Chapter

The Applicability of Internet Voting in Africa

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Abstract

The covid-19 pandemic has brought about new ways of conducting business through the use of Information Communication Technologies and elections have not been spared either. Internet voting is another form of strengthening democracy through the use of Information Communication Technologies. Africa lags in the implementation of electronic voting, especially Internet voting. This chapter applied a critical socio-technical analysis that analyses factors that influence the applicability of Internet voting within the African context. The researcher applied desktop research which included 30 journals to gather data from the Internet and other documentation sources. The findings reveal that decision-makers can partially implement Internet voting in some of the countries in Africa like Kenya, Libya, Nigeria, Morocco, Mauritius, Tunisia, and Seychelles. To successfully implement Internet voting, the decision-makers in African nations have to fully invest in the Information Communication Technology infrastructure, provide the necessary security, legislation and carry out intensive voter education to build trust among voters.

Keywords: Covid-19, lockdown, pandemic, Internet voting, critical socio-technical analysis, democracy

1. Introduction

Democracy has formed the foundation of governance in the world, with every voter willing to express his/her views on the ballot [1, 2]. Elections have been held manually and electronically in both the developed and developing nations, some results have ended in contestations and wars erupting after the elections. Covid-19 has had a devastating effect on the political, social, and economic spheres in the world [3]. The way of running elections was also affected by this pandemic as nations sought to find ways of halting the spread of the disease. In developed nations countries like Estonia and other American states have been implementing Internet voting.

Africa is constituted by 54 countries with diversified democracies [4]. Eritrea is the only country that does not hold regular elections as has continuously postponed elections citing security threat from its neighbors Ethiopia and Djibouti. The African nations have diversified electoral systems, with some countries like Zimbabwe implementing first past the post and proportional representation, and South Africa, the proportional representation in their polls [5]. Most of the African countries hold regular manual elections as demanded by the United Nations Universal Declarations on elections.

The prospects for the growth of democracy in the 21st century in Africa depend on how the continent positions itself for value-adding services such as

Internet voting. Covid –19 has forced the world to quickly develop and implement Information Communication Technologies (ICT) opportunities previously unimaginable. For Africa to take advantage of this, an effective enabling environment and use of ICTs is a particularly important contributor to modern democracy.

2. Literature review

Internet voting is where a ballot is cast by the voter through the Internet [6]. The use of Internet voting gained popularity in Estonia since 2001. Estonia is the first country to carry out a successful pilot project in municipal elections in 2005. Estonia went on further to first use Internet voting in the 2007 parliamentary elections [7].

The four kinds of Internet voting are kiosk Internet voting, polling-place Internet voting, precinct Internet voting, and remote Internet voting (Canada-Europe Transatlantic [8]). Kiosk Internet voting involves the use of a computer at a specific location (an authorized internet polling station) that is controlled by election officials. This differs from a standalone electronic voting machine because the ballot is immediately transmitted over the Internet to the central vote-counting site. Polling-place Internet voting is conducted through the use of a computer at any polling station and is supervised by the usual election officials. Precinct Internet voting is very similar to polling-place voting except that it must occur at the voter's designated precinct polling station (voters are only allowed to cast their ballots at polling stations where they are registered). Remote Internet voting is where a voter cast the ballot from the comfort of their homes or where the is Internet provision [9]. The advantages, disadvantages, and countries that are implementing Internet voting are shown in **Table 1**.

Internet Voting type	Advantages	Disadvantages	Countries implementing the system
1. Remote Internet voting	• Convenient and accessible for voters who have Internet access at home, at work, or abroad; and for persons with disabilities, the military, single parents, voters who are traveling, etc. • Flexible voting time for voters • Flagging of ballot errors • Replication of ballot images without voter information for counting or audit purposes • Lower cost than traditional methods • Potential to enhance electoral efficiency • Faster and more accurate election results • Elimination of long queues • Instant absentee ballot • Font size and screen language can be modified	• Limited access to the Internet or limited understanding on part of some voters • Possibility of stolen voter packages or identification cards • Misuse of voter's Identity Card (ID) and personal information voting by others without the knowledge of the voter • Difficulty verifying voter ID • Possible pressure on voters to vote a certain way if in the presence of others • Hacks or viruses attacking the systems and altering election results • Technical difficulties, programming errors, or server malfunctions • Inaccuracies of the voter's list, resulting in one voter receiving a card intended for another voter	Australia (for military and persons with disabilities only), Austria, Canada, Estonia, Netherlands, Switzerland, USA (for the military-), UK (project canceled)

Internet Voting type	Advantages	Disadvantages	Countries implementing the system
2. Kiosk Internet voting	• Placement inconvenient high traffic locations (for example, malls and supermarkets) • Flexible voting time for voters • Flagging of ballot errors • Replication of ballot images without voter information for counting or audit purposes • Potential to help address the voting needs of certain groups of voters (persons with disabilities, single parents, etc) • Potential to enhance electoral efficiency • Faster and more accurate election results • Elimination of long queues	• Lack of paper trail to allow auditing and recounts • In the case of a power outage, no alternate method is available • Cost of machines • Software may sometimes be unreliable • Voters may leave the voting screen before the ballot is officially cast • Hacks or viruses attacking the system and altering results • Voters may be pressured to vote a certain way if in the presence of others • Technical difficulties, programming errors, server malfunctions • Machine updating and cost • Candidate representative's oversight function may be diminished • Inaccuracies on the voters' list could result in one voter receiving a card intended for another voter	France
3. Polling place Internet voting	• Eliminates mismarked or spoiled ballots and other invalid results • Programmable machines to dispense ballots for any election • Removal of authentication questions so voter identification is most similar to the traditional process • Assistive devices to improve accessibility for voters with disabilities • Faster and accurate election results • Font size and screen language can be modified	• Auditing and recounts can be questioned if there is no paper trail • In the case of a machine failure (that is, power outage) no alternate method is available • Cost of machines • Software may sometimes be unreliable (many machines have a negative reputation based on failure in USA trials) • Voters may leave the voting screen before the ballot is officially cast • Little advantage for voters in terms of convenience • Machine updating could also be an issue and costly	Australia, Belgium, Brazil, Canada, Finland, France, Germany, India, Ireland Netherlands, Norway, Portugal, Spain, Switzerland, United Kingdom, United States of America

Internet Voting type	Advantages	Disadvantages	Countries implementing the system
4. Precinct Internet voting	• Elimination of mismarked or spoiled ballots and other invalid results • Programmable machines to dispense ballots for any election • Assistive devices to improve accessibility for voters with disabilities • Removal of authentication questions so that voter identification is most similar to the traditional process • Faster and accurate election results • Font and screen language can be modified	• Auditing and recounts can be questioned if there is no paper trail • In the case of machine failure (that is power outage), no alternate is available • Machines are expensive • The software can sometimes be unreliable • A voter may leave a voting screen before the ballot has been officially cast • Little additional convenience for voters • Machine updating could also be costly	
5. Telephone/ Mobile/ Voice over Internet Protocol (VOIP)	• Convenience and accessibility for voters who have telephones or mobile gadgets; and for certain groups of voters (persons with disabilities, military, single parents, travelers, etc. • Flexible voting time for voters • Flagging of ballot errors • Familiar technology, especially for those familiar with telephone banking • No ballot printing • Fewer elections staff and poll locations • Less costly • Potential increase in voter turnout • Enhanced electoral efficiency • Elimination of long queues	• No paper trail makes traditional recount impossible • Possibility of stolen voter packages or identification cards • Difficulty verifying voter ID • Must ensure candidate representative's function is written into the program (e.g. Halifax candidate module) • Others present may pressure voters to vote a certain way • Possible telephone/mobile lines overloading or phone service interruption • Inaccuracies on the voter' list could result in one voter receiving a card intended for another voter	Netherlands, United Kingdom

Source: Sambo [10].

Table 1.
Comparison of internet voting methods.

As shown in **Table 1**, Internet voting is necessitated by the demographics of a country especially people living abroad who would want to exercise their democratic right but will not be residing within the citizenry country during an election. Chisinau [11] argues that Internet voting will allow voters to cast their ballots at the comfort of their homes or convenient places. Voting through the Internet is easier as voters can cast ballots using their own devices and there is no time wasted in long queues. Voters do not travel long distances, thus reducing transportation costs and can do other business chores. It allows for inclusivity as people living with disabilities or serious medical conditions can exercise their democratic rights. Internet voting will also allow those people who will be traveling or will be on duty during election day to cast their ballots anywhere in the world [12].

The disadvantage of Internet voting is that it consists of a large complex network which makes it difficult to monitor the entire network, thus posing a serious security threat. The monitoring of the network is very expensive of which there is no 100 percent guarantee that the network will be secure. Hackers could use malware to rig the outcome of the elections, by tampering with the way votes are submitted and counted or even casting votes for people who did not vote. Internet voting may be a source of conflict between political parties if one party considers that Internet voting might be beneficial to the other party/parties [12].

2.1 Critical socio-technical analysis

The critical socio-technical analysis [10] which is premised on analyzing an information system during the systems development life cycle was used to identify key factors in the applicability of Internet voting in Africa. By finding key factors affecting the applicability of Internet voting in Africa, it is expected that decision-makers would come up with strategies that support the successful implementation of such systems.

African Electoral Management Bodies (EMBs) have been using manual systems in general elections for the past decades which has resulted in disputed elections, high operating costs affecting the Gross Domestic Product (GDP) because of systems and processes inefficiency. Only two countries, the Democratic Republic of Congo and Namibia have used polling stationed-based electronic voting machines which do not have Internet connectivity [13]. Covid-19 has not helped the situation either as countries have been forced into lockdowns, compelling nations to postpone elections. The introduction of Internet voting especially casting a ballot outside a polling station is the most difficult technological upgrade for an Electoral Management Body (EMB) as it involves the core of the entire electoral process [14]. This chapter investigated 'why' and 'what' factors were affecting the applicability of Internet voting in African general elections.

3. Methodology

In this study, desktop research was used to collect data from 30 journals and other documentation about factors affecting the applicability of Internet voting in Africa. The critical socio-technical analysis was then used to guide this study in the search and analysis of factors such as political, social, technical, legal, security, privacy, trust, and transparency affecting the applicability of Internet voting in Africa. These factors were selected after critically analyzing contemporary issues in developing and developed countries successfully implementing, on trials or have abandoned the implementation of Internet voting.

4. Findings

While the benefits from Internet voting will guarantee the rights of citizens to exercise their democratic rights, the study discovered that no country in Africa is implementing Internet voting in general elections. The factors affecting the applicability of Internet voting in Africa are political, legal, social, technical, security, privacy, transparency, and trust.

4.1 Political

Africa has the most number of people that flee their countries seeking greater opportunities from developing and developed nations [15]. Citizens from African

countries migrate to other countries due to the effects of climatic changes, such as droughts, storms, and flooding. Other factors such as economic and political stability (wars) also force nationals to migrate to other countries seeking better opportunities [16]. The migration of people allows African countries to offer their citizens their democratic rights by allowing them to vote through the Internet. Some African governments also tend Internet shutdowns citing national security or curbing the spread of fake news during elections, for example, the Ugandan, Libya, Malawi, and Sudan Presidential elections [17] which makes it difficult to implement Internet voting.

4.1.1 Legal

The legal framework allows voters to exercise their rights during an election or absentee voting through the Internet [18]. For African citizens living abroad or who will be committed during election day to exercise their democratic right, there must be legislation that supports Internet voting. The legal framework empowers the EMB and other stakeholders to remove the element of mistrust, as the voting process is done within the confines of the law. At the moment no country in Africa is exploring the use of Internet voting rendering the introduction of such legislation a futile exercise.

4.1.2 Technical

African countries are still facing challenges in the implementation of mobile communication and Internet technologies [19]. Countries like Somalia, South Sudan, and Mozambique have often been affected by ravaging wars, which destroys infrastructure and forcing these countries into retarded economic growth. As shown in **Table 1**, the limitation in the Internet penetration factor is that the network service providers do not provide 100% service coverage. This makes it practically impossible to offer Internet voting within the country for national general elections as some other communities will be disadvantaged by failing to access the service to cast their ballots. The penetration of internet communication in Africa is very low at 43% as shown in **Table 2**. Countries like Kenya, Libya, Mauritius, Nigeria, Morocco, Seychelles, and Tunisia have a higher national Internet penetration factor. These countries can partially implement Internet voting in some of their regions. Other African nations especially that are below 50% like Eretria, Togo, Western Sahara, South Sudan, Sierra Leone, and Somalia will have difficulties in implementing Internet voting nationally.

4.1.3 Social

There is a wide gap between the digital divide within the African nations especially between the urban and the rural community, the elderly, and the young generations [20]. The young generations have embraced technology as they use smartphones and laptops as communication and business tools. A large population in African countries live in rural communities. Some of these people cannot afford to buy gadgets, power, and data used for Internet services. There is also a lack of digital skills and literacy among the communities both in urban and rural setups especially among the elderly. The content or language used on the Internet makes it difficult for some African communities to comprehend the importance of using such services. Hence the use of Internet voting in African countries will be difficult because of the digital divide.

4.1.4 Security

Internet voting should be secure for the results to be credible [21]. Key factors such as freedom, and equality during an election are important aspects of security

Country	Estimated Population	Estimated Registered Voters	Estimated Voter population	Internet Users 31 December 2020	Penetration (% Population)
Algeria	44,616,624	24,474,161	27,992,084	25,428,159	57.0%
Angola	33,933,610	4,992,399	5,967,849	8,980,670	26.5%
Benin	12,451,040	4,802,303	5,378,554	3,801,758	30.5%
Botswana	2,397,241	924,709	1,444,142	1,139,000	47.5%
Burkina Faso	21, 497,096	2,395,226	2,497,500	4,594,625	21.4%
Burundi	12,255,433	5,113,418	5,863,257	1,606,122	13.1%
Cabo Verde	561,898	392,731	N/A	352,120	62.7%
Cameroon	27,224,265	6,900,928	13,001,295	7,878,422	28.9%
Central African Rep.	4,919,981	1,954,433	2,005,942	557,085	11.3%
Chad	16,914,985	6,252,548	5,809,346	2,237,932	13.2%
Comoros	888,451	313,647	474,387	193,700	21.8%
Congo	5,657,013	2,221,596	2,617,983	833,200	14.7%
Congo Dem. Rep.	92,377,993	40,371,439	44,138,661	16,355,917	17.7%
Cote d'lvoire	27,053,629	7,359,399	15,503,401	12,253,653	45.3%
Djiboti	1,002,187	215,687	609,344	548,832	54.8%
Egypt	104,258,327	63,157,351	63,705,978	54,741,493	52.5%
Equatorial Guinea	1,449,896	325,555	417,365	362,891	25.0%
Eritrea	3,601,467	N/A	N/A	248,199	6.9%
Eswatini	1,172,362	546,784	N/A	665,245	56.7%
Ethiopia	117,876,227	36,851,461	49,011,364	21,147,255	17.9%
Gabon	2,278,825	680,194	1,177,350	1,367,641	60.0%
Gambia	2,486,945	886,578	1,151,645	442,050	19.0%
Ghana	31,732,129	17,027,641	N/A	14,767,818	46.5%
Guinea	13,497,244	5,410,089	6,556,813	2,551,672	18.9%
Guinea-Bissau	2,015,494	645,085	935,920	250,000	12.4%
Kenya	54,985,698	15,590,236	25,374,082	46,870,422	85.2%
Lesotho	2,159,079	1,254,506	N/A	682,990	31.6%
Liberia	5,180,203	2,183,629	2,319,382	760,994	14.7%
Libya	6,958,532	1,509,218	4,029,365	5,857,000	84.2%
Madagascar	28,427,328	10,302,194	14,291,036	2,864,000	10.1%
Malawi	19,647,684	6,859,570	10,030,988	2,717,243	13.8%
Mali	20,855,735	7,663,464	8,920,714	12,480,176	59.8%
Mauritania	4,775,119	1,417,823	2,125,242	969,519	20.3%
Mauritius	1,273,433	941,719	1,044,325	919,000	72.2%
Mayotee (FR)	279,515	N/A	N/A	107,940	38.6%
Morocco	37,344,795	15,702,592	23,126,996	25,589,581	68.5%
Mozambique	32,163,047	13,153,088	13,554,684	6,523,613	20.3%
Namibia	2,587,344	1,358,468	1,479,603	1,347,418	52.11%
Niger	25,130,817	7,446,556	9,623,301	3,363,848	13.4%
Nigeria	211,400,708	82,344,107	106,490,312	154,301,195	73.0%
Reunion (FR)	901,686	110,968	N/A	608,000	67.4%
Rwanda	13,276,513	7,172,612	N/A	5,981,638	45.1%
Saint Helena (UK)	6,086	2,309	N/A	2,300	37.8%

Country	Estimated Population	Estimated Registered Voters	Estimated Voter population	Internet Users 31 December 2020	Penetration (% Population)
Sao Tome & Principe	223,368	97,274	105,318	63,684	28.6%
Senegal	17,196,301	6,683,043	8,071,074	9,749,527	56.7%
Seychelles	98,908	74,634	N/A	71,300	72.1%
Sierra Leone	8,141,343	3,178,663	3,284,182	1,043,725	12.8%
Somalia	16,359,504	4,220,466	N/A	2,089,900	12.8%
South Africa	60,041,994	25,809,443	37,372,792	34,545,165	57.5%
South Sudan	11,381,378	4,800,000	N/A	900,716	7.9%
Sudan	44,909,353	13,126,989	19,667,400	13,124,100	29.2%
Tanzania	61,498,437	29,754,699	29,480,237	23,142,960	37.6%
Togo	8,478,437	3,738,786	4,645,140	1,011,837	11.9%
Tunisia	11,935,766	7,065,885	8,219,612	8,170,000	68.4%
Uganda	47,123,531	8,219,612	8,219,612	18,502,166	39.3%
Western Sahara	611,875	N/A	N/A	28,000	4.6%
Zambia	18,920,651	6,698,372	7,331,669	9,870,427	52.2%
Zimbabwe	15,092,171	5,695,706	7,650,931	8,400,000	55.7%
Total Africa	1,373,486,514			590,296,163	43.0%
Rest of world	6,502,279,070	N/A	N/A	4,463,594,959	68.6%
World Total	7,875,765,584			5,053,891,122	64.2%

Source:https://www.internetworldstats.com/stats1.htm, https://www.idea.int/data-tools/continent-view/Africa/40

Table 2.
Internet users statistics for Africa.

requirements for Internet voting. The transmission of all voting data to servers or tabulation centers must be secure. All voting which is done whether on the Internet or otherwise should be granted the same status as any other vote cast in the same election. This means that each vote should be given the same weight as it also determines the outcome of an election [22]. Various encryption methods have been suggested for use with Internet voting including the blockchain [23]. African countries should have networks that can encrypt ballots cast over the Internet without the network being compromised, overloaded, or due to other disruptions like shutdowns.

4.1.5 Privacy

With the use of Internet voting, an EMB has to ensure that each vote cast remains a secret. A free election means that the voter must not be coerced by public or private pressure. After voting through the Internet, the voters should have an acknowledgment for the candidate that they have voted for. All ballots cast through the Internet should be accorded the same secrecy as in manual systems [24]. If a ballot is cast, the voter's identification details must be able to be authenticated and not linked to the ballot. The vote cast should also be accounted for in the outcome without identifying the voter. In Africa voter intimidation remains a serious challenge [25], thus through Internet voting, voters may be coerced to vote for undeserving candidates.

4.1.6 Trust and transparency

Trust in Internet voting can only be accepted if the results from this service are credible. The EMB should assure voters that their votes are secure and secret. To

build trust voters should also be able to verify that all collected ballots were from eligible voters and that they have been accurately counted [26]. If Internet voting is to be implemented in African countries pilot testing has to be undertaken to allow voters to test the system before being fully implemented in a general election. To build trust among stakeholders (voters, activists, and media) an EMB should be transparent in all the activities involved with Internet voting. To avoid mistrust from the public, the stakeholders should be educated on how Internet voting works and also made to appreciate the qualities of the system. Relevant information should be availed in a language that can easily be understood by the public. The information should include full technical documentation of how the system is designed functionally and technically, all levels of software documentation, source code, and the technical and organizational environments where the system is hosted.

4.2 Discussion and analysis

With the advent of the Covid-19 pandemic causing deaths, and unavoidable shutdowns, elections cannot be suspended indefinitely, decision-makers have to find alternative ways of conducting elections without compromising the health and safety of the electorate. Internet voting is one such method that may guarantee the health and safety of the electorate where voters can vote in the comfort of their homes. Decision-makers have to take note of the following during feasibility studies and implementation of Internet voting:

Politically, it is fundamental to foster a broad consensus among political parties for the implementation of Internet voting. This involves transparency where the relevant actors have a voice. Internet voting should be seen as politically neutral that is the new procedure should not benefit disproportionally given factions of the political spectrum [27]. For electoral results to be accepted by voters, Internet voting must produce an outcome that reflects the will of the people in an environment that establishes transparency and trust [14].

Technological and security concerns are often pointed to as the main concern of Internet voting [28]. To validate and verify the technological voting system the set of technological requirements have to be consulted systematically. In Africa, some voters live in remote areas but may also want to cast their ballots using the Internet. African countries have limited Internet infrastructure which should prompt governments to improve this area if its citizens are to benefit from Internet voting. The improvement on the infrastructure would also benefit an EMB during the voter registration process, as voters will be able to register through the Internet.

There have been numerous attacks of electronic voting systems over the Internet with the 2016 American Presidential election being the most contentious election of the decade [29]. The stakes of any general election are always high, which may create interests chief among them malicious actors-particularly in countries with specific geopolitical adversaries who may specifically create and deploy attacks or malware designed to manipulate the vote. In Africa, the use of Internet voting which has got limited transparency and audit trail may lead to manipulation and voter fraud. It will be very difficult to monitor votes cast over the Internet, to build trust among the citizens an EMB has to be trusted in pursuing its mandate.

Most electronic voting systems are now being developed with blockchain encryption [30, 31]. Blockchain technology is an end-to-end encryption method that secures ballots transmitted from voters' private devices to a centralized tabulation facility. However, it has been observed that most serious vulnerabilities threatening integrity and secrecy of voting happen before ballots ever reach the blockchain. Voters may be coerced by family members or other pressure groups to vote in a certain way that does not reflect their will. It is also difficult to validate if the voter is the real one casting the ballot which

Internet voting used in General Elections	Partial use of Internet voting and Special cases	Planned to be piloted or Piloted but Discontinued or Never Used
Estonia is the only country to allow citizens the option of online voting in local, national, and European elections	**Armenia:** Diplomatic staff and their families can vote online.	**France:** Voting was never used for out-of-country voters in the 2012 parliamentary elections but discontinued in 2017 due to security concerns; the government plans to bring it back in 2022. Out-of-country residents also voted online in the 2016 Republican party primaries.
	Australia: Online voting was trialed for out-of-country military personnel in 2017 but has been discontinued. New South Wales allows some groups- voters with disabilities, living in remote areas, out of state- to vote online, but there are no plans to extend this option to other states.	**India:** In 2010. Internet voting was trialed in the local elections in the state of Gujarat.
	Canada: Online voting is possible for municipal elections in some districts of Ontario and Nova Scotia. Canada has considered introducing Internet voting in federal elections.	**Norway:** Online voting for2011 local and 2013 national elections was made available in some districts. In 2014, Internet voting was discontinued for security reasons.
	Mexico: Some states have allowed online voting for out-of-sorts country voters.	In 2004, the **Netherlands** used Internet voting for an election to the *Rijnland* water board and in 2006 for out-of-country voters for national elections. Internet voting was discontinued in 2017 due to security concerns.
	New Zealand: Out-of-country voters can vote online.	**Spain:** In 2010, Barcelona held an online referendum on an urban development project. The voting was a one-off, online-only pilot and was highly controversial.
	Panama: Out-of-country voters can vote online.	**United Kingdom:** Online voting was trialed in local council elections between 2002 and 2007.
	Switzerland: Some cantons offer online voting to out-of-country voters- also in a few cases, to resident voters- in elections and referendums. The stated goal is to roll out Internet voting to the entire country**.**	**Russia:** is set to introduce its first online voting system. The system will be tested in a Moscow neighborhood that will elect a single member to the capital's city council in September 2019. One of the first experiments to introduce Internet voting was conducted by the Electoral Commission of the Volgograd Region during voting in Uryupinsk in 2009, and the Odintsovo district in 2010.
	United States: Despite the security concerns raised after a District of Columbia trial of Internet voting was hacked, more than 30 U.S. states allow military personnel and out-of-country residents to vote online. Voters using online or mail ballots waive their secrecy rights.	**Finland** has appointed a working group to study the technical feasibility of an online voting system. It determined that the technology does not yet sufficiently meet all the requirements, citing problems with reconciliation of verifiability and election secrecy

Source:http://www.europarl.europa.eu/RegData/etudes/BRIE/2018/625178/EPRS_BRI(2018)625178_E N.pdf

Table 3.
Countries that use internet voting (use of internet voting outside of polling stations in politically binding elections).

is crucial to the credibility of an election. Estonia, for instance, has resolved this issue without blockchain by using e-ID cards. Blockchain technology also does not protect against -denial-of-service attacks that make servers unable to operate, does not protect information as it travels on the Internet, and does not make servers and infrastructure more resistant to advanced persistent threats. Despite improvements in encryption techniques, security will always remain a challenge for Internet voting.

The major social challenge is the digital divide as some parts of the population remain excluded from Internet voting and that gap exists in African countries regarding computer literacy and household Internet usage and availability. The 'Digital transformation Strategy' adopted by African countries in February 2020 should be pursued to narrow the gap between the digital divide in urban and rural communities and also narrow the 'gender digital divide' [32].

Currently, most African countries do not have any legislation that supports Internet voting. The legal framework should be put in place to allow for Internet voting, which should clearly state who is eligible and the reasons that support eligibility.

Despite low usage in Internet voting around the world, Estonia is the only country that has fully utilized this service in general elections. **Table 3** highlights countries that have fully, partially, piloting and discontinued the use of Internet voting.

The success of Internet voting depends largely on how it is perceived by the people meant to use it: citizens. For example, Internet voting is difficult to be transparent as compared to manual systems. The transparency and reliability of Internet voting have been questioned, as this is electronically done. Therefore, it is fundamental to know what their attitudes towards the implementation of Internet voting would affect them.

5. Conclusions

The applicability of Internet voting in Africa largely depends on how the nation's willingness to adapt to new technology in the face of challenges such as political, legal, security, privacy, trust and transparency, the digital divide, and limited infrastructure. The successful experience of countries such as Estonia highlights the importance of a gradual, step-by-step design and implementation of Internet voting which may be used for benchmarking. It is also recommended that the perception of the citizens should be taken into consideration. African nations should also make an effort to improve the internal coverage of Internet services within their territories.

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