POLICY RECOMMENDATIONS FOR ADOPTION AND INTEGRATION OF ADVANCED TECHNOLOGIES IN LSGI ELECTION MANAGEMENT SYSTEM IN KERALA

This document is respectfully submitted to the Honourable State Election Commission of Kerala. It encompasses detailed analyses and recommendations relevant to the upcoming electoral processes and policies. The contents herein are prepared with the objective of enhancing the efficacy and transparency of the electoral system, ensuring it aligns with the highest democratic standards.

Submitted to:
State Election Commission,
Kerala

Submitted by:
Aromal J R,
MA Public Policy student,
St. Xaviers College, Mumbai
Date: 10/06/2024

Contents

Executive summary

This policy proposal document contains a comprehensive analysis and forward-looking plan aimed at modernising the election management and conduct process for Local Body elections in Kerala. The document is divided into three sections, each addressing critical aspects of the current and future electoral process.

Chapter one, two, three and four provides an overview of the history and evolution of election management mechanisms in India and Kerala along with the examination of the existing legislation aiding the election process. These chapters trace the development of electoral practices and highlight the regulatory frameworks governing elections. Chapter five envisions the future of voting which emphasises the potential of blockchain technology with the aid of AI to transform and enhance the electoral process. It outlines how blockchain can be integrated into elections to ensure higher voter participation, improved security and greater transparency. This chapter also mentions two innovative and detailed policy recommendations for incorporating blockchain technology into the election management system. Chapter six briefs about the implementation strategies for the proposed policy recommendations. This chapter also proposes legislative and systemic reforms to support policy adoption. It discusses the necessary changes and preparations required to facilitate the integration of blockchain technology into the electoral system. This chapter also mentions the need for infrastructure development, stakeholder engagement, and capacity building to ensure a smooth transition and effective implementation of the new technology.

Altogether, the document provides a roadmap for leveraging technological advancements to modernise the electoral process in Local Body Elections in Kerala, aiming to create a more inclusive, secure, and transparent voting system.

Democracy and Elections

The Indian Constitution thrust the pivotal role of elections in upholding democratic principles. Elections serve as the cornerstone of democracy, providing citizens with a fundamental mechanism to participate in governance and express their will. By casting votes, citizens exercise their sovereignty, influencing the composition of legislative bodies and the formation of governments. In the Indian Constitution, several prescribes the framework for elections, ensuring the democratic process's integrity and fairness. Article 324 vests the Election Commission of India with the responsibility of superintendence and control over electoral preparations and conduct. Article 325 safeguards against discrimination in the electoral process, ensuring that no individual is excluded from voting based on religion, race, caste, or sex. Article 326 establishes the principle of adult suffrage, granting every citizen above eighteen the right to vote, subject to certain disqualifications. Additionally, Articles 327 and 328 empower Parliament and State Legislatures, respectively, to enact laws governing various electoral aspects, including the preparation of rolls and constituency delimitation. (*Government of India. (1950). Constitution of India*.)

1. Emergence of Election Commissions in India

1.1 Representation of Peoples Act 1950 and 1951

The process of election in post independent India started with the Representation of People Act (RPA) of 1950 and its subsequent amendment in 1951. RPA 1950 primarily dealt with allocation of seats in the Lok Sabha and the Legislative Assemblies of the states, it also dealt with delimitation of the constituencies. The act laid down the requirements for qualifications and disqualifications for membership to these legislative bodies. RPA 1950 adhered to the principle of Universal Adult Suffrage, which granted all the citizens above the age of 21 the right to vote subject to certain exceptions. (*The Representation of The People Act, 1950 (43 of 1950*, 2016)

The RPA 1951 was an amended and supplemented version of RPA 1950. This act introduced detailed procedures for the conduct of elections like preparation of electoral rolls, nomination of candidates, polling, counting of votes and provisions to resolving disputes. RPA 1951 additionally also mentions about the offences related to election malpractices and recommended penalties for the same. (*The Representation of The People Act, 1951 (Act No. 43 of 1951*))

1.2 Election Commission of India

On 25th January 1950, Election Commission of India (ECI) was established under Article 324 of the Constitution of India. ECI is an independent Constitutional authority responsible for the superintendence, direction and control of the entire electoral process in India. The RPA 1950 and 1951 conferred ECI with extensive powers and empowered

It oversees the management of elections, enforcement of electoral laws arising during the electoral process within the country.

The ECI is headed by the Chief Election Commissioner, who is appointed by the President of India. ECI works autonomously and is insulated from government and executive influence to ensure the integrity and impartiality of the electoral process. ECI plays a crucial role in upholding the democratic ideals enshrined in the Indian Constitution and safeguards the sanctity of elections in India. (*About ECI*, n.d.)[1]

1.3 Emergence of State Election Commission's

Established under Article 324 of the Indian Constitution, ECI emerged as the apex body and cornerstone of the country's electoral governance. ECI refined the electoral processes and introduced innovations like EVM and voter education programs aimed to refine the electoral process over time. However there was a growing need for localised electoral management and the concept of State Election Commission (SEC) gained prominence which is aimed to oversee elections to local bodies. The 73rd and 74th amendments constitutionally empowered the SECs to operate autonomously within their respective states to mirror the role of ECI on a regional scale and is responsible for conducting elections to the urban and rural local bodies. Establishment of SECs along with ECI highlights India's commitment to democratic decentralisation, electoral governance and inclusive representation at all levels.

1.4 73rd and 74th Amendments as pillars for decentralisation

[1] www.eci.gov.in/about-eci (*accessed on 27/04/2024)*

The 73rd and 74th amendments in 1992 are marked as landmark moments in India's democratic evolution. The driving force behind these amendments were a concentrated effort to decentralise the governance system and to empower the local self-government institutions. These amendments were facilitated by the recommendations of several committees and commissions like the Balwant Rai Mehta Committee, Ashok Mehta Committee, G.V.K Rao Committee, Sarkaria Commission, and L.M Singhvi Committee.

Balwant Rai Mehta Committee, formed in 1957 reviewed the effectiveness of the Community Development Program and National Extension Service. The committee recommended the importance and establishment of democratic decentralisation through Panchayati Raj Institutions (PRIs). Ashok Mehta Committee in 1977 revitalised the concept of Panchayati Raj Institutions and proposed a two-tier system which advocated for greater autonomy at the local level. The G.V.K Rao Committee, formed in 1985 suggested constitutional recognition and protection for the PRIs. The committee proposed for amendments to empower the PRIs with adequate resources and authority. The Sarkaria Commission which functioned from 1983 to 1987, highlighted the discourse on decentralisation and federalism. The L.M Singhvi Committee, established in 1986 recommended constitutional amendments which provides a solid foundation for decentralised governance.

These committees extensively studied the functioning of Panchayati Raj Institutions and Municipal bodies, then highlighted the need for constitutional amendments to recognise these local bodies by taking inspiration from Mahatma Gandhi's aim of promoting grassroot democracy and gram swaraj. The 73rd amendment introduced a three-tier system of panchayats while the 74th amendment focused on urban governance through

municipalities. Some of the key provisions of these amendments were establishment of State Election Commissions (SECs) to oversee local body elections, reservation of seats for marginalised groups, and devolution of powers from higher levels of government. Article 243 under these amendments specified the composition of panchayats and municipalities with SECs overseeing their election process. The 73rd amendment through Article 243K provides for the establishment of SECs in all States and Union Territories for conducting election in rural local bodies, similarly Article 243Z and 243ZA empowers the State Election Commissions to conduct elections to all local bodies in municipalities. (*73rd Constitutional Amendment Act, 1992*, n.d.)[2] (*The Constitution (Seventy - Fourth Amendment) Act, 1992*)[3]

1.5 The roadmap towards State Election Commission, Kerala

The local body election history in Kerala can be traced back to 1953, when local body elections were held for the first time under the Travancore-Cochin Panchayat Act, 1950. After the formation of Kerala State in 1956, an Administrative Reforms Committee (ARC) was formed in 1957 which recommended measures for decentralisation and democratisation of governance in Kerala. The committee's proposal was a two-tier system of governance with directly elected village, panchayats and district councils. After the passage of Kerala Panchayat/Municipality Acts of 1960, elections were held in Kerala in 1963, 1979, and 1988.

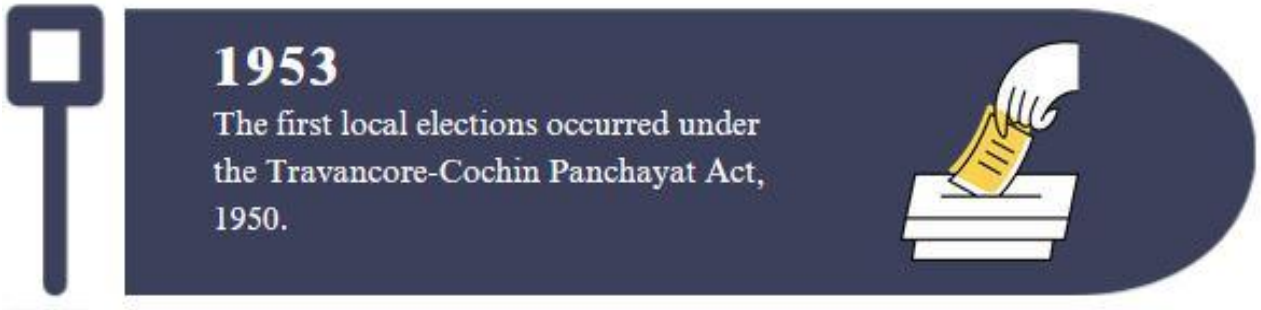
[2] panchayat.gov.in/document/73rd-constitutional-amendment-act-1992/ (*accessed on 28/04/2024)*

[3] mohua.gov.in/cms/The-Constitution.php *(accessed on 27/04/2024)*

Parallelly on a national level, the government constituted committees which pushed and recommended for a uniform three tier system for rural local governance , which laid the foundation for Panchayati Raj Institutions in India. The end result of these committees came out as the 73rd and 74th constitutional amendment acts in 1992 adding Parts IX and IX-A to the Constitution, which respectively deals with rural and urban local governance. In accordance with these constitutional amendments, Kerala enacted the Kerala Panchayat Raj Act 1994 and the Kerala Municipality Act 1994. Local body elections in Kerala held during 1995, 2000, 2005, 2010, 2015, and 2020 were under these enactments.

Under Article 243K and Article 243ZA of the constitution, State Election Commission Kerala was established on December 3 1993. The SEC oversees the electoral process for Panchayats and Municipalities. Article 243E and 243U of the constitution prescribes the duration and periodicity of elections to these local bodies which mandates elections at five year intervals. (*State election commision Kerala)*[4]

1.6 Timeline SEC Kerala



[4] www.sec.kerala.gov.in/public/milestones *(accessed on 02/05/2024)*

- After Kerala State formed in **1956,** an Administrative Reforms Committee (ARC) chaired by the first Chief Minister in 1957 recommended decentralization and democratization.
- ARC suggested a two-tier system: village panchayats and district councils.
- The **1960** Panchayat Act divided the Local Bodies Department into Panchayat and Municipal Departments for administrative ease.

- The second election took place in 1963, post the state's formation in 1956 and the enactment of the Kerala Panchayat/Municipality Acts of 1960.
- Subsequent elections occurred in 1979 and 1988.

- In 1957, the Government of India appointed a committee led by Shri. Balwanth Rai Mehta to study the Community Development Programme. This committee recommended a uniform three-tier system of rural local government, laying the foundation for Panchayati Raj in India.
- The 73rd and 74th constitutional amendments were passed by the Parliament in 1992, adding Part IX and IXA to the Constitution.
- The 74th Amendment pertains to rural local governments (Panchayati Raj Institutions - PRIs), while provisions for urban local governments (Nagarpalikas) were made. It came into effect in 1993.
- In accordance with these amendments, Kerala State enacted The Kerala Panchayat Raj Act 1994 and The Kerala Municipality Act 1994.
- The first election under the new legislation was held in 1995, followed by subsequent elections in 2000, 2005, 2010, 2015, and 2020.

- Kerala has 1200 local self-government institutions distributed across 14 districts.
- These institutions are categorized into 941 Gram Panchayats, 152 Block Panchayats, 14 District Panchayats, 87 Municipalities, and 6 Municipal Corporations.
- The detailed breakdown includes 15962 wards in village panchayats, 2080 wards in block panchayats, 331 seats in district panchayats, 3078 wards in municipal councils, and 414 wards in municipal corporations.

- Article 243E and 243U of the Constitution of India address the duration/ tenure of Panchayats and Municipalities and the periodicity of elections to rural and urban local bodies.
- According to these articles, every Panchayat/Municipality is to continue for five years from the date of its first meeting, unless dissolved under any prevailing law.
- Dissolution of a Panchayat/Municipality during its tenure is prohibited by this constitutional provision.
- Elections to constitute a Panchayat/Municipality must be completed before the expiry of its five-year term. If dissolved, elections should be held within six months.
- If a dissolved Panchayat/Municipality had less than six months remaining in its tenure, there's no requirement for an election for such a short period.
- Thus, conducting elections for rural and urban local bodies every five years is mandatory.

- Elections to civic bodies hold immense importance as they form the basic foundation of local-level democracy, crucial for the broader democratic framework.
- The legitimacy of these elections as essential components of the democratic process at the local level is growing steadily.
- State Election Commissions, established under Articles 243K and 243ZA of the Constitution of India, are responsible for overseeing the preparation of electoral rolls and conducting elections for Panchayats and Municipalities within the state.
- The State Election Commission of Kerala was established on December 3rd, 1993, to fulfill these responsibilities.

2. Evolution of election conduct mechanism in India

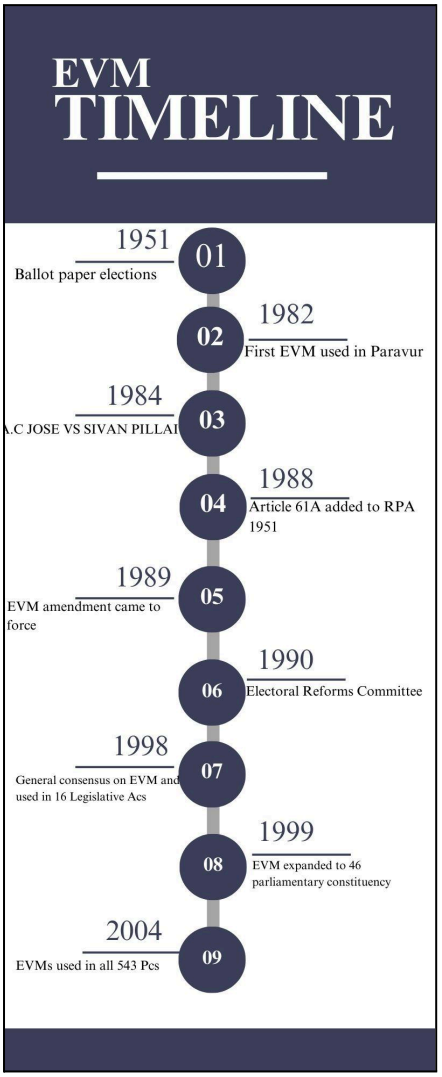
Paper ballots were used for elections in India before the emergence of Electronic Voting Machines (EVMs). The voters casted their votes by marking on a ballot paper their chosen candidate or party. The paper ballots were manually counted at the end of the voting period by election officials. The positive note of this system was that its simplicity and easiness for the voters to understand and the counting process was relatively transparent because it could be easily observed by the party agents and election observers. However this was accompanied by downsides also like ballot stuffing, booth capturing and manipulation during the counting process. These lead to allegations of electoral fraud and malpractices and sometimes affected the credibility of the election. (Kalia, 2024)

2.1 Introduction of EVM

The need for an efficient and tamper-proof method of voting and counting brought in the concept and introduction of EVMs. EVMs eliminate many of the manual processes involved in traditional paper ballot methods by electronically recording votes. However there are discussions and debates still around the corners regarding the security and integrity of EVMs as the best method of conducting free and fair elections in India.

The legal history of introduction of EVMs in India began with their first usage in the North Paravur Assembly constituency in Kerala on May 19, 1982. The ECI used its authority under Article 324 of the constitution and directed the usage of EVMs despite initial refusal from the Government of India. The legality of the usage of EVMs and its

impact in that election was challenged in the Supreme Court case of A.C. Jose v. Sivan Pillai (1984)[5]. The ECI claimed that it has plenary powers under Article 324 which superseded the parliamentary laws or rules and emphasised the benefit of using EVMs over paper ballots. The court ruled that usage of EVMs in certain polling stations exceeded the jurisdiction of the commission and set aside the election results for those stations. (*Legal History of EVMs* , 2022)[6]



[5] A.C. Jose v. Sivan Pillai, AIR 1984 SC 921

[6] www.eci.gov.in/eci-backend/public/uploads/monthly_2022_11/10386732_LegalHistoryofEVMsandVVPATs_pdf.a942a6ed2e36892f92adecb5e88f6d3d (*accessed on 30/04/2024*)

2.2 Legislative provisions for bringing in EVM

Inorder to incorporate EVMs into the electoral process, there were several legislative provisions introduced. Major change was the addition of section 61A to the Representation of People Act (1951) which took place in 1989. This granted the ECI authority to specify the use of EVMs in constituencies. The constitutional validity of this section was challenged and up upheld by the Supreme Court in the case of All India Anna Dravida Munnetra Kazhagam v. Chief Election Commissioner (2001). In this case Section 61A provided a legal basis for usage of EVMs, thus validating the adoption of EVMs in elections. Some other important additions were also made to the RPA 1951 for incorporating EVMs into the election management process. Section 58 was added which outlines the procedure for conducting a fresh poll in case of various contingencies during an election. Section 135A which speaks about the offences of booth capturing, making such offences cognizable which allows for an immediate arrest without warrant. section 169 empowers the central government in consultation with the ECI to make rules for carrying out the provisions and purposes of the Act. Rules made under this Act must be laid before both Houses of Parliament for a period of thirty days and may be modified or annulled based on parliamentary approval.

Various rules were made to govern use and operations of EVMs. Rule 49A mandates the EVM design must consist of a Control Unit and a Ballot Unit. It also mentions that this design should be approved and accepted by the Election Commission. Rule 49B outlines the responsibilities of the Returning officer in preparing the voting machine. This includes setting labels containing the names and symbols of contesting candidates on the balloting unit, sealing it along with the control unit, and setting the number of contesting candidates,

sealing the candidate set section of the control unit accordingly. Rule 49C specifies the arrangements at polling stations. The returning officer is responsible for providing each polling station with a voting machine, relevant parts of the electoral roll, and other necessary election materials. Additionally, with the Election Commission's approval, a single voting machine may serve multiple polling stations within the same premises. Rule 49E details about the preparation process of EVMs before polling. Each voting machine must bear a label with essential details such as the serial number, constituency, polling station details, and date of the poll. The presiding officer must ensure that the voting machine is devoid of any recorded votes and bears the required label before the poll commences. Rule 49L outlines the procedures for using the voting machine which includes the recording of elector details , obtaining signature or thumb impressions and marking names on the electoral roll. Rule 49M emphasises maintaining voting secrecy within polling stations and details the steps a voter must follow to vote. Rule 49MA addresses the complaints about the particulars that are printed on paper slips generated by the printer for paper trail. It also mentions the provisions and specific procedures the presiding officer should take for investigating and resolving allegations and taking proper actions. Rule 49N allows the blind or physically infirm electors to be assisted by a companion during voting, subject to certain conditions and declarations. Rule 49Q empowers the presiding officer to enter the voting compartment during polling to ensure the integrity of the balloting unit and the smooth progress of the poll. Rule 49S mandates the preparation of an account of votes recorded by the presiding officer at the close of the poll, which is enclosed in a separate cover and provided to polling agents. Rule 49T addresses the sealing of voting machines after the poll concludes. The presiding officer ensures that no further votes can be recorded by closing the control unit and detaching the balloting unit. Rule 49U outlines the sealing

of other packets containing various election-related documents. These packets include the marked copy of the electoral roll, register of voters, tendered ballot papers, list of challenged votes, and any other papers directed by the Election Commission. Rule 49V details the transmission of voting machines, sealed packets, and other papers to the returning officer, ensuring their safe custody until vote counting begins. Rule 49W provides Rule 49W describes the procedures for an adjourned poll. This includes the delivery of necessary materials to the presiding officer and the conduct of the adjourned poll. Rule 49X specifies actions to be taken in the event of a booth capturing, including immediate closure of the control unit and detachment of the balloting unit. Rule 55C enables the returning officer with the authority to scrutinise and inspect the voting machines used at multiple polling stations simultaneously. Rule 56C outlines the counting of votes recorded in the control unit, including the display of votes polled by each candidate and the completion of necessary forms. Rule 56D addresses the scrutiny of the paper trail which allows the candidats or their agents to request the counting of printed paper slip under certain circumstances. Rule 57C describes the sealing of voting machines after counting of votes to ensure the integrity of the results and the safe custody of the machines. Rule 92 and 93 mentions the custody and production of various election-related papers ensuring their security and integrity. These rules restrict access to certain documents and require court orders for inspection or production. Rule 94 outlines the disposal of various election papers after the conclusion of an election and Rule 95 grants the Election Commission the power to issue directions to facilitate the proper use and operation of voting machines, subject to the other provisions of the rules (*Legal History of EVMs* , 2022)[7] (*The Representation of the People Act, 1951,* n.d.)[8]

[7] *Id.*
[8] www.indiacode.nic.in/bitstream/123456789/2096/5/a1951-43.pdf (*accessed on 30/04/2024)*

3. Evolution of election conduct mechanism in kerala

The first local body election took place in kerala under the ambit of Travancore-Cochin Panchayati Act, 1950.After the formation of Kerala State in 1956, an Administrative Reforms Committee (ARC) was formed in 1957 which recommended measures for decentralisation and democratisation of governance in Kerala. The committee's proposal was a two-tier system of governance with directly elected village panchayats and district councils. The later formed Panchayati act, 1960 recommended a system consisting of panchayat department and municipality department. After the formation of Kerala state in 1956, the second local body election took place under the ambit of this panchayat/municipality act,1960 in the year 1963.After the enactment of 73rd and 74th amendment acts the kerala legislative assembly created Panchayati Raj Act, 1994 and Municipality Act, 1994. The Kerala State Election Commission became the apex constitutional body overseeing the local body elections in the state from then onwards.

Local body elections in Kerala from 1953- 2000 were completely paper ballot based elections. The adoption of EVMs by ECI prompted SEC Kerala to amend both panchayat raj and municipality act to adopt the usage of EVMs for the conduct of their election conduct process from 2005. It was used in a single tier for urban areas and a three tier system for rural areas. EVMs under SEC Kerala were partially used during 2005 and 2010 general elections. Single post EVMs were used in urban area constituencies during the initial phases. In the 2015 general elections the entire election conduct was done using EVMs, to enable this about 35,000 multi post EVMs were

deployed in three-tier rural areas in addition to single post machines used in urban areas. (*State Election Commission Kerala*, *n.d*.)[9]

3.1 legislative provisions for EVMs in kerala

In Kerala the local elections are conducted under the supervision of the State Election Commission in accordance with Kerala Panchayati Raj Act 1994 and Kerala Municipality Act 1994.

3.1.1 Provisions in Kerala Panchayati Raj Act for introduction of EVM

Section 74 of Kerala Panchayati Raj Action mentions the manner of voting for local elections. This section was amended in 2005 to add section 74A which mentions the introduction of EVMs for local body elections. This section was renumbered as 74B by Act 11 of 2020. This section defines electronic voting machines as per the election commission and Rules to carry out the election using the above mentioned EVMs. (*The Kerala Panchayat Raj (Amendment) Bill, 2021*)[10] (Local Self Government Department Kerala, n.d.)[11] (*State Election Commission Kerala*, *n.d*.)

Several Rules were introduced under section 74B of the Act to regulate the use of EVMs in the election management process. Rule 24G governs the polling by EVMs, Rule 24H outlines the design and describes the design of these machines, Rule 24I deals with the

[9] www.sec.kerala.gov.in/public/resources/ntg/acts (*accessed on 02/05/2024*)

[10] prsindia.org/files/bills_acts/bills_states/kerala/2021/Bill%20no.%2042%20of%202021_Kerala.pdf *(accessed on 02/5/2024*)

[11] dop.lsgkerala.gov.in/ml/system/files/article/Kerala%20Panchayati%20Raj%20Act%201994%20and%20Rules.pdf (*accessed on 02/5/2024*)

preparation of voting machines by the Returning Officer[12]. Rule 25A specifies the arrangements at the polling stations which use EVMs[13]. Rule 26A details the preparation of voting machine for polls using EVMs[14]. Further provisions include Rule 35A which outlines the procedure for voting by using EVMs, Rule 35B ensures the maintenance of voting secrecy and procedures at the polling stations where EVMs are used, Rule 35C mentions about the recording of votes for the blind or infirm electors using EVMs, 35D addresses the scenario where an elector decides not to vote in an election by using EVMs, Rule 35E pertain to the tendered votes in election by EVMs, Rule 35F allows the presiding officer to enter the voting compartment in election using EVMs if necessary, Rule 35G prescribes about the closing of a voting machine in case of booth capturing[15]. Regarding the post poll process, Rules 41A mandates an account of votes recorded through EVMs[16]. Rule 42A and 42B deal with the sealing of EVMs and other packets after polling using EVMs[17]. Rule 43A mentions the transmission of voting machines and related materials to the Returning Officer after polling by EVMs[18]. Rule 46A scrutiny of EVMs[19]. Rule 48A deals with counting of votes in EVMs and 48B deals with sealing of EVMs[20].

3.1.2 Provisions in Kerala Municipality Act for introduction of EVMs

Section 130 of Kerala Municipality act mentions the manner of voting for local elections. This section was amended in 2005 to add section 130A under act 33 which

[12] Rule 24G, 24H, 24I previously numbered as 24A, 24B, 24C were inserted by SRO No.893/2005, w.e.f 9-9-2005. These rules were renumbered into 24G, 24H, 24I after addition of Rule 24A to 24F by SRO No. 840/2020 dt. 26-11-2020.
[13] Rule 25A, 26A, 35A, 35B, 35C, 35D, 35E, 35F, 35G, 41A, 42A, 42B, 43A, 46A, 48A and 48B were inserted by SRO No.893/2005, w.e.f 9-9-2005.
[14] *Id*.
[15] *Id*.
[16] *Id.*
[17] *Id.*
[18] *Id.*
[19] *Id*.
[20] *Id*.

mentions the introduction of EVMs for local body elections. This section was renumbered to 130B in 2020 by act 12 w.e.f 30-9-2020. This section defines electronic voting machines as per the election commission and rules to carry out the election using the above mentioned EVMs. (*The Kerala Municipality Act, 1994*, n.d.)[21] (*Municipalities Act – Department of Town & Country Planning*, 2021)[22]

Several rules were introduced under section 130B to regulate the use of Electronic Voting Machines in elections. Rule 24G governs polling by EVMs, Rule 24H outlines the design of these machines, 24I deals with the preparation of voting machine by Returning Officer[23].Rule 25A specifies the arrangements at the polling stations where EVMs are used[24]. Rule 26A details the preparation of voting machines for polls using EVMs[25]. Additional rules like 35A which outlines the procedure for voting by using EVMs, Rule 35B ensures the maintenance of voting secrecy and procedures at polling stations using EVMs, Rule 35C covers the recording of votes for the blind or the infirm by using EVMs, Rule 35D addresses scenarios where an elector decides not to vote in an election using EVMs, Rule 35E pertains to tendered votes in polling by EVMs, Rule 35F allows the presiding officer to enter the voting compartment if necessary and Rule 35G mandates the closing of voting machine in the events of booth capturing[26]. Regarding the post poll process, Rule 41A mentions the account of votes recorded through EVMs[27]. Rule 42A and Rule 42B mentions about the sealing of EVMs and other packets after polling respectively,

[21]www.sec.kerala.gov.in/portal/resources/downloadAttachment/ea78b52a-d647-4d8b-8d01-c741f350943c *(accessed on 02/5/2024)*
[22]townplanning.kerala.gov.in/2021/09/16/municipalities-act/ (*accessed on 02/5/2024)*
[23] Rule 24G, 24H, 24I renumbered after the introduction of rule 24A to 24F by SRO No.839/2020. Previously 24G, 24H, 24I were inserted by SRO No. 852/2000, w.e.f 4-9-2000.
[24] Rule 25A, 26A, 35A, 35B, 35C, 35D, 35E, 35F, 35G, 41A, 42A, 42B, 42C, 43A, 46A, 48A and 48B were inserted by S.R.O No. 852/2000, w.e.f. 4-9-2000.
[25] *Id.*
[26] *Id.*
[27] *Id.*

Rule 42C mention about the transferring of voting machines to the Returning Officer after the election[28]. Rule 46A pertains to the scrutiny of EVMs[29]. Rule 48A covers the counting of votes in EVMs and Rule 48B ensures the sealing of the voting machines[30].

---

[28] *Id.*
[29] *Id.*
[30] *Id.*

4. Technology evolution and elections

YEAR	Technology Introduction	Tech impact in India	Election Progress in India
Late 19th Century	Industrial Revolution - Introduction of mechanised manufacturing processes, steam power, and railways.	India witnessed the advent of textile mills and railways during this period, transforming its economy and infrastructure.	India witnessed the advent of textile mills and railways during this period, transforming its economy and infrastructure.
1959	The first integrated circuits - Robert Noyce invented the first monolithic integrated circuit.	India witnessed the advancement in electronics and microelectronics, laying the foundation for future technological innovations.	The development of integrated circuits paved the way for electronic components used in modern electronic voting machines (EVMs), enhancing the efficiency and accuracy of the voting process in India.
1960s	Cloud computing emerged and is believed to have been invented by J. C. R. Licklider.	India is leveraging cloud technology for efficient data storage and processing in various sectors, including governance and elections.	Cloud technology facilitates the storage, processing, and analysis of vast amounts of electoral data, enabling efficient voter registration, election management, and result dissemination in India's democratic elections
1970s	Direct-Recording Electronic (DRE) machines - First came into widespread use.	India witnessed the introduction of electronic voting machines (EVMs). ECIL started working on EVM prototype to enhance the efficiency and accuracy of the voting process.	The adoption of electronic voting machines (EVMs) revolutionised the voting process in India, leading to faster tabulation of results and increased transparency in elections.

1971	Introduction of Microprocessors - Miniaturisation of computing power, leading to the birth of personal computers.	India embraced microprocessor technology, leading to the growth of the IT industry and digital literacy.	Microprocessor technology facilitated the development of electronic voting machines (EVMs), enhancing the efficiency and accuracy of the voting process in India.
1975	Emergence of microcomputers.the introduction of the Altair 8800, the first personal computer kit, sparked the beginning of the personal computing revolution.	India established ISRO and launched its first satellite, Aryabhata, in 1975, marking its entry into space exploration.	Technological advancements in space exploration fostered India's satellite-based communication and remote sensing capabilities, aiding in electoral planning, monitoring, and communication in remote areas.
1982	The introduction of the Commodore 64, a pioneering home computer with advanced graphics and sound capabilities, revolutionised personal computing and became the best-selling computer model of all time.	The launch of INSAT-1B in 1982 in India facilitated improved communication, remote monitoring, broadcasting of election-related information, and emergency communication during elections, thereby enhancing the transparency and efficiency of the electoral process.	On may 19 EVMs were first used in 50 polling stations in North paravur, kerala
1990s	World Wide Web - Birth of the internet, connecting the world and transforming communication and information access.	The 1990s saw the liberalisation of the Indian economy, leading to the growth of IT and software industries and the emergence of internet connectivity.	The internet revolutionised voter information dissemination, voter registration, political campaigning, and election monitoring through online platforms and social media
Early 2000s	Implementation of Cybersecurity Measures - Safeguarding digital infrastructure and data from cyber threats.	India has bolstered its cybersecurity posture with the establishment of CERT-In and other cybersecurity initiatives.	Cybersecurity measures are critical for protecting electoral databases, voter information, and election infrastructure from cyberattacks and unauthorised access, ensuring the integrity and confidentiality of the electoral

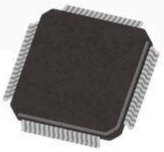
			process.
2007	Introduction of the iPhone, and Android Pioneering smartphones, merging communication, computing, and multimedia capabilities.	The late 2000s witnessed the smartphone revolution in India, with the launch of various smartphones and the growth of mobile connectivity.	Smartphone technology enabled the development of mobile applications for voter education, election monitoring, and real-time reporting of electoral irregularities, enhancing transparency and accountability in the electoral process.
2009	Emergence of Blockchain and Distributed Ledger Technology (DLT) - Offering secure and transparent digital transactions	India is exploring blockchain technology applications across various sectors, including finance, supply chain management, and governance.	Blockchain technology holds promise for secure and tamper-proof electoral processes, ensuring the integrity of voter registration, ballot casting, and result tabulation in India's democratic elections.
2014	Introduction of 4G LTE (Long-Term Evolution) technology, significantly enhancing mobile internet speeds and connectivity worldwide.	The launch of the Mars Orbiter Mission (Mangalyaan) by the Indian Space Research Organisation (ISRO), marking a significant milestone as India's first interplanetary mission and showcasing the country's growing prowess in space exploration.	Introduction of VVPAT in lok sabha elections for the first time.
2024	Increased utilisation of artificial intelligence and machine learning algorithms to enhance various aspects of the electoral process, including voter registration, sentiment analysis, predictive analytics, and cybersecurity measures.	One of the latest technological introductions in India could be the widespread adoption of fifth-generation (5G) wireless technology, revolutionising communication networks and enabling faster internet speeds, improved connectivity, and enhanced capabilities for digital innovation and development across various sectors.	The introduction of blockchain-based voting systems, ensuring heightened security, transparency, and integrity in elections through tamper-proof digital vote records, thereby guaranteeing accurate election outcomes.

Sources: collected from multiple internet sources about technological evolution

4.1 Technology saturation and diffusion time

The time gap between introduction of a technology and getting implemented on the ground is mentioned as technology saturation period.

INTEGRATED CIRCUITS & MICROPROCESSORS TO PERSONAL COMPUTERS & SMARTPHONES



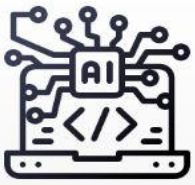
From introduction of IC chips in 1959 and microprocessors in 1971 to creation of personal computer kit in 1975
Tech diffusion period- Nearly 15 years

EMERGENCE OF WWW TO CYBERSECURITY MEASURES

World Wide Web emerged in the late 1990s and it took nearly a decade to set and furnish cybersecurity measures to regulate and govern the internet realm.
Tech diffusion period- Decade

DIRECT RECORDING ELECTRONIC MACHINE TO VVPAT

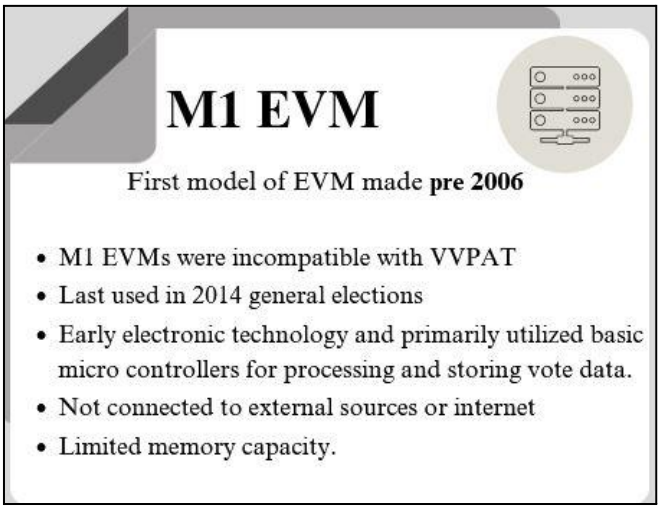
DRE machine technology took around 4 decades to be implemented in VVPAT machine for Electronic voting.
Tech diffusion period- 4 decades

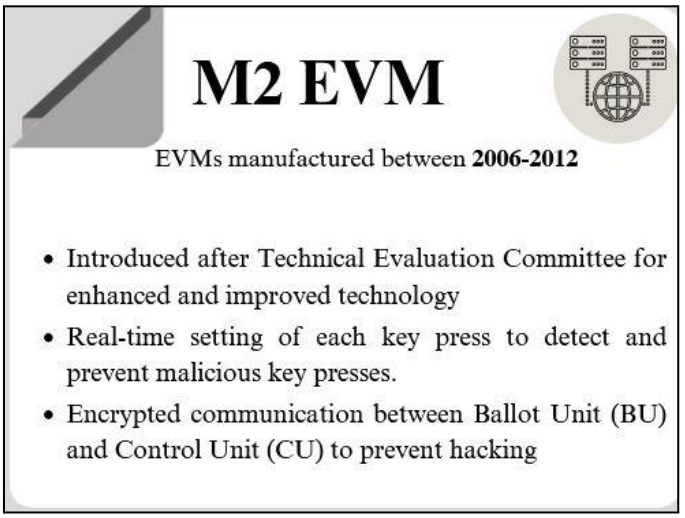


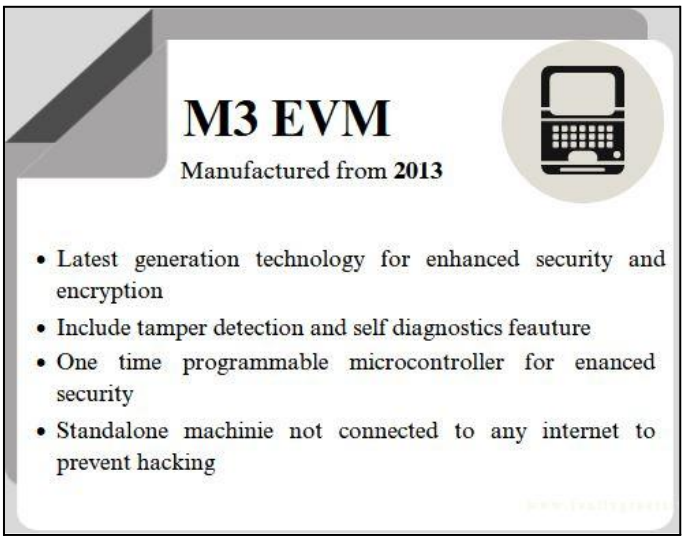
CLOUD COMPUTING TO ARTIFICIAL INTELLIGENCE

Cloud computing emerged in 1960s and its metamorphosis into advanced technologies like AI took decades of technological evolution
Tech diffusion period- 6 decades

4.2 Technological evolution of EVMs:







5.The future of voting in India

Free and transparent elections are crucial for upholding the voice of people in India and protecting democracy in india. Discussions over the effectiveness and integrity of the voting process still persists despite the Election Commissions commendable efforts and scale of operations. Emerging technology like that of DLT and Blockchain offers glimmers of hope by offering promising solutions to address the challenges associated with the conduct of elections. The tamper-proof nature of the blockchain technology makes the election process near to impossible to manipulate, ensuring the sanctity of the electoral roll and the integrity of voting data.The transition from EVMs to Blockchain based remote and E-voting systems could revolutionise the voting process in India alongside providing voters with a secure, transparent and convenient means to cast their ballots. (Chaudhary, n.d.)

5.1 What is DLT and Blockchain technology?

5.1.1 DLT

DLT operates on a peer-to-peer network in which a participant or node also maintains an identical copy of the ledger. The decentralised nature ensures repetitiveness and fault tolerance because there is no single point of failure. Proof of work (PoW)[31] or Proof of Stake (PoS)[32] acts as consensus mechanisms in DLT to validate the transactions and ensures agreement on the state of the ledger among all the participants.

[31] Proof of Work is a consensus mechanism in blockchain where computers compete to solve complex puzzles, and the first to solve one gets to add a new block of data, ensuring the process is secure and fair.

[32] Proof of Stake is a consensus mechanism in blockchain where participants are chosen to update a digital ledger based on how much they invest in the system.

Security of the data within DLT is ensured by the cryptographic nature of the ledgers. Every transaction within the DLT is cryptographically signed to verify its authenticity and integrity which prevents unauthorised alterations to the ledger or the data. An additional technological value called cryptographic hashing[33] links the blocks of the transaction making an immutable chain. DLT ecosystems also enable interoperability which means that different platforms and networks can communicate and exchange data seamlessly.

The decentralised architecture, cryptographic security, consensus mechanisms and interoperability makes DLT an efficient, enhanced and secure framework technology for managing data and transactions. (Nevil, n.d.)

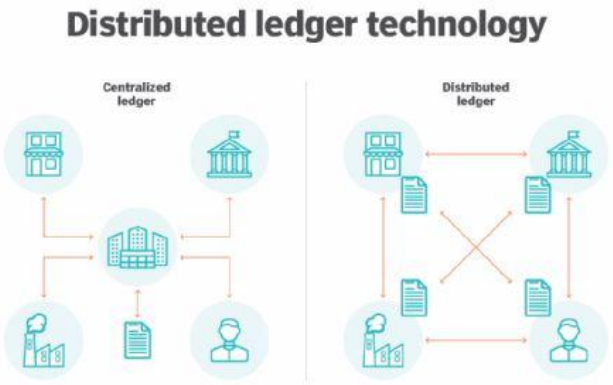


Image Source : www.techtarget.com/searchcio/definition/distributed-ledger (accessed on: 15/05/2024)

5.1.2 Blockchain technology

Blockchain technology is a byproduct of Digital Ledger Technology that works on a network of computers or nodes. Information in blockchain is stored in blocks linked

[33] Cryptographic hashing is a process that converts any data into a fixed-size string of characters, which acts like a unique digital fingerprint for that data.

together chronologically which forms a chain. The decentralised nature is the main element of blockchain technology, which means no single entry controls the entire network. Security of the transactions are ensured through encryption and consensus mechanisms which makes the data immutable and tamper-proof.

One major differentiation of blockchains is based on its accessibility and control. It is classified into public and private blockchain. Public blockchains are often called permissionless blockchains, which often allows anyone to join the network without any restrictions and make any transactions. Such types of blockchain are fully decentralised with no central authority controlling as well as accessing the data. Private blockchains or permissioned blockchain on the other hand require authorisation with limited access to trusted entities. Private blockchains offer greater privacy and control. Permissioned blockchain offers authorisation or participation only to users selected by central authority or consortium. This type of blockchain prioritises privacy and control making them suitable for enterprise applications which require regulatory compliance. (Hayes, n.d.)

How blockchain works

Initially blockchains when a new entry is made into the blockchain network it is encrypted and transmitted to the network where the transactions or entries are validated by a peer-to-peer node, this ensures authenticity. The valid transactions are then grouped into blocks, which form mempools[34], which are subsequently added to blockchain through a consensus mechanism like Proof of Work to ensure agreement among the

[34] Mempool is the short for memory pool which acts as a temporary storage area for unconfirmed transactions.

nodes on the validity of the new blocks. Once the block is added to the blockchain containing the hash[35] of the previous block, the transaction is then considered complete and is permanently recorded. (Jain, 2023)

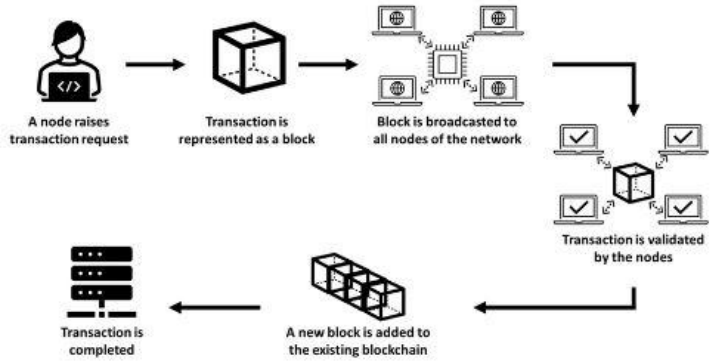


Image Source :doi.org/10.3390/logistics6010015(accessed on: 15/05/2024)

5.2 How blockchain technology could be used in elections

In their academic paper on 'Blockchain-Based-E-Voting Systems: A Technology Review' (Berenjestanaki et al., 2023,), authors propose the various technological requirements for enabling E-voting based on blockchain technology. They propose a 5 staged technological division for the conduct of elections using blockchain technology starting with the requirement of Blockchain platform, consensus algorithm, security and privacy techniques, authentication and identity verification techniques and other techniques like cryptography, development and testing.

The first requirement is of a blockchain framework and technology platform which encompasses tools utilised for designing and implementing blockchain-based systems. Some of the frameworks which the study found efficient for designing and

[35] A hash in blockchain acts like a digital fingerprint for data stored on the blockchain.

implementing blockchain-based systems include Etherum, Hyperledger Fabric, Bitcoin and Multichain. These frameworks serve as fundamental building blocks to construct Decentralised Applications (Dapps) for voting conduct. The study states that ethereum is the predominant choice among these frameworks constituting approximately 34.91% of the existing utilised framework for E-voting.

Customised system tailored frameworks can also be created for the purpose of E-voting rather than adhering to any single blockchain framework. So blockchain technology can be used under customisation to allow for flexibility in design and implementation which caters to the unique demands and constraints of the E-voting application.

The second technical requirement for blockchain in election will be of a consensus mechanism or algorithm used .Consensus algorithms are the rules that keep everyone in a blockchain network on the same page about what transactions are valid and what the current state of the ledger is. Some of the major consensus algorithms used in blockchain are Proof of Work (PoW) , Proof of Stake (PoS), Proof of Authority (PoA), Byzantine Fault Tolerance (BFT), Practical Byzantine Fault Tolerance (PBFT), Raft consensus algorithm, Delegated Proof of Stake (DPoS), Crash Fault Tolerant (CFT), Stellar consensus protocol (SCP), and Hybrid (PoC combined with PoS).

Among these consensus algorithms Proof of Authority (PoA) and Practical Byzantine Fault Tolerance (PBFT) are the best suited for E-voting. PoA relies on trusted entities or individuals as block validators. In e-voting systems. Identity verifications and trust are crucial when it comes to E-voting , PoA ensures that credible and authorised validators participate in the block validation.process. PBFT ensures agreement among nodes even

in the presence of malicious actors. PBFT can offer security against all malicious threats which is paramount in E-voting scenarios.

Security and privacy of the blockchain based E-voting platforms are crucial considerations to ensure the integrity of the E-voting process. Some of the most prevalent security and privacy techniques according to the study are Zero-Knowledge Proofs (ZKPs), Homomorphic Encryption (HE) , Blind Signature (BS), Ring Signatures (RS), Mix Networks (MN), Time-Lock Encryption (TLE), Machine Learning (ML), Circle Shuffle (CS), and Multi-Signature Schemes.

Another technology requirement for the conduct of E-voting according to the study is the authentication and identity verification technical requirements. This technology requirement serves pivotal roles like confirming voter eligibility, preventing fraud and safeguarding the confidentiality of the votes. Amongst the techniques mentioned above the study found out that biometric authentication stood out as the widely addressed approach with unique physical characteristics like fingerprints, facial features and iris patterns to verify individual's identities accurately. Additional authentication methods like OTPs, Aadhaar ID verification, multifactor authentication and PKI-based X 509 certificates can be complimented as authentication tools for additional layers of security and reliability. Multi step authentication adds further assurance by requiring multiple levels of verification if needed. The unique ID based on hash values can ensure the uniqueness of voter identifiers.

The study suggests some other technological requirements also which can be implemented within the realm of E-voting which facilitates blockchain technology usage. Cryptography techniques, smart contract development platforms and testing tools

are also needed for E-voting systems. For example some popular tools like Solidarity and Remix help in coding and Remix helps in coding and deploying smart contracts, tools like Ganache and Hyperledger Caliper aid in testing and benchmarking, tools like Grafana and Gatling ensures efficiency and monitoring, for cryptography tools like SHA and AES ensures data security, tools like Schnorr signature and SM2 algorithm helps in providing digital signature for transaction verfication.

These technological requirements aid in the inculcation of blockchain technology in conduct of election. These references from the above mentioned study by (Berenjestanaki et al., 2023,) shows us what are the technological aids which exist in the domain of E-voting which uses blockchain technology for the conduct of voting.

5.3 Development and discussions regarding technological upgradation for election management in India.

In India initial discussions on blockchain based E-voting took off mainstream when chief Election Commissioner Sh Sunil Arora mentioned it during his visit to Indian Institute of Technology, Madras on 30th october 2019.

It is then followed by a webinar hosted by ECI in partnership with Tamil Nadu e-governance agency on the topic “Technology aspects of remote voting: Exploring Block chain” on 10th August 2020. Technologists, academicians, policy practitioners, cyber security experts from India and around the world participated in the webinar to discuss the possibilities and technicalities of using blockchain in voting systems in india. In his keynote speech Sh. Sushil Chandra stressed the importance of greater inclusiveness in elections. He expressed the concern that significant proportions of

voters are unable to express their franchise because of the geographical barriers posing a barrier to easy casting of votes. The commissioner mentioned that occupation, education, medical treatment and other reasons have lead to instances of electors being different from the place of registration in electoral rolls.the commissioner emphasised that the key considerations while developing such system should be to inspire trust of all stakeholders, assure integrity of electoral process and secrecy and inviolability of ballot. The webinar was addressed by experts in the technology domain like Principal Scientific Adviser to Government of India, Prof K Vijay Raghavan, Director of IIT Bhilai, Prof Rajat Moona, Director of IIT Madras, Prof Bhaskar Ramamurthi. Sandra Ro, CEO of Global Blockchain Business council, Monique Bachner, Member of International Association for Trusted Blockchain applications, Ismael Arribas, President of Kunfud Spanish chapter of Government Blockchain application.

On 28th December 2022, the ECI in a letter to political parties initiated to pilot the existing prototype of remote voting system which the ECI already designed. In the letter ECI showed the trends of voting turnout percentage over the years in India and discussed the importance of considering domestic/migrant voters. Some of the statistics that ECI mentioned is shown below:

Year of election	Registered Electors (Crores)	Voter turnout (%)
1951	17.32	45.67
1957	19.37	47.74
1962	21.64	55.42
2009	71.70	58.21
2014	83.40	66.44
2019	91.20	67.40

Voter Turnout	40-50%	50-60%	60-70%	70-80%	80-90%	All States/UTs
	Number of States					
GE-2014	1	2	12	12	8	35
GE-2019	1	2	11	12	10	36

Image Source: letter to political parties by ECI: discussion on improving voter participation of domestic migrants using remote voting (accessed on: 15/05/2024)

ECI in detail mentioned about internal migration and how it affects the voter turnout and democratic participation effectiveness. ECI also mentioned the Hon'ble Supreme Courts vide order dated 25/06/2015 in WP No.80 of 2013 and IA No.3 in WP No.265 of 2014, *Dr. Shamsheer V.P. versus Union Of India* on the topic of alleged denial of voting opportunities to domestic migrants had among the others directed the ECI to explore Remote Voting for domestic migrants. The letter mentions that although there are provisions within the conduct of Election Rules 1961[36], like Rule 18[37], 27E[38], 27I[39] for distance based voting, ECI mentions that they are not commonly accessible and is prominent enough to address the internal migration issue.

The technical features in the prescribed prototype of the ECI is a modified version of the existing M3 EVMs which works on a non-networked technology. ECI named it as RVM (Remote Voting Machine) which can be used in multi-constituency polling stations in remote locations. RVM consists of :

[36] old.eci.gov.in/files/file/15145-the-conduct-of-elections-rules-1961/ (*accessed on 15/5/2024*)
[37] Persons entitled to vote by post (Rule 18, conduct of election rules,1961).
[38] Issue of ballot paper (Rule 27E, conduct of election rules,1961).
[39] Return of ballot paper (Rule 27I, conduct of election rules,1961).

Remote Control Unit (RCU) which is similar to the existing control units but has some additional capabilities to store votes for each candidate and constituency.

Remote Ballot Unit (RBU) which features an electronic dynamic display called Ballot Unit Over Display (BUOD) instead of a paper ballot. This display can dynamically show the list of candidates based on the constituency number read by the constituency card reader.

Remote VVPAT (RVVPAT) which works like the existing M3 VVPAT but has the ability to store symbols and candidate images for various constituencies.

The Remote Symbol Loading Unit (RLSU) captures symbols of candidates from laptops managed by the Home Returning Officer (RO)

Constituency Card Reader (CCR), it is a barcode reader that identifies constituency number of a voter at multi-constituency polling stations. The CCR is connected to a Public Display Control Unit (PDCU) which is an interface between CCR, public display and RBU.It ensures that the list of candidates for a voter's constituency is displayed on both the public display and the RBU simultaneously as soon as the voter's constituency card is read by the CCR.

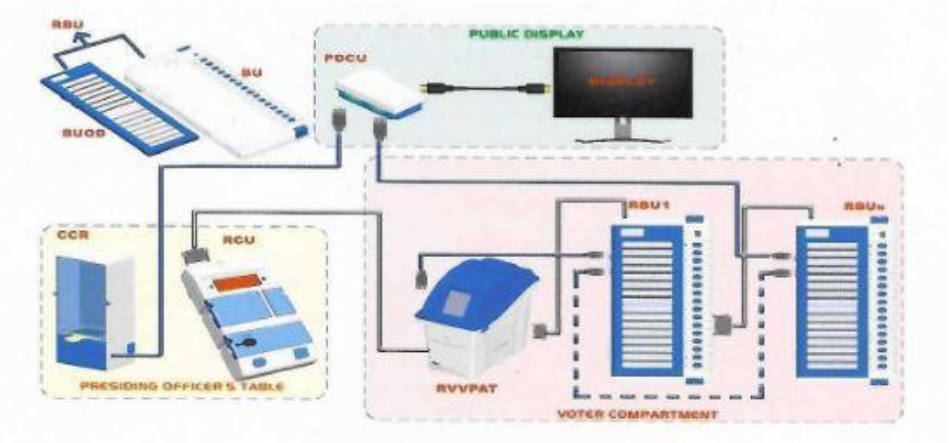


Image Source: letter to political parties by ECI: discussion on improving voter participation of domestic migrants using remote voting (accessed on: 15/05/2024)

Proposed commissioning process for RVMs: the Home Returning Officers (ROs) is in charge of creating the electronic ballot based on the finalised ballot paper confirmed after the candidate withdrawal period which is then forwarded to Remote Returning Officer (RRO) . The RRO is incharge of loading all the constituency symbols into the RSLUSs. This process can be audited by the representatives of the political parties and candidates, who can view the symbols in real time on a screen or monitor. This ensures transparency and confidence in the remote voting process.

The proposed voting process starts with the Presiding Officers verifying the voters identity which is followed by the Constituency Card scanning using the CCR. After scanning using the CCR the ballot sheet details for the respective constituency are displayed on a large screen through the Public Display Unit and on the RBU. This display gets dynamically updated based on the constituency card which is read by the CCR. The voter can then select their preferred candidate on the RBU and then the vote is recorded with state code, constituency number and candidate number in the RCU. The RVVPAT then prints the slip with the candidate name, symbol, state code, constituency code and serial number.

The counting process in remote voting according to the prescribed RVM model for multi-constituency remote polling stations starts when RCU records the total votes for each candidate in each constituency. The total for each constituency and candidate are sequentially displayed. The results are then shared with the concerned Home ROs who is in charge of accurate and transparent counting of votes.

On 29th December 2022 the ECI released a press note which summarised the contents in the letter to political parties by also highlighting legal challenges, administrative challenges and technological challenges regarding remote voting technology.

Similar efforts for technological advancement have been initiated in the state levels also. Bihar has initiated an enhanced Facial ID based voting system in partnership with FaceTagr a private technological company. Together they installed Facial ID based voting in 3000 booths in Bihar. FaceTagr's system successfully verified 1.5 million individuals in uncontrolled environments with no proper lighting and challenging angles. FaceTagr also developed an app called SvaDESH which is an android based application which also can be used to initiate Face ID based election conduct in any uncontrolled environment.

The Telangana State Election Commision (TSEC) launched a pilot initiative which shows a DLT based E-voting application. The TSEC e-Vote application is developed by the Centre for Development of Advanced Computing (C-DAC) with the support of the Information Technology, Electronics and Communications (ITE&C) Department of Telangana State. This application works on DLT based Blockchain technology and enables eligible voters to register their vote for their preferred candidate and constituency in elections using mobile phones.

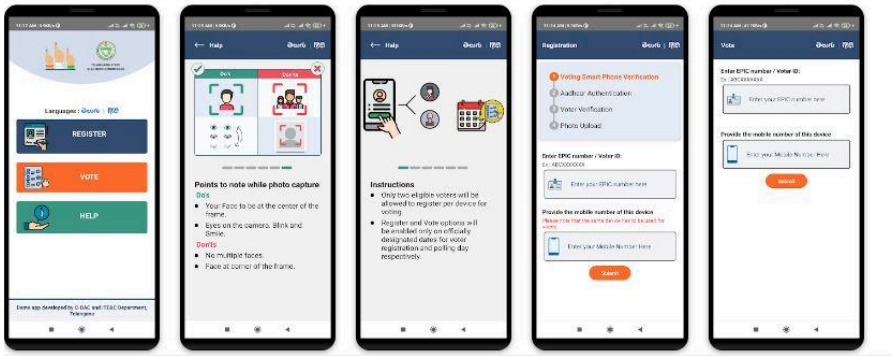


Image Source: Google play store, TSEC eVote app by C-DAC Hyderabad (accessed on: 15/05/2024)

5.4 Policy proposals for technological upgradation of election conduct mechanisms in local body elections, Kerala

Considering the pivotal role of elections in democracy and the sensitive nature of elections, it is imperative to modernise the election conduct mechanisms and associated governance aspects. This policy proposal outlines strategies to leverage most modern and secure technologies like DLT and Blockchain to enhance and upgrade the election conduct mechanisms in Local Body Elections in Kerala. This policy proposes the adoption of innovative solutions like blockchain based E-voting systems, biometric authentication and advanced data management tools to conduct transparent, secure and friendly electoral processes within Local Body Elections in Kerala.

Inorder to bring up solutions to increase the voter participation, security and transparency of the election process, this policy proposes two technological innovations:

1) Blockchain based RVM kiosk
2) Blockchain based Mobile voting application

Both these methods have two major segments for voting: the identification, authentication phase and the ballot recording phase.

5.4.1 Blockchain based RVM kiosk

This Remote Voting Machine is more like the one piloted by ECI, major difference is that ECI's model is a non networked machine while the proposed RVM is a DLT based blockchain connected RVM kiosk. The linkage with blockchain network eliminates the

requirement of some physical components like the ballot storing component, VVPAT component etc. since the connectivity is blockchain based, it ensures tamper proof recording of votes and uploading it to a database which is hack-proof and tamper proof.

➢ **Technology behind blockchain based RVM kiosk**

The proposed RVM kiosk features a complete digital interface which is networked to a blockchain system into which the votes are encrypted into which can only be decrypted by the Election commission during the time of vote counting. The interface is Artificial Intelligence (AI) enabled. The machine is equipped with a face ID with retina scanner and fingerprint scanner to ensure proper identity authentication. The AI enabled biometric verification can help the system to properly trace and authenticate the voter with additional information provided through the Identity cards. The machine has a digital display interface with a processor and RAM which replicates a computer. All the inputs to the machine are conducted using the digital interface which then immediately encrypts the entries into the blockchain based DLT network.

➢ **Voting process using blockchain RVM Kiosk**

The voting process under the proposed machine is divided into two phases: the identification/authentication phase and the ballot recording phase.

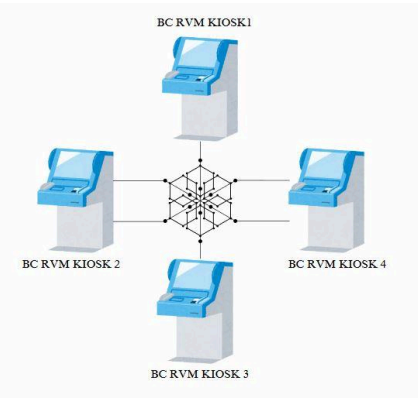
1) The identification/authentication phase

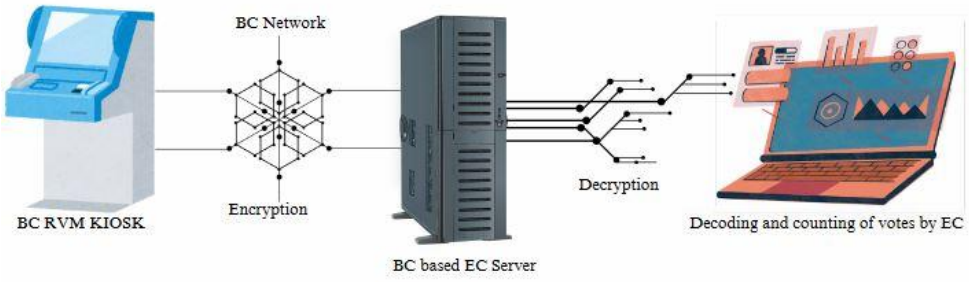
   The voter has the option to choose the ID they want to authenticate themselves with. They have the provision to authenticate with Aadhaar card or voter ID issued by ECI. Which will be further proceeded with a biometric verification

and registration of attendance using the Face ID with retina scanner as well as the fingerprint authentication. The AI enabled system will use the biometric information and match it with the existing database to properly map and authenticate the voter. The AI enabled Face ID has the potential to trace and verify the face of the voter in comparison with the face they provided for the ID card. This biometric attendance seeking will mark the attendance of the voter and can be used to match with the biometric database of Aadhar to verify if it's the same person. After proper authentication and identification the corresponding constituency and the candidate list will emerge on the digital display unit based on the constituency registration on the voters list which the machine picks up from voters ID registration.

2) The ballot registration phase

After the display of candidates list and name on the digital display unit the voter can select their preferred candidate and mark their vote. A confirmation pop up window comes up reassuring the voter of their choice. After the confirmation, a digital form of VVPAT and a unique alpha-numerical serial code will be generated and displayed on the screen which vanishes after a 7 second time. This reassures the voter of their choice and ensures transparency and integrity.





➢ Benefits of blockchain based RVM over ECI's RVM prototype

- Cost benefit- ECI's RVM is a non-networked machine which requires many physical components accompanied with human resources to aid voting process, storing of ballots, VVPAT printer etc. the proposed blockchain based RVM is a DLT networked machine with a digital interface which encrypts the vote entered into the blockchained network in real time eliminating the requirement of additional physical components and associated human resources work which is automated by the blockchain network. This significantly cuts the cost of the election conduct process.
- Security and integrity- The real time encryption and uploading of votes into the blockchained network cuts down the need to store physical ballot units, the need to ensure security of logistics of the ballot units and the VVPAT verification process. This ensures a quick, realtime and secure form of voting and post voting process.
- Speed- The real-time blockchain network connected RVM can fasten the election process and ensure higher voter participation in a shorter span of time avoiding the longer ques. This can facilitate and encourage more people to come forward and vote.

5.4.2 Blockchain based Mobile voting application

This is an even convenient form of voting process which is similar to the application created by Telangana State Election Commission. This features an application which works on a blockchain network to register the votes.

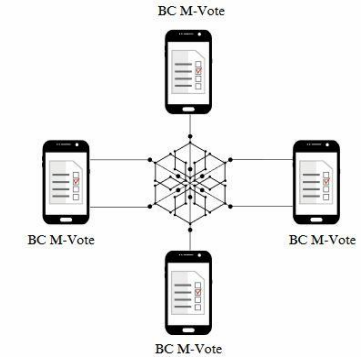
➢ Technology behind the blockchain based Mobile Voting application

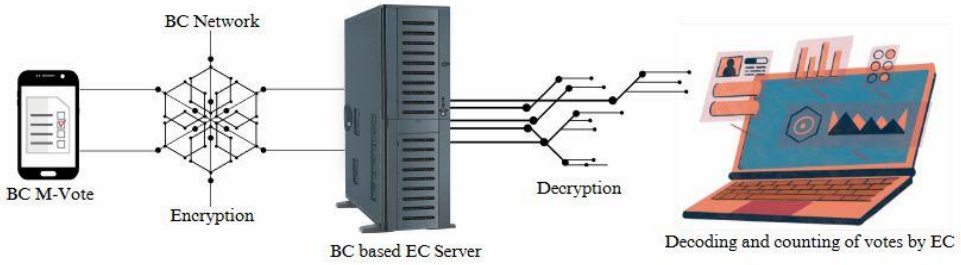
The major requirement for this technology is a blockchain based mobile application which can work on both android and ios platforms. The application will be networked to a blockchained ecosystem onto which the inputs are encrypted into. The application is equipped with Face ID or facial recognition feature like the one deployed and piloted by FaceTagr in Bihar, and is AI enabled which can trace and map the user using. This can be additionally secured with fingerprint security in devices with fingerprint scanners. Biometric verification with AI technology can enable efficient voter verification. The application does not allow any other applications to work in the background. The application traces the device IP address to prevent multiple votes registering from the same device. The application can allow a maximum of 2 votes to be registered under one device after proper scrutiny and authentication.

➢ Voting process using blockchain based mobile voting application

The voter after downloading the application has to mandatorily do the identification and authentication phase using voters ID or Aadhar ID. During the voting time, the user has to identify and authenticate by giving biometric attendance using facial recognition and

fingerprint authentication. This marks the attendance of the voter. Which then takes them to another screen with the constituency and candidates list based on the constituency mentioned in the IDs. the voter can choose their preferred candidate and their symbol to register their vote. A confirmation window with the selected candidates name and symbol will pop up to reassure the voter of their choice. After final submission, a digital resemblance of VVPAT is generated with another screen popping up with the voted candidates name and symbol followed by a unique alpha-numerical code which vanishes after a 7 second time. The input generated is encrypted into the blockchain network which can only be decrypted by the Election Commission while counting votes.





6. Implementation strategies for the proposed policy

For the proper implementation of the proposed policy, changes have to be initiated in the legislative sphere as well as systemic or institutional sphere.

6.1 Legislative changes for proposed policy implementation:

The proposed policy recommendation to be implemented in Local Body Elections in Kerala requires amendments in some legislative provisions in Kerala Municipality Act 1994 and Kerala Panchayati Raj Act 1994. Gujarat implemented such a legislative amendment to bring in E-voting in the Bombay Municipal Corporation (Conduct of Election) Rules, 1994 by first releasing a notification in 2010 to seek for objections from the affected stakeholders. They proposed an amendment in rules by adding section 52U (after 52T) to bring in provisions for E-voting. The Gujarat State Election Commission later used the powers conferred to them in Rule 52U to conduct E-voting in elections. The Rule further elaborated the provisions and details for conducting E-voting (SEC Gujarat, 2011).

Amendments required in Kerala Municipality Act 1994 to facilitate Remote or E-voting includes amendment to section 130B (last amended in 2020) which mentions the introduction of EVMs to local body election at municipality level. This section has to be amended to add in provisions related to Remote Voting and Mobile Voting on blockchain technology. Required rules should be added under the section after amendment which caters to the usage of the proposed machines for voting in accordance with the existing rules of conduct of elections.

Kerala Panchayati Raj Act 1994 requires amendments to section 74B (last amended in 2020). This section speaks about the introduction of EVMs to local body elections at panchayat level. This section has to be amended to add in provisions related to Remote Voting and Mobile Voting on blockchain technology. Required rules should be added under the section after amendment which caters to the usage of the proposed machines for voting in accordance with the existing rules of conduct of elections.

6.2 Systemic/Institutional changes for proposed policy implementation:

6.2.1 Stakeholder mapping and stakeholder awareness

All the stakeholders who are impacted by the change in the voting process due to the upgradation into blockchain based remote and mobile voting services have to be traced, identified. They are to be made aware of the changes that are going to take place and how it will benefit them and ease the electron conduct mechanism. Three of the major stakeholders who are to be emphasised includes:

- Personnel/Human resources within the Election Commission - being the frontline group who has to deal with the changed and upgraded voting mechanism , it is important and necessary to equip these groups of personnel with the right technical as well as impact of the upgraded voting process. The human resource within the Election Commission has to be properly educated on the technicalities and legalities of using the blockchain based voting mechanism.
- Voters/Participants of election - being the group of people for whom these policies are to be mended for, their empowerment about the new voting technology is pivotal. The policy suggests massive campaign efforts through

social media, mainstream media, press releases and awareness campaigns to educate the participants of the democratic process about the proposed policy reform and the new technology. The voters are to be made familiar and convinced about the new technology and method of voting.

- Establishments/institutions - this group involves important participants and pivotal establishments in democratic practices like political parties, other constitutional as well as statutory establishments etc. it is the duty of the Election Commission to convince this very important group of stakeholders about the updated technology and how it yields fruitful results. Political parties should be convinced about the tamper proof nature of the technology and how it increases voter participation. They should also be convinced about the transparency and integrity of the election process which will be fulfilled by the implementation of the proposed policy upgrade.

6.2.2 Technological enhancement

The facilitator of the election, which is the Election Commission, should be equipped with required technological infrastructure for the implementation of blockchain RVMs and M-voting application development . The policy suggests the creation of a special wing within the commission with technical aptitude to autonomously conduct the technical side of proposed policy implementation or outsourcing to a trusted technological consultancy under proper negotiations and documentation. A well trained human resource with technical as well as legal knowledge on how to conduct election under the proposed blockchain based voting systems will only aid in value addition to

the Election Commission and facilitates seamless election conduct using the proposed technology.

References

About ECI. (n.d.). Election Commission. Retrieved April 27, 2024, from https://www.eci.gov.in/about-eci

Berenjestanaki, M. H., Barzegar, H. R., Ioini, N. E., & Pahl, C. (2023, December 19). Blockchain-Based E-Voting Systems: A Technology Review. *Electronics*, *13*(1), 17. https://doi.org/10.3390/electronics13010017

Chaudhary, A. (n.d.). *How Blockchain can facilitate free and fair elections in India*. Moneycontrol. Retrieved May 15, 2024, from https://www.moneycontrol.com/msite/wazirx-cryptocontrol-articles/how-blockchain-can-facilitate-free-and-fair-elections-in-india/

The Constitution (Seventy - Fourth Amendment) Act, 1992 Background. (n.d.). Ministry of Housing and Urban Affairs. Retrieved April 27, 2024, from https://mohua.gov.in/cms/The-Constitution.php

Hayes, A. (n.d.). *Blockchain Facts: What Is It, How It Works, and How It Can Be Used*. Investopedia. Retrieved May 21, 2024, from https://www.investopedia.com/terms/b/blockchain.asp#citation-50

In 1953 the first local body elections were held under the provisions of the then Travancore - Cochin Panchayat Act, 1950. (n.d.). State Election Commission Kerala. Retrieved April 30, 2024, from https://www.sec.kerala.gov.in/public/milestones

Jain, S. (2023, February 17). *How Does the Blockchain Work?* GeeksforGeeks. Retrieved May 21, 2024, from https://www.geeksforgeeks.org/how-does-the-blockchain-work/

Kalia, S. (2024, April 8). *A brief history of EVMs in India | Explained*. The Hindu. Retrieved April 30, 2024, from https://www.thehindu.com/news/national/history-of-electronic-voting-machine-evms-in-india/article68015562.ece

The Kerala Municipality Act, 1994. (n.d.). State Election Commission Kerala. Retrieved May 2, 2024, from https://www.sec.kerala.gov.in/portal/resources/downloadAttachment/ea78b52a-d647-4d8b-8d01-c741f350943c

The Kerala Panchayati Raj amendment bill, 2021. (n.d.). PRS India. Retrieved May 2, 2024, from https://prsindia.org/files/bills_acts/bills_states/kerala/2021/Bill%20no.%2042%20of%202021_Kerala.pdf

Legal History of EVMs . (2022). Election Commission of India. Retrieved April 30, 2024, from https://www.eci.gov.in/eci-backend/public/uploads/monthly_2022_11/10386732_LegalHistoryofEVMsandVVPATs_pdf.a942a6ed2e36892f92adecb5e88f6d3d

Local Self Government Department Kerala. (n.d.). The Kerala Panchayati Raj Act and Rules. Retrieved May 2, 2024, from https://dop.lsgkerala.gov.in/ml/system/files/article/Kerala%20Panchayati%20Raj%20Act%201994%20and%20Rules.pdf

Municipalities Act – Department of Town & Country Planning. (2021, September 16). Town Planning. Retrieved May 2, 2024, from https://townplanning.kerala.gov.in/2021/09/16/municipalities-act/

Nevil, S. (n.d.). *Distributed Ledger Technology (DLT): Definition and How It Works*. Investopedia. Retrieved May 15, 2024, from https://www.investopedia.com/terms/d/distributed-ledger-technology-dlt.asp

The Representation of The People Act, 1950 (43 of 1950. (2016, November 3). Legislative Department. Retrieved April 27, 2024, from https://lddashboard.legislative.gov.in/electionlawsrelated/representation-people-act-1950-43-1950

The Representation of The people act, 1951 (Act no. 43 of 1951. (2016, November 3). Legislative Department. Retrieved April 27, 2024, from https://lddashboard.legislative.gov.in/electionlawsrelated/representation-people-act-1951-act-no-43-1951

The Representation of Peoples Act, 1951. (n.d.). India Code. Retrieved April 30, 2024, from https://www.indiacode.nic.in/bitstream/123456789/2096/5/a1951-43.pdf

73rd Constitutional Amendment Act, 1992. (n.d.). Ministry of Panchayati Raj. Retrieved April 28, 2024, from https://panchayat.gov.in/document/73rd-constitutional-amendment-act-1992/

State Election Commission Kerala. (n.d.). *Rules and Acts*. State Election Commission Kerala. Retrieved May 2, 2024, from https://www.sec.kerala.gov.in/public/resources/ntg/acts