, cited above. It bears reproduction as follows: -

“While several Australian jurisdictions have some form of electronic voting system, as seen in Chapter Three, Australia is not the only country to have adopted electronic voting for periodic elections. According to the International Institute for Democracy and Electoral Assistance (IDEA), 15 countries have a form of polling place, ‘closed’, electronic voting system, and 20 countries have attempted some form of remote voting, or ‘open’ system, trial (IDEA 2016, p.2). Prior to the implementation of NSW’s iVote system at the 2015 NSW state election, Estonia was the world’s largest remote voting, or ‘open’, electronic voting system, with nearly 30 percent of votes cast this way at the 2015 Estonian parliamentary elections. This chapter considers evidence the committee gathered as part of its 2016 study tour. The chapter examines evidence from Estonia, focusing on remote voting, Denmark, the United Kingdom and some jurisdictions in the United States of America and New Zealand.

DENMARK

ORGANISATIONS WITH WHOM THE COMMITTEE MET

The committee met with representatives from the Municipality of Copenhagen, including the head of Copenhagen's Electoral Division, the Ministry of Economic Affairs and the Interior – Electoral Division, Ministry of Social Affairs and academics from the Centre for Voting and Political Parties, University of Copenhagen.

DENMARK’S ELECTORAL SYSTEM

Denmark has had a unicameral parliament since 1953. (Prior to that the Folketing was the lower house of a bicameral parliament. This was amended following a constitutional referendum.) The parliament has 179 members: 175 are elected in Denmark, two in the Faroe Islands and two in Greenland. The country is divided into 10 multi- member constituencies (which in turn are divided into districts). Each constituency is assigned a set number of seats. A total of 135 seats are distributed in proportion to the votes in each constituency”. The other 40 seats are supplementary, and allotted to balance any difference between district- level results and the nationwide vote share. This is meant to ensure that the number of seats each party secures matches as closely as possible each party’s vote share, in accordance with Denmark’s constitution which requires not only regional representation but “equal representation of the various opinions of the electorate”.

DISCUSSION ABOUT ELECTRONIC VOTING IN DENMARK

The committee learnt that while the Danish Parliament has discussed electronic voting, Denmark has not adopted electronic voting. Electronic voting was initially proposed in Denmark in 1996 by the Progress Party, which was at the time a minor party. The proposal was for kiosk voting at polling places and telephone and computer voting from home. While there was not widespread political support for the initiative, the then Danish Interior Minister, Berthe Weiss, supported some local government experiments with electronic voting.

The committee learnt that the introduction of electronic voting systems is not considered a realistic option for the time being. The mayors of eight of the largest urban municipalities in Denmark addressed the former Minister for Social Welfare in 2008 requesting the Minister to take steps to contribute to the creation of the necessary statutory authority that would enable the municipalities to carry out a pilot project on electronic voting at polling stations, i.e. non- remote voting. However, the then Danish government decided to turn down the municipalities on the grounds of being opposed to a replacement of the current public control with the counting and final counting of votes with a more sophisticated control of the electronic counting of votes that only specialists knowledgeable of IT- systems could reasonably undertake. Security was also cited as a concern. The then Danish government also stated that it wished to await further experiences with remote voting in other countries before it wished to embark on pilot projects.

More recently, remote voting was most discussed during the legislation process following the introduction of electronic electoral registers for Danish elections. During Bill debate in the Folketing, remote voting was found to contravene one of the principles of Danish election legislation – that a “voter’s casting of his or her vote shall be monitored by election authorities in the sense that an election official shall be present to ensure not only the identity of the voter before he or she is allowed to vote, but also that the vote is cast without giving others the opportunity to see how the voter has voted”.¹⁷⁸ The secret vote in Denmark is more than just a right; maintaining it is also a duty imposed on electoral authorities. The only circumstances where this right is circumvented is when electors need assistance to vote “due to disability, poor health, or for similar reasons”.

UNITED KINGDOM

ORGANISATIONS WITH WHOM THE COMMITTEE MET

During its time in the United Kingdom the Committee met with representatives from the UK Electoral Commission to discuss the British experience with electronic voting, and the Hansard Society. The Hansard Society was founded in 1944 to promote democracy and an engaged citizenry both in the UK and worldwide. The UK Electoral Commission was established in 2000. It is an independent body which oversees elections and regulates political finance in the UK. The Commission is overseen by ten Commissioners — six Commissioners must be non- partisan, and four Commissioners have party political experience. The Commission has 125 full time

staff and is accountable directly to the Parliament, not the Government, by reporting to a Committee of the House of Commons chaired by the Speaker. The Commission has a role in elections which is largely advisory, assisting returning officers to ensure the elections are well run and reporting on their performance. The Commission is also a regulatory body for party registration and party finances. Prior to the establishment of the Electoral Commission, parties were registered as companies.

THE UK'S ELECTORAL SYSTEM

There are six types of elections in the United Kingdom: United Kingdom general elections, elections to devolved parliaments and assemblies, elections to the European Parliament, local elections, mayoral elections and Police and Crime Commissioner elections. Elections are held on Election Day, usually a Thursday. Since the passing of the Fixed-term Parliaments Act 2011 for general elections, all six types of elections are held after fixed periods, though early elections to parliament and the devolved assemblies and parliaments can occur in certain situations. The UK has six different electoral systems: the single member plurality system or first past the post, the multi member plurality system, party-list proportional representation, the single transferable vote, the additional member system and the supplementary vote. Elections are administered locally; in each lower-tier local authority, the actual polling procedure is run by the Returning Officer and the compiling and maintenance of the electoral roll by the Electoral Registration Officer (except in Northern Ireland, where the Electoral Office for Northern Ireland assumes both responsibilities). Unlike Australia, where electoral commissions have a statutory responsibility to run elections, the Electoral Commission does not run elections. The Electoral Commission only sets standards for and issues guidelines to Returning Officers and Electoral Registration Officers, but is responsible for nationwide electoral administration, such as the registration of political parties and directing the administration of national referendums.

VOTING IS NOT COMPULSORY IN THE UK

The 2001 UK Parliament election had a record lowest turnout of 59.3 per cent. Since that election the Electoral Commission has played a public awareness role to encourage turnout, particularly with younger voters.

ADVANCE VOTING AND POSTAL VOTING

In the UK, advance voting is limited to postal voting. There is no attendance advance voting. Postal voting has been available on demand since 2001 (other than in Northern Ireland). A voter must supply their signature and date of birth when they apply, which are then used for verification. Approximately 17 to 18 percent of electors chose to vote by post, and the turnout for postal voters is much higher - approximately 86 per cent of ballots are returned. Postal votes must be received by 10.00 pm on polling day. Late postal votes are not accepted, as finality is prioritised over counting every vote. There have been no reported problems with mail delays within Great Britain itself, but delays can be an issue for overseas voters due to the 25- day time period for an election.

ELECTRONIC VOTING PILOTS

Soon after its establishment, the UK Electoral Commission played a key role in evaluating e- voting and e- counting pilots. The UK Government established a framework under which local government areas could apply to trial new methods of voting or vote counting in local elections. Funding was provided by the UK Government and each local government area could choose an option to try from the list of approved methods. Some of these included internet voting and phone voting.

The Electoral Commission assessed the pilots against certain criteria:

- Did it make voting or counting easier?
- Did it improve turnout?
- Did it help facilitate voting?
- What was the impact on electoral fraud?
- What was the impact on cost?

Overall, the Commission found the pilots were not well managed and there was insufficient lead in time for planning and implementation. Some systems were still being tested just weeks before the election. The Commission also found many of the quality and testing arrangements were inadequate, and in one case the electronic voting system failed on election day and people had to use a paper ballot instead.

Some other key findings included:

- Many voters reported electronic voting was more convenient, although some issues were experienced with preregistration;
- The take up of electronic voting was linked to whether it was available on polling day. The lowest uptake was in Sheffield because it was only available for advance voting but not on election day itself (approximately 3 per cent) much higher elsewhere (16 or 17 per cent) when it was available on polling day;
- There was no discernible impact on turnout; the majority who voted were likely to have voted anyway. However, this was contradicted by local surveys which suggested 25 to 30 per cent of those who voted electronically would not have voted if electronic voting channels were not available;
- There were no security incidents, but the risk was higher than it should have been; and
- There were wide variations in cost, but that was largely because the pilots did not have the benefit of economies of scale. In Shrewsbury, each vote cast electronically cost £625. There have been no further applications for pilots since 2007. However, electronic counting has been used for the elections for the London Assembly and Mayor of London.

SPEAKER'S COMMISSION ON DIGITAL DEMOCRACY

The Commission on Digital Democracy was established by the Speaker of the House of Commons to explore how Parliament could make better use of digital technology to enhance and improve its work. One of its targets is that by 2020, secure online voting should be an option for all voters. The UK Commission is examining the significant work that would need to be done to implement this including examining the preconditions for internet voting, security, reliability, accessibility and cost issues. To realistically implement internet voting for the 2020 election, legislation would need to be put in place by 2019.

ATTITUDES TOWARDS ELECTRONIC VOTING

The Hansard Society recently completed an audit of political engagement. The audit also assessed attitudes to electronic voting.

One of the Society's key activities is an annual audit of political engagement. It is a time-series study providing an annual benchmark to measure political engagement in Great Britain, gauging public opinion about politics and the political system, and more broadly the general health of its democracy. With voting being optional in the UK, one of the engagement indicators the Society measures is the likelihood to vote. Following a decrease in the number of people stating they were likely to vote to 41 per cent in 2013, this has risen to 59 per cent likely to vote in 2016. This has been impacted by a series of key votes, including the referendum on Scottish

independence in 2014, a general election in 2015 and the Brexit referendum in 2016, which have generated considerable public interest. As part of its 2015 audit, the Society examined the question; "What might encourage us to vote?". It looked at attitudes toward alternative voting methods and whether they were likely to increase participation. Online voting scored the highest with 45 percent of respondents stating that it would encourage them to vote. This is contrasted with 26 per cent who supported compulsory voting and only 11 per cent who supported an all postal election. The audit also showed that younger voters are more likely to support online voting than older voters (49 per cent of under 55s compared to 37 per cent of over 55s).

UNITED STATES OF AMERICA

ORGANISATIONS WITH WHOM THE COMMITTEE MET

The Electoral Assistance Commission (EAC) is an independent agency of the United States government created by the Help America Vote Act 2002 (HAVA). The Commission serves as a national clearinghouse and resource of information regarding election administration. It is charged with administering payments to states and developing guidance to meet HAVA requirements, adopting voluntary voting system guidelines, and accrediting voting system test laboratories and certifying voting equipment. It is also charged with developing and maintaining a national mail voter registration form. Following the 2000 US presidential election and its many logistical issues, including the 'hanging chads' controversy in Florida, the US Congress passed a bipartisan measure, the Help America Vote Act of 2002 (HAVA), in order to reform many facets of the voting process and increase voter education and turnout. HAVA led to the replacement of voting machines, voter registration reform, better access to voting for the disabled and a new regime for poll worker training. Congress established timelines for implementation and federal funds were provided to help with the process.

VIRGINIA

The committee also met with three different local government authorities in the Commonwealth of Virginia – the Alexandria City Board of Elections, Arlington County Board of Elections and Fairfax County Board of Elections. Alexandria City is a local government area within the Commonwealth of Virginia and has approximately 86,000 registered voters. The Virginia Department of Elections provides overall guidance on elections and certifies electoral equipment, but each local jurisdiction can choose which equipment it uses. Arlington County is another local government area within the Commonwealth of Virginia. It was an early adopter of electronic voting, changing from lever machines to electronic voting in the 1990s. Fairfax County is the largest county in the Commonwealth of Virginia. It has approximately 730,000 registered voters and 650,000 active registered voters. On Election Day, Fairfax County has 243 precincts where votes can be cast.

NEW YORK

In New York the committee also met with the New York State Board of Elections, the United Nations Electoral Assistance Division and the Brennan Centre for Justice, New York University. The New York State Board of Elections is a bipartisan agency of the New York state government within the New York State Executive Department responsible for enforcement and administration of election- related laws. The United Nations Electoral Assistance Division, housed within the Department of Political Affairs, exercises key functions to ensure coherence and consistency within a broad array of UN entities working to provide United Nations electoral assistance in the field. The Brennan Centre for Justice, New York University, is a non- partisan public policy and law institute that focuses on the fundamental issues of democracy and justice.

US ELECTORAL SYSTEM

The United States is a federal republic, with elected officials at the federal (national), state and local levels. On a national level, the head of state, the President, is elected indirectly by the people of each state, through an Electoral College. State law governs the running of elections, and local government authorities, or counties, usually oversee the administration of elections and voting systems. Given that there are 3,144 counties in the United States, there are thus thousands of different, potential electoral 'configurations'. Electronic voting in the United States Electronic voting is widespread in the United States. At the 2016 US general elections, the Pew Research Centre estimates that nearly half of registered voters (47 percent) "lived in jurisdictions that use only optical- scan as their standard voting system, and 28 percent lived in direct record- only jurisdiction. Another 19 percent of registered voters live in jurisdictions where both optical- scan and DRE systems are in use.

TYPES OF VOTING SYSTEMS

There are a number of different types of electronic voting systems that are used or have been used in the United States:

- Direct recording electronic machines. The voter votes on a machine, and the machine records the result; these machines are usually 'closed' voting systems;
- Optical scanners. The voter votes on pieces of paper, which they then feed through a machine that counts the vote;
- Digital scanners. The voter votes on pieces of paper, which they then feed through a machine that counts the vote and stores a scanned copy of the whole ballot; and
- Ballot marking devices. The voter uses an electronic system to cast their vote, which then prints a paper ballot paper. That ballot paper is then submitted into an optical or digital scanner. For many years following the introduction of HAVA, many

states preferred direct recording electronic machines, which were 'closed' systems. However, over time security concerns were raised, particularly the possibility of election results being manipulated, and the need for results to be auditable. The committee was told that the majority of direct recording electronic machines have now been decertified, and preferred electronic voting systems have a voter verified paper audit trail (VVPAT). This can either be through a printer attached to a direct recording electronic voting machine which generates a paper record of the vote, or optical or digital scanners, where the vote is cast on paper and counted electronically.

There are some EAC certified systems that do not have a paper backup, but they must have a separate record of the vote that can be audited. Some states, such as California, have introduced legislation to require all voting machines to have a VVPAT. The main advantage of electronic systems is the speed and accuracy with which votes can be counted. Most systems also give the voter a warning if their vote is informal, so the systems can assist to reduce voting informality. Most elections held in the United States are first past the post, unlike Victoria which uses preferential or proportional voting. The EAC advised that no preferential voting (or as it is called in US, ranked voting) system has been certified against the VVSG. There would be significant challenges developing such a system, as each voting machine is separate and results are generally tabulated manually from the results reported from each polling place. Given this, it is not possible to accumulate votes across different polling places to accurately determine a result through preferential voting. Furthermore, as elections are run at a local level, often machines differ across jurisdictions within the one state. Unless the machines were compatible, this may cause issues for a preferential or proportional result across the whole state.

NEW ZEALAND

In February 2016 the committee met with several organisations to discuss New Zealand's consideration of electronic voting, focusing on online voting. Appendix 4 lists the organisations and individuals the committee met with.

LOCAL GOVERNMENT TRIALS

The committee met with the New Zealand Parliament's Justice and Electoral Committee. Both committees discussed how a potential pilot of remote 'open' system electronic voting was first raised in 2010 in the New Zealand Parliament's Justice and Electoral Committee report into the 2010 local authority elections. The report recommended that the Government consider a trial of online voting at the 2013 local authority elections. The committee was also told that local authorities have pressured for regulatory change to allow online voting at local authority elections.

Following this report, on 4 September 2013, the New Zealand government established a working party to "consider the feasibility of online voting in local elections. The Online Voting Working Party's membership included representatives from across government (including the Department of Internal Affairs), local authorities, and information technology experts".

The working party released its final report in August 2014. The report noted that "changing expectations of how people want to access public services is a major driver of the need for innovation and a transformation in service delivery. The way that electors vote at local authority elections is also subject to changing expectations".¹⁸⁴ As a result of this, and other considerations, the Working Party advised that:

- Trialling online voting at the 2016 local government elections was feasible;
- There were several benefits to online voting, including improving overseas access to voting, making voting easier and more convenient, and reducing voter errors;
- There should be a coordinated approach between local and central government to oversee a trial, and then implementation, of online voting; and
- There should be a practical pathway to ensure online voting at the 2016 local government trials. The Working Party advised that the trial would involve a single online voting system tested by a range of councils, wards and "District Health Boards to fully test its performance and functionality. The precise nature of the trial was not determined by the Working Party"; this was left to the NZ government to propose.

Following this report, on 9 December 2014, Associate Minister of Local Government, the Hon Louise Upston MP announced the Government had agreed to continue work to enable a small number of local authorities to trial online voting in the 2016 local elections. Eight councils had expressed interest in trialling online voting at the 2016 local elections: Selwyn, Wellington, Porirua, Masterton, Rotorua, Matamata- Piako, Palmerston North and Whanganui. Further, on 16 November 2015, the Associate Minister announced the next steps for the proposed trial of online voting. The eight councils above were invited to demonstrate they can meet requirements for an online voting trial. The Minister also issued an updated set of requirements for councils. Some of these conditions included:

- All electors in an election for which online voting is being used must be provided with an opportunity to “sign up to receive confirmation to find out if an online vote has been received and recorded under their name, and must be notified of this opportunity”.¹⁸⁷ This opportunity “must be provided separately from the casting of a vote online, and provided regardless of whether and how an elector chooses to vote”;
- Removal of requirement for automated solutions for vote verification. The electoral officer in charge of the online voting trial was charged with keeping a copy of the verification in case this was requested by the elector;
- Ensuring that the online voting ID, and access code, were distributed to electors separately; and
- Several other procedural, administrative and technical amendments to the system requirements.

Despite this, in April 2016 Associate Local Government Minister the Hon Louise Upston MP announced that the online voting trial proposed for this year’s local body elections would not proceed. The committee notes the Minister’s justification for stopping the trial. She said “that voting is a fundamental right of New Zealand citizens and public trust in electoral systems and results is paramount. Maintaining public confidence and understanding of local electoral processes is more important than trialling online voting this year”. The Minister also committed New Zealand to learn more about online voting and did not rule out a trial at a future New Zealand local government election.

ELECTORAL PARTICIPATION AT NEW ZEALAND ELECTIONS

The committee also met with the Electoral Commission of New Zealand to discuss national approaches to encouraging electoral participation at New Zealand elections. The committee learnt that voter turnout at New Zealand parliamentary elections is falling sharply, due to a lack of compulsory voting and other factors. At the 2011 election, “turnout as a percentage of those eligible to enrol dropped to 69.57 percent, the lowest recorded at a New Zealand Parliamentary election since the adoption of universal suffrage in 1893”.¹⁹¹ The 2014 result, 72.14 percent, is the second lowest. The Electoral Commission noted that New Zealand has a major problem with declining electoral participation.

One of the major ways which the Electoral Commission has attempted to encourage electoral participation is through advance voting, or early voting. Overall, 29.3 percent of those who voted in 2014 did so before Election Day (compared with 14.7 percent in 2011). More people “voted in the last three days of advance voting than in the entirety of the advance voting period in 2011. The ability to vote early proved popular across all electorates and age groups and we can expect further substantial growth in 2017”.

As noted in the Electoral Commission’s report on the 2014 New Zealand general election, the size of the increase “was a surprise to the Commission. Before 2014,

the numbers voting in advance had increased significantly (by about 25 percent on average) from election to election. In 2014 the number increased by 100 percent".¹⁹⁴ The Commission told the committee that commission staff were very pleased with the increasing turnout, as this indicated a positive acceptance for early voting.

The Electoral Commission also told the committee that electronic voting was not a priority for the Commission, or New Zealand in general, for the 2017 parliamentary elections. New Zealand would nevertheless follow developments in electronic voting overseas and particularly in Australia and NSW's iVote system".

NORWAY

In 2008 the Norwegian parliament authorised trials of electronic voting in Norway. This led to trials of electronic voting from home during the 2011 local elections and 2013 parliamentary elections.

To understand certain choices made during these trials, it is necessary to understand the Norwegian electoral system and what Norwegians consider important about elections. These topics are discussed in Sections 5.2 and 5.3. The Norwegian government wanted to buy a suitable electronic voting system. This process is discussed in Section 5.4. Eventually, a vendor was chosen, but we were not entirely happy with the vendor's electronic voting system. Section 5.5 discusses why we were unhappy and what remedy we chose. Eventually, the electronic voting system was deployed. The results are discussed in Section 5.6. Norway has four different elections: municipal, county and parliamentary, as well as elections to Sametinget, a representative body for the Sami.¹ While the elections share certain common features, there are important differences. Before an election, each participating political party nominates a list of candidates. The voter chooses one of these party lists to submit as his ballot. Before submission, the voter may modify the ballot. In municipal elections, the voter may modify the list by marking specific candidates (so-called personal votes) or writing in candidates from other party lists. (Note that arbitrary write-ins are not allowed.) In county elections, the voter may modify the list by marking specific candidates (so-called personal votes), but may not write in candidates from other party lists. In parliamentary elections and elections to Sametinget, voters may modify the list by reordering or deleting candidates. For all the elections, the political parties are essentially awarded seats in proportion to the number of ballots they receive. (For parliamentary elections, multiple representatives are elected for each district.) The elections differ in how list candidates are ranked after the election. For municipal elections, candidates are ranked by the number of times they are marked by their party's voters or written in by other parties' voters".

There are still other countries which have/are experimenting with different forms of electronic/digital voting. A profitable reference may be made to the observations of ECI in its status paper on EVM's.

"In Brazil, the machines used in elections are called 'electronic ballot boxes' which are stand-alone direct electronic recording systems. In Venezuela, SATIS

(Smartmatic Auditable Election Systems) voting machines are used which were fully implemented across the nation in 2004. [...].

CHAPTER-7: OPEN RESEARCH CHALLENGES

From the above appraisal, it is evident that there are many research gaps with regard to the use of modern technology in the field of elections. Moreover, it is abundantly clear that while technology is advancing in leaps and bounds the law is slow to catch up. It is also clear from an Indian experience technology and the law must move hand in hand i.e. the technological architecture must rest upon a solid framework of laws adapted to these technologies and robust jurisprudence thereupon.

Crucially, several research gaps in the legal literature are identified, notable among which are stated as follows: -

1. Though the Indian legal framework of elections has adapted to the introduction of EVM's by way of insertion of section 61-A of the Representations of People Act, 1951, the present laws governing Information Technology and Electronic Telecommunication, such as the Information Technology Act, 2000 and the Telecom Regulatory Authority of India Act, 2000, are inadequate for the adoption of Internet Voting/Elections. Consequently, more research is necessary to compare and evolve an optimal legal framework if India is ever to consider Internet Voting/Elections.
2. Furthermore, the law enforcement architecture, which is already creaking under a load of ever-increasing cybercrime, also requires an upgrade if India is to consider Internet Voting/Elections. A comparative analysis of foreign law enforcement agencies in democracies in which Internet Voting has already been adopted, such as Estonia, New Zealand, etc., is also merited.
3. The prospect of Internet Voting also has extensive overlap with the domains of privacy and technology. Presently, this overlap is regulated by the architecture of laws Information Technology Act, 2000 and Information Technology Rules 2021. Despite several attempts at the Data Protection Bill, which has undergone several iterations and amendments, has still not been enacted. Consequently, instead of the specificity of a statute, this overlap is instead governed by the amorphous though extensive pronouncement on privacy by the Supreme Court in the matter of K.S.Puttaswamy³². Therefore, the legal architecture of data privacy protection particularly when considered in light of the sanctity of the secret ballot.
4. The issue of whether the adoption of modern telecommunication technologies in the conduct of elections advances the cause of freedom and democracy and overlaps with fundamental rights also merits deeper studies.
5. New issues are emerging with the consolidation of existing technologies. One recent illustration of this is the Election Laws (Amendment) Act, 2021 which requires that the data on electoral rolls be linked with the existing Aadhaar

³²Justice K.S.Puttaswamy (Retd.) v. Election Commission of India & Anr, 2017 10 SCC SCC 1

ecosystem which is the largest unique biometric identification system of citizens in the world. The changes in the Representation of People Act, 1951 introduced by the above amending act merit serious consideration from the perspective of potential conflict with the concept of Universal Adult Franchise as enshrined in the Constitution of India in Article 326.

The above open research challenges have been included in this appraisal with a view to promoting deliberations and research in the new and emerging sectors of election laws and technology. The idea is to highlight critical gaps in research and literature that are required to be addressed for our nation and its polity to make an informed choice, in the cause of the advancement of freedom and democracy.

CHAPTER-8: CONCLUSION

This research has uncovered some facets that are key to understanding the inevitable overlap or intersection between the fields of technology elections and law. To begin with the first revelation has been the fact that there exists a mass of literature that covers this intersection. However, this mass is entirely amorphous. Much research has been carried out in the respective fields though researchers have tended to operate within the silos of their own streams with little to no interdisciplinary research study. Particularly, research from the point of view of law as it pertains to the field of election technology in India is scarce.

Another observation that emerges from this research is about the monumental journey of India from the 100% paper ballot to the 100% electronic vote. The herculean effort undertaken by the Election Commission of India through visionary leadership and institutional momentum is particularly noteworthy. To the point where India has achieved total electronic voting before attaining total literacy, and the credit for engineering the required political consensus goes exclusively to the Election Commission of India. It must be said that the Election Commission might have been less successful in its efforts were it not for the progressive approach adopted by the Supreme Court and the High Courts in India.

This research has also uncovered that there are documented experiences of other democracies worldwide, where they have adopted methods of Electronic/Digital Voting which are different from India's. From the point of view of technology, some of these methods are more advanced than India's and utilise more intensive electronic and telecommunication infrastructure than India. Consequently these countries have also involved their legal frameworks in a manner as to support the technological innovations in elections. These supporting legal innovations merit further study.

It is also pertinent to note that the Covid-19 pandemic has compelled the rapid absorption of modern technology across the world. It is therefore imperative that the impact of the pandemic on the elections held in India and abroad be studied in great detail. Perhaps what began as an adversity to be converted into an opportunity to the adoption of modern technology in elections given the appropriate supporting legal framework.

This research revealed that India's movement from the paper ballot to EVM's, though well conceived, was not backed by adequate legal framework consequently the ECI's first serious experiment with Electronic Voting though practically successful, resulted in a legal setback when the Supreme Court nullified the results of the elections on the grounds of insufficient statutory foundation. The ECI quickly learned from this failed experiment and lobbied parliament to amend the Representation of People Act, 1951 and insert Section 61-A to provide for the necessary statutory backing for EVM's. This was an important lesson that deserves to be imbibed into any roadmap for the future.

Internationally, democracies have experiments with both E-Voting and I-Voting. The countries where the internet voting has been most successful are Estonia and New Zealand. The reasons for their success are worthy of further study. This research has shown that in terms of increasing voter participation and turnout in electoral democracy there is presently no medium better suited than the internet. With one of the highest per-capita mobile smartphone penetration in the world and widespread adoption of Mobile Internet, it may be worthwhile for India to experiment with, and eventually commit to, internet based voting in elections.

Contrary to the trend, some notable democracies have reverted away from already adopted Electronic / Digital Voting Technologies in favour of more traditional, tactile, paper-like, or indeed full paper, balloting. It should be noted that these are some of the most mature, modern democracies such as The Netherlands, some states of the United States of America etc. Their negative experience equally bodes deeper consideration in order to develop a holistic perspective on the use, misuse and abuse of modern technology in elections.

It is worthwhile to mention that in other democracies such as Australia, the United Kingdom etc., it is the legislature which appears to take the lead in conducting research and analysis on the intersection points between the fields of Technology,

Elections and Law. By means of Parliamentary Inquiry Committees, Royal Commissions etc., legislatures in the commonwealth countries lead the way in imparting vision and charting the course towards genuine technological innovations in elections. This process has the added benefit of readymade political consensus as these activities are generally carried out in a bipartisan manner. In India, however, this vision has come from the ECI which is a constitutional body and, ultimately, an autonomous bureaucracy. This puts India at a processual disadvantage. Consequently, one potential solution for this issue that emerges from this research is the establishment of a permanent standing committee on electoral reform in the Rajya Sabha and in all party committees in every Lok Sabha. The terms of reference of such a committee may include the questions of electoral reforms in general and the adoption of modern technologies in elections in particular.

Statistically, a move towards Internet Voting backed by the UIDAI's Aadhaar ecosystem could yield significant cost savings. The majority of the ECI's election budget spent on safety & security of election booths and the deployment, transport and chain of custody of EVM's. Internet Voting can potentially eliminate these vast expenses. On this ground alone, a full scale cost benefit analysis is wholly warranted. Additionally, Information Technology enabled services and platforms may help to significantly mitigate pandemic related health and safety issues.

This research has not advocated any single technological model for Electronic / Digital Elections. However, even a casual perusal of the findings herein will reveal the potential for Hybrid Technological models for Elections. These may include the use of any combination of Electronic / Digital technologies. One of the advantages of such hybrid models could be that elements of the required supporting legal framework may already exist. As such, a hybrid approach may even serve well as an interim step towards the goal of total internet voting.

Today, citizens of the free world interact with each other, transact with each other conduct business with each other and generally performed a significant amount of real world functions online. From paying the electricity bill to ordering baby formula to closing deals worth billions of dollars, a lot happens over the internet. Modern technologies such as block chain have revolutionised even currencies and introduced the whole world to new ways of transacting using digital/crypto currencies. It stands to reason, therefore, that every citizen ought to benefit from the freedom and opportunity of the internet. The most direct benefit of such freedom is undeniably the use of the internet to enfranchise and empower every single voter. It is hoped that, if India seriously considers charting a course towards internet based voting, that this research may be of some use as a starting point of reference and a sincere reproduction of the state of the art.

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