

Use of Technology in Voting: India and EVMS

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Abstract: Voting in India is not only a constitutional right but also is said to be the heart of Indian democracy. The democracy in India is built on the foundation of voting and a new tool of voting has been launched in India. The Electronic Voting Machine which is popularly known as EVM is an economical technological innovation. It is an electronic device which is used to record the cast votes and is used in place of the ballot papers and also the ballot boxes. Earlier, in India, in all elections a voter used to casts vote through ballot papers which is found to be not only a time-consuming process but also it is very much prone to errors. To avoid these errors EVM was introduced and are considered more reliable. This article deals with the overview of the EVM along with the design and technology attached to it. This article also discusses both the advantages as well as the limitation of the use EVMs particularly in the elections of India.

Keywords: Election, EVM, India, Innovation, Paper Ballots, Technology.

I. INTRODUCTION

With the advancement of science and technology, India has also become quite adaptive and changed the culture of voting from using paper ballots to Electronic Voting. Electronic voting means conducting elections using Electronic Voting Machines (EVMs). Thus, the EVM, is an electronic device used for casting votes which aims to make the electoral process secure, fair and transparent.

MB Haneefa was the person who invented the first EVM for India in the year 1980. The industrial designers of the EVMs were the faculty members of the Industrial Design Centre of Indian Institute of Technology (IIT), Bombay. The newly invented EVM was first used in the year 1981 in the by-election to North Paravur Assembly Constituency of Kerala in the 50 polling stations.¹ The EVMs were again used on an experimental basis in India in the elections to 16 Assembly constituencies in Madhya Pradesh, Rajasthan and Delhi which were held in November, 1998. The 2004 Lok Sabha election was conducted entirely in the whole nation on EVMs. The use of the electronic voting system was developed and also tested by the state-owned Electronics Corporation of India and Bharat Electronics in the 1990s.²

I. THE EVMs

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¹ Sangeeta Nair, "How to use EVM in India?", <https://www.jagranjosh.com/current-affairs/how-to-use-evm-in-india-1554967343-1>

² Ashok D. Kumar and T. Ummal Sariba Begum (2017), *Electronic voting machine — A review*, IEEE, doi:10.1109/icprime.2012.6208285.

In India, the system of paper ballot for voting was used till the 1990s. Due to the factors like sheer scale of the Indian elections with large portion of Indian population eligible to vote and increasing election-related criminal activities have led the Indian election authority i.e. the Election Commission and the high courts decided to introduce electronic machines for voting.³ According to a professor of Criminal Justice with a focus on South Asia, Arvind Verma, the elections in India have been marked by election related criminal fraud, booth capturing and ballot tampering since the 1950.⁴ The meaning of the term 'booth-capture' is that where the loyal party members, the groups of criminal as well as also the upper-caste powerful men enter the booths with force in villages and remote areas, and fill the ballot boxes with fake pre-filled paper ballots.⁵ According to the various new reports, this problem grew between the 1950s and 1980s and also became a serious and large scale problem. This problem was further accompanied with violence on the day of election in India.⁶ All these factors have led to the introduction of EVMs for the purpose of voting in India.

The Election Commission of India which was led by T.N. Seshan, sought a solution to all the election related problems by developing Electronic Voting Machines (EVMs) in the 1990s.⁷ The Election Commission also claimed that these devices are designed to prevent fraud in elections.⁸

The Commission further introduced other features such as the EVM initialization procedures just before the elections.⁹ The Officials tested each voting machine in front of the independent polling agents, prior to the start of voting in order to confirm whether the operation of the EVMs are reliable or not. They also added a security lock that is the "close" button in the EVMs which can store and secure the votes that are already been casted in the permanent memory of the device. Along with it, they disabled the ability of the device to accept the additional votes in the cases of any attempt or trial to open the unit or tamper.¹⁰ Additionally, the Election Commission of India also created a database of thumb impressions and electronic voting signatures which is made open for inspection by polling agents, the volunteers and also the outside observers.¹¹ Accordingly, it is believed that these systems have reduced election related crimes in India.

II. DESIGN AND TECHNOLOGY

EVMs used in Indian Elections comprise of two main components, one is the Control unit and the other one is the Ballot unit. The control unit stores and accumulates votes cast which is used by the poll workers and the other unit

³ Arvind Verma (2009), "Situational Prevention and Elections in India", *International Journal of Criminal Justice Sciences*, Pp. 86–89.

⁴ Ibid

⁵ Milan Vaishnav (2017), *When Crime Pays: Money and Muscle in Indian Politics*, Yale University Press, pp. 87, 111.

⁶ N. S. Sakseena (1993), *India, Towards Anarchy, 1967-1992*, Abhinav Publications, 1993, pp. 38–39.

⁷ Milan Vaishnav (2017), *When Crime Pays: Money and Muscle in Indian Politics*, Yale University Press.

⁸ Opicit, Arvind Verma

⁹ "A look inside the electronic voting machine", The Hindu, 10th March, 2019

¹⁰ Electronic Voting Machine, The Election Commission of India

¹¹ Opicit. Madhavan Somanathan



which is known as the ballot unit is located in the election booth and unlike the control unit the ballot unit is used by voters. The two units cannot be separated as one unit cannot work without the other. Thus, these units are connected by a 5-meter-long wire and one end of the wire is fixed permanently to the ballot unit.¹² Both units have numerous tamper-proof protocols. The balloting unit of the EVM has an internal real-time clock attached to it and also a protocol by which it can record every input and output event along with the time stamp when they are connected to a battery. The designers of the EVMs intentionally opted for battery power in the EVMs, to prevent the possibility that the power cables can be used to interfere with the reliable functioning of an EVM.¹³

The EVMs are powered by a 6-volt alkaline battery¹⁴. As several parts of India either do not have the power supply or erratic power supply, the system of using battery in the EVMs was launched so that it can help in using the EVMs throughout the country without any kind of interruptions or delay due to electricity.

The ballot unit of the EVM has provision of buttons for 16 candidates and in the unit, if any candidate button is not in use then the unused candidate button is covered with a plastic masking tab. But when there are more than 16 candidates, which generally happens in almost all the elections of India, the EVM also has the provision of adding additional ballot units with 16 candidate buttons (up to 4 units) on the inside the first ballot unit. After the upgradation in the year 2013, an Indian EVM can host to a maximum of 384 candidates and also the option "None of The Above" (NOTA).¹⁵

The current EVMs that are being used in the elections of India are known as the M3 version which has the Voter Verifiable Paper Audit Trial (VVPAT) capacity attached to the new version of EVM.

I. VOTER-VERIFIABLE PAPER AUDIT TRAIL (VVPAT)

In an all-party meeting, majority of the political parties India supported the proposal to include the VVPAT in EVMs to avoid election tampering. Based on this demand, on 8th October 2010, The Election Commission of India appointed an Expert Technical Committee to examine the possibility of introduction of a paper trail.¹⁶ After going through the whole issue, the Expert Technical Committee recommended to introduce EVMs with VVPAT system.¹⁷ On 19th January, 2012, the Election Commission agreed to add a "paper trail" of the vote cast. This led to the development of a new model of EVM with the feature for Voter Verified Paper Audit Trail (VVPAT). It is claimed that the added feature of the EVM makes it easier to audit and verify the cast votes in case if challenged.¹⁸ With the VVPAT system in the EVM, a casted

¹² Anchal Agarwal, Richa Agarwal, Kirtika Goel (July, 2012), "A Prescriptive Policy Paper on E-Governance", *International Journal of Scientific Research Engineering & Technology*.

Use of Wireless Technology in Electronic Voting Machine",

¹³ "EVMs foolproof, can't be tampered with, says former ECIL chairman"

¹⁴ "ECI Voting Equipments". *Election Commission of India*, Retrieved 10 January 2019.

¹⁵ Lok Sabha elections 2019: Check FAQs related to EVMS", *India Today*, (March 15, 2019)

¹⁶ Ranjan, Rakesh (15 December 2011). "Delhi HC to decide on EVMs". *The Pioneer*.

¹⁷ "EVM with paper trail to be tested in 200 places". *The Times of India*. 1 June 2011.

¹⁸ "All you need to know about VVPAT", *The Hindu*, 17th April, 2017.

vote is recorded in its memory and simultaneously a serial number and vote data is printed out.¹⁹

The Election Commission of India states that the machines with VVPAT are "fully tamper proof". The Election Commission further states that to ensure that the machine's hardware has not been tampered and there are no hidden votes pre-recorded in each machine, along with VVPAT method, immediately prior to the day of election, in the presence of the polling agents, a sample number of votes for each political party nominee is entered into each voting machine. At the end of the sample trial, the votes are counted and matched with the entered sample votes.²⁰ Finally, the new EVM that is the VVPAT added EVM was first used in an election held in Noksen in Nagaland in the year 2013.²¹

III. RESULT AND DISCUSSION

According to an estimate, with the use of EVMs, about 10,000 tons of paper are saved in a national election in India which is the saving of around 2 lakh trees. Thus, the use of EVMs is effective in terms of environment protection. Moreover, eventually in the year 2019, the tentative cost of M3 EVMs has been fixed at about Rs. 17,000 per EVM and this cost is definitely less than the cost of printing the ballot papers, their storage, transpiration and cost incurred on the manpower used to carry ballot papers.²² An Indian EVM is also believed to be very cost effective because a machine once bought can work for around 15 years and accordingly the total cost of an election get reduces.²³

The EVM machines can also be moved easily from one place to another as compared to the ballot boxes. In India, people residing in inaccessible areas can also cast their vote in the elections which in turn provides the right to vote to many peoples of the country. India is a country with huge population and thus large numbers of people come out and vote. This is a good sign of democracy and of course the counting of this large number of votes consume lots of time but the use of EVMs, make the counting of votes very fast. Thus, the shorter time of counting will release the election machinery early and the employees will be able to join their departments early. The EVMs can also keep the conducted vote for a period of up to ten years. So, within these ten years, the re-counting of votes is possible in case of any disputation.²⁴ Furthermore, in a country like India where majority of people are illiterate, they find the use of EVMs easier than using the ballot papers for voting. However, many news reports have revealed that though it's hard to tamper with EVMs but it is not impossible.

A fully-electronic voting systems that are used in India are at high risks for its inability in detecting the inclusion of

¹⁹ New EVMs to have paper trail, *The Times of India* (January 19, 2012)

²⁰ Electronic Voting Machine, The Election Commission of India

²¹ "Nagaland first to use VVPAT device for voting". *Business Standard*. 4 September 2013.

²² Lok Sabha elections 2019: Check FAQs related to EVMS, *India Today*, 15th March, 2019.

²³ What are the Benefits of Electronic Voting Machines in Elections?

²⁴ Ibid

hardware or software which can be used, deliberately or inadvertently, to manipulate election results.²⁵ In India, during and after elections there have always been allegations of voting fraud that comes in degrees and increments. After the introduction of EVMs in India, although some people do believe that tampering with an EVM is totally impossible but some computer scientists have shown demo of tampering such machines in order to prove that tampering can be done easily. The scientists have also said that if people with technical knowledge got the opportunity to access the machines, then they can take the memory card which stores the votes out of the machine and can put a memory card with a virus included in the card which can easily tamper with the real votes. If such thing happens then there will be a fraud on a large scale.²⁶ Moreover, the decision taken by the present government of India not to keep the provision of caretaker government and not to hold general election under a political government and the election commission has further made the decision of using the EVM in elections in India unreasonable and unfair. The Election Commission of India which is responsible for conducting free and fair elections in India is also not beyond criticisms because of its controversial comments and acts from time to time. Accordingly, looking into the political culture of India, it can be said that any company hired for the EVM will be able to use the machines according to the ‘requirements’ of the political party that is in power. A computer software is generally generated from software programming and coding. And it is said that such software can be tampered with though a computer programmer or the person who is a computer expert and to whom the source code is well-known. The main issue here is that if the EVMs are intentionally introduced and concealed, then testing the EVMs for security purpose, is almost impossible.²⁷

IV. CONCLUSION

Till now 31 countries have experienced EVMs but only four countries use it nationwide and three nations have discontinued the use of EVMs. 11 such countries are also there which ran pilot study on the EVMs and decided not to use it. Though in many respects the EVM has advantages over the paper ballot system but when it comes to transparency and verifiability, the paper ballot system is found to be more effective. However, apart from the disadvantages, it can be said that in India the use of EVM in elections has stabilized the situation. On the one hand, the EVMs leave us optimistic, but on the other it also makes us concerned. For the effective, reliable as well as doubtless results, there is the need of further study and new innovations of the EVMs in order to reach all the communities. The election officials should also make more involvement in purchasing the newly innovated EVMs so that smooth, and

secure elections can be conducted in India. Considering all the advantages of the EVM, it can be said the EVM does have many more positive attributes as compared to the paper ballots but the allegations that are continuously being made on the EVM could also not be ignored particularly in a corruption-prone-elections that exist in India.

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²⁵ "Disadvantages of electronic voting", publicissuescomp1220uwi.weebly.com/disadvantages-of-electronic-voting.html

²⁶ "Mass EVM tampering difficult to do: US expert", *Economic Times*, 23rd May, 2019