E-Voting: A South African Perspective

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Abstract. The South African democracy, despite being worthy of admiration, is in its infancy. As such its electoral processes still needs to be nurtured and protected. Since 1994 there has been four national elections. All of these have been declared "free and fair" by the Independent Electoral Commission. However, there has been some problems and growing pains. This paper firstly discusses the current electoral system in South Africa. It then examines E-voting systems and discusses the feasibility of such a voting system for use in the South African context.

1 Introduction

"The victory of democracy in South Africa is the common achievement of all humanity." [Mandela(2005)].

Democracy is one of South Africa's biggest achievements. Fifteen years ago, for the first time, all South Africans had the right to cast their vote. This included people of all cultures. Since 1994 South Africa has had four national elections considered to be "free and fair" by the Independent Electoral Commission (IEC) of South Africa.

However, elections are not by default "free and fair". It is the responsibility of the IEC to ensure the continued integrity of the South African electoral system. The "fairness" of an election is determined by a combination of factors, including people, processes and the system itself. Occasionally this system comes under attack from unscrupulous individuals. For example, in the 2009 election marked national and provincial ballot papers were found sealed in envelopes in KwaZulu-Natal before the elections actually took place [News24(2009)]. It would be naive to assume that similar attempts at influencing the vote would not occur in future elections. The process of voting in South Africa is questioned by some, how "free and fair" is the final result? [Ebersohn(2009)]. Not everyone in South Africa can experience democracy and receive the benefits from such a system. For example citizens visiting foreign countries, people with disabilities, and people with transport problems in rural areas do not necessarily have easy access to polling stations. There have also been reported cases of multiple votes being cast [Ebersohn(2009)]. This paper will examine the South African election system and discuss the viability of E-voting in South Africa as a way to improve the overall efficiency of the system, and to reduce the risk of future attacks on the integrity of the system.

2   Background on the South African Electoral System

Microsoft Encarta Encyclopedia Online defines democracy as "the free and equal right of every person to participate in a system of government often practiced by electing representatives of the people by the majority of the people." [Encarta(2009)].

In December 1993, the South African government permitted equal rights to all South African citizens [Athiemoolam(2003)]. South Africa's first fully democratic election was held between 26 and 29 April 1994. The Independent Electoral Commission (IEC), which included international observers, declared that South Africa had a free and fair election [lvarez Rivera(2006)]. Looking at South African history, having such efficient transition to democracy can be seen as a miracle. This event captured the attention of people all around the world [Athiemoolam(2003)].

After the first democratic election the government prescribed a constitution which has been called the "birth certificate" of a new South Africa. Chapter One of the constitution guarantees democracy in South Africa; every South African citizen over the age of 18 has the right to vote in the South African elections [Republic of South Africa(1996)]. This corresponds to the vision statement of the Independent Electoral Commission stating that South Africa should have a "free and fair" election giving every voter the opportunity to vote for his/her chosen parties [IEC(2004)]. The IEC has been responsible for the implementation of the electoral system for the elections in South Africa since the first democratic election in 1994.

The South African parliamentary election takes place every five years with elections held under an electoral system of proportional representation. A proportional system uses a political party list at provincial and national levels. The political party will be allocated a number of seats in direct proportion to the number of votes received in the election. The voter can only vote for a party not an individual of choice. To ensure a "free and fair" election the electoral commission of South Africa oversees the election process [IEC(2004)].

The IEC is a permanent body established in terms of the Electoral Commission Act of 1996. It is independent from government, but reports to Parliament. The IEC promotes democracy in South Africa and must ensure a "free and fair" election at all levels of government - national, provincial and local. This is accomplished through:

– Dividing South Africa into voting districts, this ensures equal access to polling stations and avoids problems associated with overcrowding;
– Arranging the logistics of the election. This includes Information Technology systems, staffing, management of conflicts and the education of voters;
– Registering eligible voters onto a voters roll;
– Ensuring the efficiency of running the voting process; and
– Counting, verifying and announcing the final results of elections [IEC(2004)].

As can be seen from this list of tasks the IEC is responsible for overseeing the whole election process and contributing to a "free and fair" election.

3   Electoral System Characteristics

In South Africa, since 1999 eligible voters had to register to cast a vote in elections. The 1999 election saw 18 172 751 voters register in 14 650 voting districts. In 2004, 20 674 926 voters registered in 16 966 voting districts and in 2009, 23 181 997 voters registered in 19 705 voting districts. Prior to the current voting process, voters were allowed to cast their vote without having to be on a voter's roll. The current process in South Africa allows the voter to cast a vote on a ballot paper using a pencil selecting a political party [IEC(2004)].

The cost of the physical ballot paper is the first identified characteristic. In the 2004 election 56 million ballot papers were printed in colour with the 11 official languages on the ballot papers. As per the EISA research report no. 12, the total cost of the 2004 election was R790 million - that is R50.59 per national vote. The 1999 election cost R713.5 million or R44.65 per national vote; and 1994 cost R960 million or R49.15 per national vote [Piper(2005)].

A possible drawback to the South Africa system is that there are a large number of illiterate adults. Statistics show that 24 % of adults in South Africa over the age of 15 are illiterate. The number of languages in South Africa can contribute to further problems when voters go to the polling stations. Casting a vote using a ballot form might sound simple for educated people, but for illiterate people this can be a challenging task [SouthAfrica.info(2006)]).

In addition, the Electoral Institute of South Africa recognized in the 2004 elections that some of the ballot papers were not clear and contributed to some confusion amongst voters which could have played a part in the 1,58 % spoilt ballots. In the 2009 election there were 239,237 spoilt ballots nationally and 223,462 provincially [IEC(2004)].

Another concern is confidence in the ballot form. According to a survey done by Citizen Surveys in October and November 2008, South African citizens were concerned that the secrecy of their ballot form could be compromised. A sample was conducted on 2400 South Africans revealing that 58 % had confidence in the secrecy of their ballot form (Concern about Ballot Secrecy, online). In a report delivered by the Electoral Institute of South Africa, the 2009 election showed that a large number of the election officials did not have a clear understanding of the counting process which lead to delays. They observed that some of the polling stations used one ballot box for both ballots; the national assembly and provincial legislatures. Also the seals on some ballot boxes were not applied using the correct procedures [EIS(2009)].

A further contributing drawback is the fact that poverty is one of South Africa's biggest challenges, 50 % of the population live in underprivileged conditions [wor(2009)]. Transport from rural areas to polling stations can decrease voting registration and participation. People may not have the necessary funds to travel to an election polling station, which can be the reason for voter turnout decreasing in the South African elections. In 1994, 84 % of eligible voters cast their vote. In the 1999 election that figure declined to 63 % and in 2004, the election had a 61 % turnout [Kersting(June 2007)].

People with disabilities can face some disadvantages when it comes to casting votes, depending on their disability. In South Africa there are approximately 4 million people with disabilities according to the Council for Scientific and Industrial Research. As an example; when a blind person, or some one else with a disability, has to rely on assistance when casting his/her vote by making use of the presiding officer at the voting station; the integrity of the vote might be influenced [IEC(2009a)].

A large percentage of South African citizens live abroad and were eligible to take part in the 2009 election. The Constitutional Court delivered this decision on 12 March 2009 allowing South Africans living abroad to vote in the 2009 elections [IEC(2009b)]. This is good for democracy in South Africa, but can lead to challenges such as voters having problems accessing an embassy to register and cast their vote.

South Africans should not only be able to vote, but should also have a system that can be trusted. The protection of information in an election is very important; therefore this information needs to be protected from threats [Von Solms and Von Solms(2008)]. The risks that threaten the confidentiality, integrity and availability of information must be mitigated or fully eliminated. This will contribute to having a "free and fair" election where voters will have confidence in their country's electoral system.

A possible solution to eliminate some of these challenges facing the electoral system in South Africa is making use of technology; the implementation of an electronic voting system.

4   Background on Electronic Voting Systems

Electronic voting is the use of electronic means to cast a vote and is also know as E-voting. Since 1960 electronic systems have been used in certain states in America and more recently remote electronic voting has been used in countries like Estonia, Switzerland and others. E-voting is meant to complement traditional voting methods. There are different types of E-voting methods, including punch cards, optical scan voting systems, direct recording electronic voting systems (DRE systems), Web-based voting systems, ballots and voting via telephone [Bellis(Undated)][Gritzalis(2002)].

4.1   Punch Card Voting Systems

Punch cards is a voting system that has been around for decades where the voter still has to go to a polling station to cast his/her vote. This method of voting makes use of a small clipboard-sized device with a card where the voter's choice is recorded on. The card slides into the device and uses a metal or stylus device to make a hole next to the political party or candidate of his/her choice. The ballot will then be tabulated with a card counter at the polling station or at a central location using card readers. There are two well known versions of this voting system i.e. votomatic vote recorder and the datavote vote recorder [Bellis(Undated)][Gritzalis(2002)].

4.2   Direct Record Voting Systems

Direct record electronic voting systems are also known as a DRE voting system. DRE systems are the electronic version of the older mechanical lever system. They are similar because both systems don't use ballot papers to record a vote on. The DRE voting machines have touch screens or make use of keyboards to cast a vote electronically. The DRE machine has a monitor that guides the voter through all the steps involved in an election. All the votes that have been made by voters are stored on the voting machines. Storage methods used are for example memory cartridges, diskettes or smart cards. DRE systems are one of the most recent additions in the development of E-voting systems i.e. using technology to cast a vote in an election [Bellis(Undated)][Gritzalis(2002)]. DRE voting systems could have many advantages in a South African context. For example; the use of such systems could help to address the problems associated with having eleven official languages, or, by paying attention to usability concerns, a DRE could also be customized to alleviate problems experienced by disabled voters. These, and many other possible advantages, could make DRE voting systems a viable option in future.

4.3   Optical Scan Voting Systems

An optical scan voting system makes use of "dark magic logic"; this is used to read a voter's ballot form by selecting the darkest mark on the form as the choice of vote. The voter will cast a vote on a ballot form, where the political party or candidate is pre-printed with an empty rectangle, circle, oval or arrow next to it. Selecting a political party or candidate of choice is done by filling in the empty rectangle, circle, oval or arrow. The voter will then feed this ballot form into a computer tabulating system to be counted. The ballot form can also be placed in a ballot box where it will be counted by electoral staff. Making use of the optical-scan machines at the polling station will give you confidence that your vote was counted immediately. Optical scan technology has been used for decades not only for voting, but also implemented in worldwide lottery systems [Bellis(Undated)][Gritzalis(2002)].

4.4   Internet Voting System

Internet-, or Web-based voting systems, is another electronic method of voting referred to as remote electronic voting. Remote electronic voting requires that the voter has access to an Internet connection. Some countries for example Austria, Canada, Switzerland and others are involved in running pilot projects for implementing a remote electronic system in their election. Estonia became the first country to use remote electronic voting in their elections. In Estonia a voter needs to have an electronic identification card. The voting process consists of the following; first the voter inserts the identification card into a card reader, a webpage opens where the voter will cast his/her vote. The voter will need to enter a PIN for verification and a server checks the credentials of the voter. The

server will also verify that the voter is eligible to cast his/her vote. After verification a list of the candidates appears and the voter can make his/her choice, this will be encrypted. A second PIN is required to confirm the selection using a digital signature. Security in a remote electronic system is very important for an election. Making use of the Internet gives a voter the opportunity to cast their vote from anywhere in the world giving everyone the opportunity to participate [Estonia Today(2009)].

5   Electronic Voting Characteristics

E-voting enables new methods of polling, which facilitates the comfort of voters, increases the opportunity to participate and the mobility of voters. This would be particularly beneficial for those citizens who live abroad, have transport problems or are disabled and consequently limited in terms of mobility. E-voting can be beneficial for voter turnout; potentially everyone would be able to take part in the election and easier election participation would be possible. Groups of people that will benefit would be, for example, young people that are increasingly using the Internet and older people that have mobility problems. Citizens living overseas will also have the ability to vote as access to the Internet is available worldwide [Brändli and Braun(2006)].

The current South African electoral system has some drawbacks and introducing E-voting could possibly help improve the system. E-voting can help with the reduction of ballot paper and employment cost in an election and contribute to reducing environmental effects by reducing paper consumption. The counting process and result tabulation when using E-voting will much faster. Initially, the E-voting system may be more costly to implement. However, the high cost of printing ballot papers would be eliminated. Therefore in the long term, once fully implemented, E-voting could prove to be more financially viable. In addition to these cost savings, issues such as ballot box shortages that occurred in the 2009 election will be something of the past.

With approximately 1.5 million South Africans living abroad the use of Internet voting will give the opportunity to expats to cast their vote from anywhere in the world. This is not only beneficial to expats but disabled people would benefit from this too. Disabled individuals could make use of headphones, Braille keypads and so forth to cast their votes and they can vote within the comfort of their own home. This will allow them to vote independently, no human aide needed and contribute to the integrity of the vote.

Another benefit would be that the voter can change his/her vote if needed before polling station closure. Addressing the useability of such an E-voting system would be very important. South Africa has a large number of people that are illiterate; this can be one of the biggest challenges when it comes to E-voting in South African. An E-voting system can be developed with a graphical user interface making it user friendly. This will make it possible for illiterate people to understand and be able to cast a vote. Another added feature when using E-voting is that it can accommodate multiple languages thus giving every voter

access in their own language. With South Africa having 11 official languages this contributes to improving the useability of such a system.

However, with these added benefits, come increased security requirements. It is vital that the confidentiality, integrity and availability of election information must be protected to ensure the public's confidence. This is also one of the challenges facing the use of such an E-voting system. The worse-case scenario can have a devastating effect on an election. Protecting information is a challenge because of all the risks that technology faces. Examples are viruses, hackers, physical tampering, spoofing and so forth [Rubin(2002)]. Protecting a user's anonymity is very important for such an electronic system. The voter needs to know that their vote is confidential. By achieving this, confidence in such an electoral system will increase. Everyone involved in an election, including the voter, politicians and authorities need to trust the system [Brändli and Braun(2006)].

6   Conclusion

This paper has shown that there are still problems in the electoral system currently being used in South Africa. Many of these problems could conceivably be alleviated through the implementation of a comprehensive E-voting system. However, despite the possible benefits of such a system, one could also argue that South Africa is not yet ready for such a system. Apart from infrastructure questions, which should be investigated in future studies, one should also ask whether or not the South African public is ready for such a change. South Africans have only recently started to trust and make use of online services, such as, online banking, online gambling, buying airline tickets, paying accounts, filing tax returns, etc. Without public confidence, E-voting would not work. It would thus be imperative to comprehensively address the security concerns, which include issues of human confidence, before such a system is considered for South Africa. It could be argued that initial attempts should focus on using a combination of traditional and E-voting systems.

It should, however, be clear that a lot more research is needed before the question: "Is South Africa ready for E-voting?", can be answered. Future research will focus on addressing this question.

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