



Electronic Voting: Issues, Challenges and Strategy

Sangeeta Jain^{1*} and Pradeep Jain²

ABSTRACT

Considering the fact that the General Elections for Parliament and States Assemblies are approaching, this paper discusses the importance of E- voting and EVM machines. As we will see that the use of these machines is so simple and effective, they definitely have the potential to make the coming General Elections the most fair and successful in the history of Democracy of this nation. The malpractices that are rigging our present election system will be removed and most of all the percentage of voting may touch the unbelievably high level which is the real mark of any democracy. This paper tests the effectiveness of electronic voting against the eight essential requirements that any electoral process need to satisfy to make them both free and fair in modern society.

Keywords: EPIC- Electric Photo Identity Card, EVM --Electronic Voting Machine,

1. Introduction

Democracy is the most healthy & participative form of govt. in the world. It encourages collaboration & coordination between public & private systems, citizens & govt .It allows its citizen to participate in the working of the govt .where the power and political sovereignty is exercised by the people through voting. Though the origin of the term E Democracy goes back to tele democracy, cyber democracy in the early 1970s .The term was coined in 1994 by e.democracy.com, the U.S. based Minnesota project. . E-democracy is an electronic form of democracy that enhances the democratic procedures & processes by communication technologies. It makes the public participation & decision making process easy. In earlier days, the term was misunderstood as e- governance .The development of E. Democracy has paved the way for effective and efficient democratic practices. *It is the practice of using information and communication technologies for enhancing the democratic process within the established democratic norms.*

In this era of information technology (I T) every aspect related to human society & development is digitalized... India is the world's largest democracy and E-voting was first experimented in India in 2004 elections. The evolution of E. voting and E.V.M. machine has significant importance in the election system. Following discussion tries to test the effectiveness of the same.

2. E-voting and Electronic Voting Machine

Electronic voting (also known as e-voting) is a term encompassing several different types of voting, embracing both electronic means of casting a vote and electronic means of counting votes. Electronic voting technology can include punch cards, optical scan voting systems and specialized voting kiosks (including self-contained Direct-recording electronic (DRE) voting systems). It can also involve

¹ Matushri Ahilyadevi Institute of Management and Research Indore M.P., India

² Central India Institute of Technology, Indore M.P., India

* *Corresponding Author:* (E-mail : sangeetakhurai@rediff.com, Telephone: +91-731-24345634)

transmission of ballots and votes via telephones, private computer networks, or the Internet .A public network DRE voting system is an election system that uses electronic ballots and transmits vote data from the polling place to another location over a public network. Vote data may be transmitted as individual ballots as they are cast, periodically as batches of ballots throughout the Election Day, or as one batch at the close of voting. Electronic voting technology can speed the counting of ballots and can provide improved accessibility for disabled voters. However, there has been controversy, especially in the United States, that electronic voting, especially DRE voting, can facilitate electoral fraud.

An Electronic Voting Machine consists of two Units – a Control Unit and a Balloting Unit – joined by a five-meter cable. The Control Unit is with the Presiding Officer or a Polling Officer and the Balloting Unit is placed inside the voting compartment. Instead of issuing a ballot paper, the Polling Officer in-charge of the Control Unit will press the Ballot Button. This will enable the voter to cast his vote by pressing the blue button on the Balloting Unit against the candidate and symbol of his choice.



Figure 1: Electronic voting machine & control unit



Figure 2: Electronic Voting Machine

EVMs manufactured in 1989-90 were used on experimental basis for the first time in 16 Assembly Constituencies in the States of Madhya Pradesh (5), Rajasthan (5) and NCT of Delhi (6) at the General Elections to the respective Legislative Assemblies held in November, 1998. EVMs run on an ordinary 6 volt alkaline battery manufactured by Bharat Electronics Ltd., Bangalore and Electronic Corporation of India Ltd., Hyderabad. Therefore, even in areas with no power connections,

EVMs can be used. It can record a maximum of 3840 votes. As normally the total number of electors in a polling station will not exceed 1500, the capacity of EVMs is more than sufficient. It can cater to a maximum of 64 candidates. There is provision for 16 candidates in a Balloting Unit. If the total number of candidates exceeds 16, a second Balloting Unit can be linked parallel to the first Balloting Unit. Similarly, if the total number of candidates exceeds 32, a third Balloting Unit can be attached and if the total number of candidates exceeds 48, a fourth Balloting Unit can be attached to cater to a maximum of 64 candidates.

In case the number of contesting candidates goes beyond 64 in any constituency, EVMs cannot be used. Then the conventional method of voting by means of ballot box and ballot paper will have to be adopted in such a constituency. An Officer on duty is put to cover about 10 polling stations on the day of poll. He will be carrying spare EVMs and the out of order EVM can be replaced with a new one. If the EVM in a particular polling station goes out of order the officer will replace it with a new one. The votes recorded until the stage when the EVM went out of order will be safe in the memory of the Control Unit and it will be sufficient to proceed with the polling after an EVM goes out of order. It is not necessary to start the poll from the beginning. In fact, voting by EVMs is simpler compared to the conventional system, where one has to put the voting mark on or near the symbol of the candidate of his choice, fold it first vertically and then horizontally and thereafter put into the ballot box. It was a very long process while in EVMs the voter has simply to press the blue button against the candidates and symbol of choice and the vote is recorded.

The essential requirements for elections to be conducted freely and fairly are:

- The need to record information and to have the results available quickly. (Timeliness);
- The need to have a system that is accessible to all and easy to use. (Accessibility);
- The need to ensure secrecy of what takes place. (Secrecy)
- The need for voting to be undertaken seriously, after due deliberation. (Deliberation);
- The ability to ensure that each individual's vote is recorded and counted accurately. (Accuracy);
- The need to guard against manipulation and interference with information once recorded. (Security)
- The need to ensure that individuals cannot be impersonated. (Authentication);
- The need to verify what has taken place through the use of traceable information Trails. (Verifiability).

Achieving these objectives raises difficult practical issues where the votes of large numbers of people are to be recorded—although the principles are much the same whether one is recording votes from five-member committee or the entire population of India. India's new electronic system can curb fraud and build faith in the process of elections. India is one of the largest and most successful democracies of the world but there are some very serious faults in the system for example the hijacking of entire polling stations by thugs who stuffs ballot boxes with bogus votes of their favorite candidate.

The need to record information and to have the results available quickly (Timeliness)

The voting through EVM machines makes the system so rapid and simple that it is very convenient for both the urban and rural voter's. While time is extremely important for the urban voter and thus it will solve the problem of the whole electorate of India. Rural and illiterate people have no difficulty in recording their votes and in fact they have welcomed the use of EVMs.

In fact the pace of poll is quickened by the use of EVMs as it is not necessary for the voter to first unfold the ballot paper, mark his preference, fold it again, go to the place where the ballot box is kept and drop it

in the box. What he has to do under the system of EVMs is simply to press the button near the candidate and symbol of his choice.

Counting is very quick and the result can be declared within 2 to 3 hours as compared to 30-40 hours, on an average, under the conventional style.

The need to have a system that is accessible to all and easy to use (Accessibility):

EVMS fulfill both the requirements satisfactorily. It is so handy and involves no risk in its use; working of machine is accessible to all.

An Electronic Voting Machine consists of two Units – a Control Unit and a Balloting Unit – joined by a five-meter cable. The Control Unit is with the Presiding Officer or a Polling Officer and the Balloting Unit is placed inside the voting compartment. Instead of issuing a ballot paper, the Polling Officer in-charge of the Control Unit will press the Ballot Button. This will enable the voter to cast his vote by pressing the blue button on the Balloting Unit against the candidate and symbol of his choice.

The Essential Requirements for Elections to be Conducted Freely and Fairly

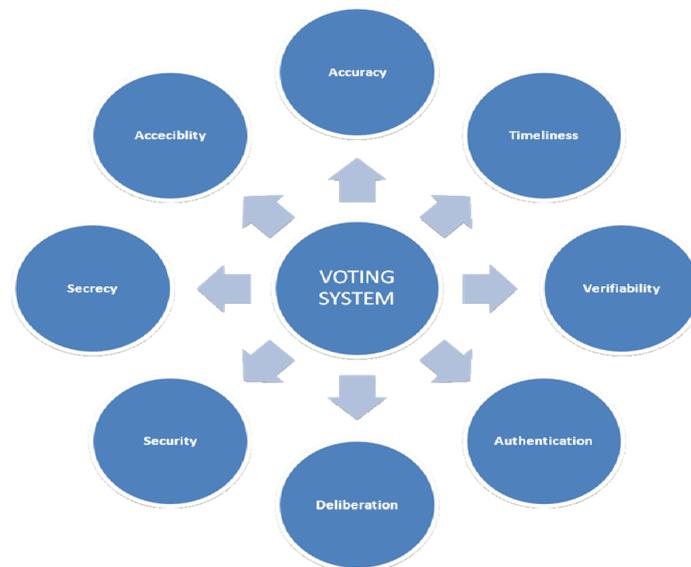


Figure 3: Essentials of Voting System

EVMS run on an ordinary 6 volt alkaline battery manufactured by Bharat Electronics Ltd., Bangalore and Electronic Corporation of India Ltd., Hyderabad. Therefore, even in areas with no power connections, EVMS can be used. There is no need to air-condition room/hall where EVMS are stored. What is required is only to keep the room/hall free from dust dampness and rodents as in the case of ballot boxes. As soon as the last voter has voted, the Polling Officer in-charge of the Control Unit will press the 'Close' Button. Thereafter, the EVM will not accept any vote. Further, after the close of poll, the Balloting Unit is disconnected from the Control Unit and kept separately. Votes can be recorded only through the Balloting Unit. Again the Presiding officer, at the close of the poll, will hand over to each polling agent present an account of votes recorded. At the time of counting of votes, the total will be tallied with this account and if

there is any discrepancy, this will be pointed out by the Counting Agents.

The need to ensure secrecy of what takes place (Secrecy)

The microchip used in EVMs are sealed. It cannot be opened, there is no chance of programming the EVM in particular way to give advantage to any political party. There are other majors also which keep the secrecy of voting. These majors are more than enough to restore the lost faith of Indian voters in the election process.

Before the commencement of poll, the Presiding Officer demonstrates to the polling agents present that there are no hidden votes already recorded in the machine by pressing the result button. Thereafter, he will conduct a mock poll by asking the polling agents to record their votes and will take the result to satisfy them that the result shown is strictly according to the choice recorded by them. Thereafter, the Presiding Officer will press the clear button to clear the result of the mock poll before commencing the actual poll. An Officer is put on duty to cover about 10 polling stations on the day of poll. He will be carrying spare EVMs and the out-of-order EVM can be replaced with a new one. The votes recorded until the stage when the EVM went out of order will be safe in the memory of the Control Unit and it will be sufficient to proceed with the polling after the EVM went out of order. It is not necessary to start the poll from the beginning.

By booth-capturing, if one means, taking away or damaging of ballot boxes or ballot papers, this evil cannot be prevented by the use of EVMs as EVMs can also be forcibly taken away or damaged by miscreants. But if one looks at booth capturing as a case of miscreants intimidating the polling personnel and stamping the ballot papers on the symbol and escaping in a matter of minutes, this can be prevented by the use of EVMs. The EVMs are programmed in such a way that the machines will record only five votes in a minute. As recording of votes has necessarily to be through Control Unit and Balloting Unit, whatever is the number of miscreants they can record vote only at the rate of 5 per minute. In the case of ballot papers, the miscreants can distribute all the 1000 odd ballot papers assigned to a polling station, among them, stamp them, stuff them into the ballot boxes and run away before the police reinforcements reach. In half-an-hour, the miscreants can record only a maximum of 150 votes by which time, chances are the police reinforcement would have arrived. Further, the presiding Officer or one of the Polling Officers can always press the "close" button as soon as they see some intruders inside the polling station. It will not be possible to record any vote when once the 'close' button is pressed and this will frustrate the efforts of the booth-capturers.

The normal rule is to count the votes polling station-wise and this is what is being done when EVM is used in each polling station. The mixing system of counting is done only in those constituencies specially notified by the Election Commission. Even in such cases, the result from each EVM can be fed into a Master Counting Machine in which case, only the total result of an Assembly Constituency will be known and not the result in each individual polling station. The Control Unit can store the result in its memory for 10 years and even more. Wherever an election petition is filed, the result of the election is subject to the final outcome. The courts, in appropriate cases, may order a recount of votes.

The battery is required only to activate the EVMs at the time of polling and counting. As soon as the polling is over, the battery can be switched off and this will be required to be switched on only at the time of counting. The battery can be removed as soon as the result is taken and can be kept separately. Therefore, there is no question of battery leaking or otherwise damaging EVMs. Even when the battery is removed the memory in the microchip remains intact. If the Court orders a recount, the Control Unit can be reactivated by fixing the battery and it will display the result stored in the memory.

It is not possible to vote more than once by pressing the button again and again. As soon as a particular

button on the Balloting Unit is pressed, the vote is recorded for that particular candidate and the machine gets locked. Even if one presses that button further or any other button, no further vote will be recorded. This way the EVMs ensure the principle of "one man, one vote". A voter can be sure that the EVM is working and his vote has been recorded. As soon as the voter presses the 'blue button' against the candidate and symbol of his choice, a tiny lamp on the left side of the symbol glows red and simultaneously a long beep sound is heard. Thus, there are both audio and visual indications for the voter to be assured that his vote has been recorded.

The need for voting to be undertaken seriously, after due deliberation (Deliberation)

This point is related to the political awareness of the Electorate. The responsibility of voters is of great importance. The electorate must be well-informed about the political scenario of the country and have to use their right to vote very cautiously.

The ability to ensure that each individual's vote is recorded and counted accurately (Accuracy)

There is zero error and no invalid votes under the system of voting under EVMs. The importance of this will be better appreciated, if it is remembered that in every General Election, the number of invalid votes is more than the winning margin between the winning candidate and the second candidate, in a number of constituencies. To this extent, the choice of the electorate will be more correctly reflected when EVMs are used. The normal rule is to count the votes polling station-wise and this is what is being done when EVM is not used in each polling station. The mixing system of counting is done only in those constituencies specially notified by the Election Commission. Even in such cases, the result from each EVM can be fed into a Master Counting Machine in which case, only the total result of an Assembly Constituency will be known and not the result in each individual polling station. The Control Unit can store the result in its memory for 10 years and even more.

The need to guard against manipulation and interference with information once recorded (Security)

Booth-capturing, if one means, taking away or damaging of ballot boxes or ballot papers, this evil cannot be prevented by the use of EVMs as EVMs can also be forcibly taken away or damaged by miscreants.

If one looks at booth capturing as a case of miscreants intimidating the polling personnel and stamping the ballot papers on the symbol and escaping in a matter of minutes, this can be prevented by the use of EVMs. The EVMs are programmed in such a way that the machines will record only five votes in a minute. As recording of votes has necessarily to be through Control Unit and Balloting Unit, whatever is the number of miscreants they can record vote only at the rate of 5 per minute.

In the case of ballot papers, the miscreants can distribute all the 1000 odd ballot papers assigned to a polling station, among them, stamp them, stuff them into the ballot boxes and run away before the police reinforcements reach. In half- an -hour, the miscreants can record only a maximum of 150 votes by which time, chances are the police reinforcement would have arrived. Further, the presiding Officer or one of the Polling Officer always press the "close" button as soon as they see some intruders inside the polling station. It will not be possible to record any vote when once the 'close' button is pressed and this will frustrate the efforts of the booth-capturers.

The need to verify what has taken place through the use of traceable information Trails (Verifiability)

The vote is recorded for a particular candidate when he/she presses a particular button on the balloting unit and then machine gets locked. There is no question of revolting .The battery is required only to activate the EVMs at the time of polling and counting. As soon as the polling is over, the battery can be switched off and this will be required to be switched on only at the time of counting. The battery can be removed as soon as the result is taken and can be kept separately. Therefore, there is no question of battery leaking or otherwise damaging EVMs. Even when the battery is removed the memory in the microchip remains intact.

If the Court orders a recount, the Control Unit can be reactivated by fixing the battery and it will display the result stored in the memory.

The need to ensure that individuals cannot be impersonated. (Authentication)

Only a person who is ordinarily resident in a constituency is entitled to be registered in the electoral roll of that constituency. The minimum age for registration of a voter is 18 years. However, such of the non-resident Indian Citizens who are employed under Govt. of India in a post outside India are eligible to be registered as voters. No one is enrolled at more than one place. E. voting has no check for electoral roll. Whereas, Section 61 of the Representation of the People Act, 1951 provides that with a view to preventing impersonation of electors, so as to make the right of genuine electors to vote under section 62 of that Act more effective, provisions may be made by rules under that Act for use of Electoral Identity Cards for electors as the means of establishing their identity at the time of polling.

This Photo identity card will eliminate the bogus voting from the election. The importance of Election identity card is felt in India. The election commission wants photo card for casting vote in the election. Election Commission to direct, with a view to preventing impersonation of electors and facilitating their identification at the time of poll, the issue of Electoral Identity Cards to electors bearing their photographs at State cost, the electors shall produce their Electoral Identity Cards at the polling station and failure or refusal on their part to produce those Electoral Identity Cards may result in the denial of permission to vote; and directing the issue of Electoral Photo Identity Cards (EPICs) to all electors, according to a time bound program ; and Whereas, the Commission has taken note of the fact that over the last few years since the implementation of the program of issue of EPICs was taken up, the election machinery of state have issued these cards to a substantially high number of electors and made all possible efforts, by way of repeated rounds of the constituencies and areas, with a view to issuing cards to the left-out electors; and Now, therefore, after taking into account all relevant factors and the legal and factual position, the Election Commission hereby directs that all electors in each of the Assembly Constituencies going to poll in the current general election, who have been issued with their EPICs, shall have to produce these cards to exercise their franchise, when they come to the polling stations for voting.

The Election Commission will, however, permit the electors who have not been issued their EPICs to vote provided their identity is otherwise established by the production of any of the alternative documents:-

This Photo identity card will eliminate the bogus voting from the election. Millions of rupees spent but did not fetch good result. Only few million people got the card and there is no multipurpose for the photo card. This revolution is going to change the whole system by a simple weapon: a suitcase-size plastic box (EVM Machine)

3. Discussion

- The cost per EVM (One Control Unit, one Balloting Unit and one battery) was Rs.5, 500/- at the time the machines were purchased in 1989-90. Even though the initial investment is somewhat heavy, this is more than neutralized by the saving in the matter of printing of ballot papers in laths, their transportation, storage etc. EVMs used in 2004 elections are checked and all machines are in working condition according to election commission officers in MP. These machines are ready to use for coming state assembly elections.
- The substantial reduction in the counting staff and the remuneration paid to them.
- The main important factor is – the saving of trees. (Environmental factor) Supporters say it's also good for the environment in a country trying to save its vanishing forests. More than 8, 000 tons of paper, made from approximately 16 million trees, are used to print ballots for past elections.

- In fact, voting by EVMs is simpler compared to the conventional system Rural and illiterate people have no difficulty in recording their votes and, in fact they have welcomed the use of EVMs. For urban people also this system is very useful because it saves their precious time.
- Booth-capturing, can be prevented by the use of EVMs. The EVMs are programmed in such a way that the machines will record only five votes in a minute. As recording of votes has necessarily to be through Control Unit and Balloting Unit. For decades, millions of illiterate Indians voted by pressing their thumb prints on ballot cards.
- In future in this country which is world's largest democracy and will become the largest user of computerized voting machines , all elections will be totally computerized .this will also affect the economy of the nation very favorably
- The committee headed by Dr EM Sudarsana Natchiappan felt that mandating EPIC would encourage the class of urban dwellers, who don't have cards, to get them made. .The committee recommended that the government should either mandate the proposal of the Election Commission of India for considering EPIC as multi-purpose card or ask the Home Ministry to expand working on the project of multi-purpose cards throughout India.
- Once EPICs are introduced in elections it will encourage both urban and rural voters. Such policies of government will always be welcomed by the people and strengthen the roots of Democracy. Authors of this paper feel the need of national on line database which contains the following information: 1. Photo of the Citizen 2. Indian Citizenship Number 3. Blood Group 4. Address. 5. Date of Birth 6. Place of Birth 7. Thumb Impression 8. Cast Category (OC/BC/MBC/ST/SC) 9. Parental details 10. Educational Qualification 11. Marital Status 12. Family details (Wife & children name and ID numbers) 13. Property details 14. Credit History 15. Income tax Details 16. Criminal records if any. This database should be available to all the concerned govt. depts. to access freely on one click to prevent criminal activities and smooth working for verification as well as by having single number and carrying one card citizen can interact with all depts. This tool can be very useful for authentication. This card should be mandatory and must be required to carry at every place.

4. Concluding Remarks

India, being the largest democracy of the world and considering the fact that this country has a lot of poor, illiterate & rural people the success story of functioning of Democracy in this country, has been phenomenal especially if we compare it with the govts. of USA, UK, & PAK. Adoptions of new technologies and acceptance of changes have always been always critical issues. Elections by E.V.M. machines in 2004 General Election in India will not only be described as a successful event but also be a milestone in the history of E- Democracy .The introduction of E- voting will solve the problems of booth capturing,, bogus voting etc. to a great extent . Since the voting process was not reliable and very time consuming a large percentage of voters didn't go to vote and the govts were elected by 40 to 60% voters which could hardly be called a fair Government. If the EPIC is made compulsory & multipurpose people will willingly accept them.

References

1. Mishra, S S (2008) E.Democracy: *Concepts and Practices*, The ICFAI University press. Available online at www.iupindia.org(2008)
2. Sahu, G P: A Literature Review and Classification of e-Governance Research (2008) *proceeding of faculty development programme on management information systems* at school of management studies Motilal Nehru National Institute of Technology Allahabad. July 14 to 26 ,2008
3. Hicks, E, Marushaka T and Trofimoff, M (2008). E.tehnologies: converging Digital Surveillance and I T System , *E business* , February 2008.
4. *The Australian* (2004) available at <http://tinyurl.com/3661y> (Rec'd from John Lamp, Deakin U)
5. Voter Registration; Current Elections 2008; Past Elections; Judicial References; Election Laws & ECI

- Instructions; Library & Publications ...available at www.eci.gov.in/faq/evm.asp
6. Contributions to traditional electronic voting systems in order to ...(2006) available at www.enl.cs.gwu.edu/voting/India, accessed during May – July 2008.
 7. Electronic Voting Machine, EVM, Election Voting Machine, India - Live coverage of Indian election 2004 available at www.indian-elections.com/electoralsystem/electricvotingmachine, accessed during May – July 2008..

About the Authors

Sangeeta Jain is currently working as Reader, H.O.D. in M.B.A. Dept. at Matushri Ahilya Devi Institute of Management & Research, Indore. (M.P.) She possesses 11 yrs. Of Industrial experience as well as 7 yrs of teaching .Her areas of interest include - E-Commerce and Management Information Systems, Customer Relationship Management, Rural Marketing and e-Government.

Pradeep. K. Jain is currently working as Lecturer of English at Central India Institute of Technology, Indore.(M.P.) He possesses over 10 years of teaching experience in the field of Spoken English & Personality Development. His areas of interest include - Communication Skills, Indian Culture and Philosophy.