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2019 MID-TERM ELECTIONS IN REVIEW:
AN ASSESSMENT OF THE 'CREDIBILITY' OF THE 2019 MID-TERM ELECTIONS

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2019 MID-TERM
ELECTIONS
IN REVIEW:
AN ASSESSMENT OF THE 'CREDIBILITY' OF THE 2019 MID-TERM ELECTIONS

WRITTEN BY
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CONTENTS

ABSTRACT

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Elections are the most important feature of a democracy. It is where citizens directly participate in the creation of government by choosing whom to put in positions of power. The Philippines' most recent election was the 2019 midterm election. This is the fourth election in the Philippines that made use of an automated election system (AES).

This study provides an evaluation of the performance of the 2019 Philippine mid-term elections focusing on how the automated system of counting and transmitting votes affected the credibility of the results. It also explored the issues that arose before, during, and after election day. It offers recommendations on how to build trust in the AES by stakeholders. The study made use of Alvarez, Atekson, and Hall's (2013) performance-based evaluation metric in assessing the performance of the 2019 mid-term election and the COMELEC scorecard to assess its the performance in comparison to the 2010, 2013 and 2016 elections.

The study finds that the 2019 Philippine mid-term election was "well-run" based on the performance-based evaluation system's metric. The 2019 mid-term elections also scored high in all seven indicators of the COMELEC scorecard. In comparison to the 2016, 2013 and 2010 elections, the 2019 elections did better in almost all indicators.

Although the 2019 midterm election was well-run, it was not completely problem-free. Issues in the voter's registration verification machines, problems in supplies, malfunctions of some Vote Counting Machines (VCMs), SD card errors, and a glitch in the display of the transparency server occurred. Although these did not cause major disruptions on election day and were addressed by the COMELEC's contingency measures, this received media attention and sparked doubts and criticism among some sectors.

Still, system and policy improvements are necessary to further improve credibility and trust in succeeding elections. There is also a need to ensure that the ordinary Filipino is informed and educated on the workings of the automated election system.

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Competitive elections are the hallmark of modern representative democracy. (Mozaffar & Schedler, 2002: p. 11) They are an instrument to hold the government accountable, and a means to ensure that citizens' views and interests are represented in the democratic process. As such, elections should be conducted in a fair manner to ensure accountability and genuine representation (Thomassen, 2014). The Philippines has embarked on a "big push" infrastructure spending program called "Build, Build, Build Program." This program attempts to increase infrastructure spending from 5.4 percent of GDP in 2017 to 7.3 percent of GDP in 2022, and costs approximately US$170 billion. Numerous studies have examined the empirical record of whether big infrastructure and public capital spending programs have succeeded in accelerating economic growth in developing countries. Evidence shows, on average, only a weak positive association between infrastructure spending and economic growth under episodes of "big push" or massive infrastructure spending.

Elections are also a mechanism that links the people's policy preferences to public policy making. An election is the process of government selection, wherein the winning party or candidate's policy

mandate is the one to be reflected in future government decisions. Elections are a vital cog in the democratic process because they ensure that the policy preferences of the electorate affect public policy. However, all this only applies if elections are impartial and competitive. As such, elections should be conducted in a fair manner to ensure accountability and genuine representation (Thomassen, 2014).

The Philippines held its mid-term elections on May 13, 2019, for senators, party-list representatives, legislative district representatives, and select local government positions. This mid-term election utilized an Automated Election System (AES) where paper ballots were used in voting, which were then scanned and recorded by vote-counting machines. This was not the first time the Philippines conducted an automated election. Since 2010, the Philippines has had a total of four national elections using an AES.

This study provides an assessment of the AES, focusing specifically on the credibility of the electoral process. It serves as a basis for recommendations on how to improve the current electoral system. This study answers the question:

How did the automated process of counting votes and transmitting of results affect the credibility of the 2019 mid-term elections? Additionally, the paper also aims to answer the following questions:

(1) *Was the 2019 election accurate, efficient, and credible?*
(2) *What were the issues and how were they addressed?*
(3) *How can stakeholders – voters, candidates, election officials, and the like – trust the electoral process and, in turn, its outcome?*

This paper aims to contribute to the body of electoral knowledge by documenting and assessing the most recent developments in AES in the Philippines. The issues that arose because of the technology, and its impact on the credibility of the election process and outcomes. Lastly,

the study also provides a framework for a credible and trustworthy election, and it provides recommendations to improve subsequent elections.

Related Literature

This review of related literature has three parts. The first part is an overview of automated elections in the Philippines. The changes and notable developments in the automated electoral process in the Philippines are also discussed in this section. The second part is a discussion on election technology. Included in this part is an examination of the salient features of Automated Election System law in the Philippines, which marked the shift from a manual voting system to an automated system. The last section is a discussion of frameworks for measuring electoral performance. This section discusses the performance evaluation framework, the three levels of electoral governance, and key performance indicators the Philippines Commission on Elections (COMELEC) used to outline its scorecard.

Automated Elections in the Philippines

The COMELEC considered automated elections as early as 1992 as a means of modernizing the electoral process through Operation Modex or "Modernization and Excellence." The succeeding efforts to modernize elections include the COMELEC's commissioning of foreign consultants to study election modernization, officials traveling to the United States to learn the best practices of the U.S. voting system, and the loaning of machines and public demonstrations. All of these were done while waiting for the passage of the law that would automate the electoral process.

Following an unsuccessful attempt to enter into a contract with election equipment supplier Business Records Corporation (BRC), competitor American Information Systems, Inc. (AIS) won the bid to supply canvassing equipment for a pilot test of election automation. By April 1996, AIS delivered 42 model 150s machines to COMELEC and began technical training of COMELEC's Management Information System (MIS) personnel.

In 1996, election automation equipment was pilot tested in the elections in the Autonomous Region of Muslim Mindanao (ARMM). The equipment tested was capable of tallying by scanning ballots. The results were finalized within 72 hours of election day. The year after the pilot testing, Republic Act (RA) 8436 was signed into law allowing for the automation of the May 1998 elections. However, due to insufficient preparation, funds and facilities, the automated system was only used in Lanao del Sur, Maguindanao, Sulu, and Tawi Tawi (Schaffer, 2009).

Similar problems in 2001 plagued the country's transition to an AES. The COMELEC focused its modernization efforts to the development of a National Voters Registration and Identification system. The project involved the development of a voter database that would store fingerprints, match voter data, and eliminate double registration. It also involved the issuance of tamper-proof voters ID. The PhP6.588 billion contract was awarded to Photokina in 1999. However, the actual budget allotted by Congress to COMELEC for the modernization project in 2001 was only PhP1 billion. The project was not completed and Photokina sued COMELEC (Kimura, 2009).

In 2002, the Comelec embarked on an AES project for the 2004 elections, which consisted of three phases. Phase 1 was registration/verification of voters. Phase 2 was automated counting and consolidation of votes. Phase 3 was electronic transmission of election

results. COMELEC awarded the Phase 1 contract to SAGEM of France for the lease of 2,005 morpho smart optical scanner to capture voters' data and prevent double registration. The machines were equipped to capture three types of biometric data including face photograph, fingerprints of thumbs and index fingers of both hands, and signature (Kimura, 2009).

As part of Phase 1 of the AES project, a centralized computer database containing the list of all registered voters was established in 2003. Voters were asked to validate their registration to eliminate inactive, duplicate and fake registrations. Among other issues, the production of the voter list was delayed because COMELEC personnel were not sufficiently familiar with the system and unable to send the data in time. The system also did not cover all voters. It covered only new voters, those who were unable to vote in the last two elections, and those who changed details. By the end, it only covered 10 million registrants out of over 46 million total registered voters. Also, the automated fingerprint identification system was not procured due to budgetary constraints, leaving the COMELEC unable to detect double registration automatically (Kimura, 2009). Lastly, the software used in the validation crashed. Investigations revealed that the software containing the old list of voters and the new ones were incompatible. As a result, the names of some registered voters disappeared when the lists were merged (Schaffer, 2009). With the May 2004 elections nearing, COMELEC decided to let field officers use their existing paper voter lists on election day.

In April 2003, COMELEC awarded the Phase 2 of the AES project to Mega Pacific Consortium (MPC), which was comprised of Mega Pacific eSolutions, Inc. (MPEI); Election. Com, Ltd. (Election. Com); and We Solv, Inc. (Oracle). The Philippine Supreme Court, however, voided the contract with Mega Pacific due to irregularities.

In particular, the court noted that the contract was awarded despite Mega Pacific's failure to pass eight "critical requirements designed to safeguard the integrity of the election" (National Democratic Institute for International Affairs, 2004: 9).

Automation also faced further issues in the May 2004 elections in Phase 3 of the AES project. COMELEC entered a separate contract with the company Philippine Multi-Media System, Inc. (PMSI) for Phase 3 of the AES called, "Electronic Transmission, Consolidation and Dissemination of Election Results Project Contract." The project had a budget of PhP298,275,808.90 and involved the lease of 1,900 units of satellite-based Very Small Aperture Terminals (VSAT). The implementation of this system, however, was challenged for shaky legal grounds. In the end, the Supreme Court decided to maintain the status quo, making it impossible to implement (Kimura, 2009).

Issues in the voter registration system, the voiding of the contract in Phase 2, and the Supreme Court decision in Phase 3 left COMELEC with a limited amount of time to prepare for an automated election for the 2004 elections. In the end, it resorted to manual balloting, counting and canvassing. The automated system remained unimplemented despite the law allowing for automation of elections in the Philippines having been in place since 1998.

In 2007, RA 9369 amended RA 8436, the Automated Election System Law. This amendment facilitated the first nationwide automated elections in 2010. The COMELEC conducted a month-long competitive bid participated in by the leading global providers of automated voting systems.

The private company Smartmatic secured the contract with the lowest bid and passing all COMELEC criteria which includes ballot reading accuracy, end-to-end audit capability, full event monitoring, and the capacity to arrive at final results within timely limits

to provide the hardware and software used in the election. Tests performed weeks before election day found some faulty memory chips and were replaced. Though some candidates pushed for the postponement of elections and/or reverting to the manual system, the technology was used marking the first fully automated elections in the Philippines and in Asia.

On election day, 72,882 machines functioned properly, with only 0.6% machines malfunctioning. The results of local elections were announced hours after the polls closed and national results were proclaimed the next day, marking a radical departure from the long wait that followed manual elections (Magno & Panelo, 2017).

The second nationwide automated election was held on May 13, 2013. Automated Election System Watch,[1] however, raised concerns ahead of election day that the compact flashcards that were to be used in the scanning and canvassing of ballots were insecure. New data could be transplanted in the compact flash cards and thus required the concerned parties and stakeholders to review them (AES Watch, 2013). Nevertheless, the elections were held, and the automated system was used in all subsequent elections. Both the 2010 and 2013 elections made use of paper-based ballots and Precinct Count Optical Scan (PCOS) machines. PCOS machines were replaced by VCM in the 2016 elections. VCMs were more technically advanced, providing additional security layers to the election system. The 2016 Philippine election was generally well-received and was said to be better managed than the 2010 and 2013 elections (Magno & Panelo, 2017).

Election Technology: Automated Election Systems in the Philippines

Election technology pertains to knowledge, skills, methods and processes used in elections. It also encompasses platforms, machines

and equipment used in elections. At the most basic level, these are technologies used in voter registration, voting, counting, transmission, consolidation and reporting of election results. These include systems as simple as those involving showing of hands, to systems involving paper ballots and manual counting, to electronic ballots and automated counting, as well as fully electronic elections. In election discourses, the term "election technology" may refer to technologies that can be used to improve convenience, efficiency, transparency, integrity and credibility of elections, among others. The credibility and reliability of the election process builds a relationship of trust between the voters and the election system.

Election technology can also cover the use of the Internet or remote voting to facilitate and increase voter participation for those who cannot cast their votes in their voting precincts. It is used to reduce "over-votes, spoiled ballots, undervotes, as well as other related problems under the manual voting system" (Magno & Panelo, 2017: p. 2). It is also used to increase accessibility and convenience.

Examples of election technologies include software, hardware, and systems that capture, store, and automatically cross-check voter registration data, including biometrics to check voter eligibility and prevent and/or eliminate multiple registrations. It also includes machine-readable ballots, optical machine ballot readers and vote-capturing machines that aid voting and increase the speed at which votes are tallied. Also included are automated counting, electronic canvassing and secure transmission systems that minimize human interventions and potential manipulation of results. It includes data encryption technologies, such as blockchain, secure servers and verification technologies that prevent, minimize or discourage tampering of results (see for example ACE, n.d.; IFES, n.d.; Kimura, 2009; Schaffer, 2009; Magno & Panelo, 2012; Alvarez, Atkeson & Hall, 2013; Malathi, et al., 2019).

The use of election technology, particularly AES, is expected to result in "faster, efficient, accurate and secure elections." (Magno & Panelo, 2017). AES uses punch cards, optical scan systems, ballot-marking devices, electronic voting machines, internet voting and other devices.

Countries utilize AES in varying degrees. Some states have fully automated processes from the voter registration, casting of votes, canvassing, through the transmission and publication of results. Other states' automated elections use paper-based systems coupled with electronic transmissions of results. When adopted correctly, AES prevents fraud because, in the transmission of results, human intervention is kept at a minimum compared to manual voting systems (Magno & Panelo, 2017).

The Automated Election System law provides that the electoral system is to make use of appropriate technology for the casting of votes and devices to count and consolidate votes. This includes counting machines that make use of optical scanning technology and data storage devices that can electronically store and canvass results. RA 8436 authorizes COMELEC to secure the necessary equipment and technology through procurement of lease and to deploy it (RA 8436, 1997).

The salient features of the AES are the following:

> *"(a) use of appropriate ballots, (b) stand-alone machine which can count votes and an automated system which can consolidate the results immediately, (c) with provisions for audit trails, (d) minimum human intervention, and (e) adequate safeguard/security measures (RA 8436, 1997)."*

In addition, the law provides that the machines must be user friendly, thus eliminating the need for voters to be computer literate to operate them. Second, the machine should be equipped with a security system that has little-to-no human intervention. It should be, "built-

in and multi-layer existent on hardware and software with minimum human intervention using latest technology like encrypted coding system" with the security key control inside and sealed off.

The law also prescribes that counting machines must also come with a built-in printer printing the precinct number on the ballots. The ballot paper must also comply with international standards to ensure that the machine recognizes the votes. The feeder on the counting machines must also be automatic, and it should be able to scan and count 100 to 150 ballots per minute. The counting machines must be capable of detecting counterfeit ballots and previously counted ballots and have a mechanism to reject them. Furthermore, the machines must be able to read the precinct number, city, or municipality before counting. The machines used to scan and read the ballots must have a built-in drive to save the data (RA 8436).

The law also provided guidelines for the printers built into the counting machines. The printer should have the capacity to print, in one stroke, seven copies of the reports. It should have at least 128 kilobytes of Random Access Memory (RAM). The machine's scanning feature must also be capable of self-cleaning. The machines should be insensitive to temperature and be rustproof, and must also come with an uninterrupted power supply (UPS) and user manuals (RA 8436).

The machines must be capable of connecting to an external computer peripheral to facilitate the canvassing and consolidation of votes scanned and counted. The machines must also ensure that it can accomplish the scanning and counting in the shortest amount of time possible. It must also be able to generate reports such as the election return, statement of votes, and the certificate of canvass. Lastly, the machines and the technology to be used must be able to ensure accuracy in counting the votes. The margin of error must also be disclosed (RA 8436).

In the Philippines' 2010, 2013, 2016 and 2019 elections, the same AES made use of a paper-based system. The election technology used included an election management system (EMS), a consolidation and canvassing system (CCS) and VCM. The EMS contains and manages all the data and information. Voters mark next to the name of their candidate on paper ballots – unlike in the manual voting system, where names of the candidates had to be written down – then feed the ballot into a VCM. The VCM scans and records the vote using optical mark-reader technology. The VCM is equipped with a memory card that stores the results of the scanning and keeps a digital image of the ballots.

Aside from this, it is claimed that the VCMs can detect dirt and stains. The VCM could differentiate between voters' intended mark and dirt or stains on the paper, reducing misread ballots and overvote ballots. It also made use of more secure technology with "stronger encryption keys for digital signatures and requiring three digital signatures to operate the VCM and transmit results" (Magno & Panelo, 2017: p. 9).

VCMs were also equipped with more reliable Secure Digital (SD) cards, ballot authentication and ballot segregation features, which prohibited scanning and recording ballots from other precincts. Receipts, or Voter Verification Paper Audit Trails (VVPAT), were also printed out by the machine. This gave the voter further verification that the vote cast was accurately read, scanned and recorded. At the end of election day, the votes were digitally counted and transmitted by the machines to the servers located in the national canvassing centers (Magno & Panelo, 2017).

The May 2019 mid-term elections used the same system as the 2016 elections. Similar to previous automated elections, the results were transmitted quickly, and winners were proclaimed in a matter

of days. Despite this election being the fourth to make use of AES, and despite all audits conducted to election results in 2010, 2013 and 2016 exercises to validate the accuracy of the AES, issues and concerns still arose regarding the integrity of the election process.

Assessing the Electoral Governance of the 2019 Mid-term Election

An election evaluation generally intends to determine if the election was well-run, with the end of informing policymakers and implementors in the bid to improve the electoral process. The general understanding of a well-run election is one that is glitch-free, especially for automated elections, and is free from irregularities.

This assessment of the 2019 mid-term election focuses on how the AES was applied and how it impacted the election process and reporting. The analysis in this paper is organized according to two frameworks: The Performance-Based Measurement Evaluation Metric by Alvarez, Atkeson, and Hall (2013), and the COMELEC Key Performance Indicators. The use of the two frameworks allows us to assess the 2019 elections from multiple angles using different perspectives. Each one is discussed briefly before data is presented in accordance with each framework.

A. Performance-Based Measurement Evaluation Metric

R. Michale Alvarez, Lonna Rae Atekson, and Thad E. Hall in Evaluating Elections: A Handbook of Methods and Standards (2013) posits an eight-point system to determine whether elections are well-run or not.

First is the question of integrity – an election must be free from fraud. Fraud may include allegations of cheating, vote-buying and

other illicit acts related to altering results and election turnout.

Second is the question on disenfranchisement – were there people unable to cast their votes and how many? In the case of the 2019 mid-term election, this covers the number of ballots rejected by the VCMs and the number of people unable to find their names on the registered voters' lists. Another example is when voters are listed in a different voting precinct.

Third, the level of stakeholder confidence – voters and other stakeholders must believe in the canvassing and vote-counting processes. This refers to whether the candidates, their supporters and the voting public trust that the system of identifying winners is accurate, free from fraud, and that all votes cast will be counted justly.

Fourth, a well-run election is an election where poll watchers have a standardized means of reporting problems. Issues concerning the electoral process must be reported in a timely and accurate manner.

Fifth, effective elections need to ensure that voting precincts and areas are convenient and accessible to all.

Sixth, reports of problems encountered during elections must be investigated to see the efficiency of the process.

Seventh, the results must be recorded promptly. Additionally, the credibility of the auditing procedures must also be determined.

Lastly, election evaluations must also consider the amount of invalid or spoiled ballots.

A high-performing election is one wherein election officials are not sued by the candidates. Lawsuits are seen as evidence of the distrust and potential problems with the electoral process. Candidates and their parties are seen to be important stakeholders of the process. In the Philippine context, a high-performing election is one where there are little to no electoral protests filed with COMELEC. In addition, voters' confidence and general opinion about the election is also a measure of

the quality, which can be quantified using public opinion surveys.

The performance of the 2019 mid-term election is assessed using the eight indicators of a "well-run" elections outlined in the performance-based evaluation metric created by Alvarez, Atkeson, and Hall (2013). The eight indicators are: (1) integrity – elections must be free from fraud and anomalies, (2) number of people turned away–the majority of the electorate are able to cast their votes, (3) high voter confidence, (4) poll watchers and other election officials follow standards and procedures, (5) precincts are accessible, (6) issues arising on election day are reported and investigated, (7) results are transmitted in a timely manner and, (8) low rate of invalid or spoiled ballots.

Some indicators overlap and are thus integrated into the discussion. In the discussion, the second and eighth indicators, namely: the number of people turned away and spoiled ballots, respectively, are integrated into the discussion on disenfranchisement. The fourth and sixth indicators are also integrated into the discussion on the protocols and procedures for reporting and investigating issues.

Integrity of the Election
A "well-run" election is free from fraud and therefore is credible and believable. The 2019 mid-term elections used an AES which assured integrity because it ensures accuracy in the canvassing of results. It is claimed that automated elections are more accurate compared to manual systems. The Electoral Knowledge Network (n.d.) notes that "counting machines are generally faster and more accurate than counting by hand" As such, the canvassing or counting of millions of votes is more accurately done by machines than humans. Apart from this, the automated system can also improve transparency. Stakeholders, especially ordinary citizens, can monitor the canvassing and result transmission through means other than being at the polling precincts.

Interviews with COMELEC's accredited citizen arm, Parish Pastoral Council for Responsible Voting (PPCRV) and AES provider Smartmatic, along with the various media reports on statements made by LENTE, COMELEC, party lists, and several candidates reveal that the issues that arose during the 2019 elections that affected its credibility included the seven-hour glitch when the results displayed in the server at the Transparency Center where media is given access to unofficial results stopped updating. As COMELEC was in charge of monitoring and supporting the server, proper escalation protocols had to be followed before Smartmatic was authorized to repair the problem under the scrutiny of the PPCRV, media, and representatives of political parties. This was also broadcast live over Facebook.

According to PPCRV, these incidences caused uncertainty. This uncertainty was centered on the question of whether the votes cast were actually being counted. The COMELEC is also reported to have acknowledged that these issues may have affected public trust and as such, offered assurance that it would release the error logs in the transparency server to dispel doubts about the election results (ABS-CBN, 2019a).

The results were transmitted by the VCMs to three different servers, namely: (1) the official results transmitted to the National Board of Canvassers, (2) the partial official count displayed on the official COMELEC website WWW.2019ELECTIONRESULTSCOMELEC. GOV.PH, and (3) the partial unofficial count transmitted to the transparency server which, is then shared with the media, political parties, election watchdogs and other third-party organizations.

Despite the issues with the transparency server display, the rest of the results transmission continued without interruption. According to COMELEC, the results transmission did not really stop. Rather, it was not displayed properly at the location where the media,

Figure 1 . Cheating and Election-Related Violence

STANDARDS OF THE MAY 2013/2016/2019 ELECTIONS
April 2013 to June 2019 / Philippines
(In Percent)

In accordance with the following bases or standards, how would you characterize the May 2013/2016/2019/elections in your place? Let us begin with (STANDARD). Would you say that the last May 2013/2016/2019 elections..

		LOCATION					CLASS		
		RP	NCR	BAL LUZ	VIS	MIN	ABC	D	E
PRESENCE OF CHEATING IN YOUR PLACE									
There was cheating	June 2019	7	7	5	8	11	1	8	7
	July 2016	10	12	10	8	11	8	11	7
	June 2013	13	13	12	14	15	17	15	7
	April 2013	28	38	22	37	28	37	28	28
No cheating occured	June 2019	74	66	70	80	81	74	73	74
	July 2016	83	81	80	87	87	79	83	86
	June 2013	82	76	85	79	81	77	79	91
	April 2013	49	40	50	48	53	34	50	53
Can't say	June 2019	19 ⬆	27	26	12	7	25	19	19
	July 2016	7	7	11	5	3	13	7	7
	June 2013	5	10	3	7	4	6	6	2
	April 2013	22	22	28	15	19	29	23	19
PRESENCE OF VIOLENCE IN YOUR PLACE									
There was violence	June 2019	4	5	3	3	4	2	4	4
	July 2016	4	2	2	6	8	5	4	4
	June 2013	10	10	10	13	6	16	10	7
	April 2013	16	20	11	27	15	14	16	16
No violence occured	June 2019	93	85	94	95	95	96	93	92
	July 2016	95	97	97	94	90	94	96	94
	June 2013	89	86	90	86	93	83	88	93
	April 2013	67	63	67	62	72	69	66	68
Can't say	June 2019	3	10	3	2	1	3	3	4
	July 2016	1	1	1	1	2	1	1	2
	June 2013	1	4	0	2	1	1	2	0
	April 2013	17	17	22	10	13	17	18	16

Source: Pulse Asia

political parties, and election watchdogs were watching because of a technical problem. In an interview, the PPCRV claimed that they audited the transparency server error logs with media observers and party representatives, and the audit showed no fraud or anomalies. The election results were further confirmed with PPCRV's parallel manual audit, where the fourth copy of the election returns are collected, counted, and compared to the digitally generated results, which matched.

Integrity in the elections also includes issues such as election-related violence and cheating allegations. An election that has integrity is generally peaceful and is free of allegations of cheating by the candidates. Figure 1 shows Pulse Asia's survey on the amount of election-related violence and incidences of cheating. They report that such incidences have been slowly declining through the years.

In relation to this, elections must also be safe for the voters, the poll watchers, and other stakeholders. According to the PPCRV, the automation of elections made the whole experience safer for poll watchers. AES also contributes to reducing violence by increasing transparency and producing results quicker.

We note that indicators of election-related violence, such as power outages, missing ballot boxes, stealing of ballot boxes while in transit, and other similar incidences, were lessened in part due to the automation. Under AES, the stealing of ballot boxes containing election returns would no longer be meaningful, as the VCMs' scanning technology stores and transmits data remotely. This means that even if the ballot boxes were stolen, the votes would still be counted because the VCMs have a digital copy of the ballot that is transmitted to COMELEC servers. As well, the transmission of results happens very quickly and over data networks making it extremely difficult to intercept. Tampering with the results is also extremely difficult due to the numerous security features of the AES system, the number

of records that need to be reconciled, the existence of multiple servers, the existence of logs and the random manual audit.

Nevertheless, we note that there were still reports of election-related violence and incidences of harassment and threats in the run-up to the May 2019 elections. The number of incidences, however, is smaller compared to previous elections. A total of 43 election-related incidents with 73 victims were reported from December 2018 to May 13, 2019. In the 2016 elections, there were a total of 106 incidents with 192 victims, according to the Philippine National Police (PNP) (PNA, 2019). The PNP reported that the 2007 mid-term elections had a total of 229 cases, while the 2001 mid-term elections had a reported 269 cases (ACE, n.d.). Mid-term elections prior to 2010 used manual systems.

PPCRV had 300,000 volunteers for the 2019 mid-term elections and 800,000 volunteers for the 2016 presidential elections. With the automated system, poll watchers spend less time in polling precincts because elections are completed at a faster pace. According to the PPCRV, this was the most tangible of all the benefits of AES.

Automated Election System Accuracy

Accuracy is a guarantee that votes cast by the people are successfully recorded and counted. A high accuracy rate is necessary for a credible and well-run election. Accuracy of the AES is measured in two ways: random manual audit and parallel count. The random manual audit is a feature only of Philippine elections conducted using the AES and was not used in prior manual elections. Manual elections only had the partial and unofficial parallel count by the accredited body (e.g., NAMFREL or PPCRV) to check accuracy.

A random manual audit is conducted by COMELEC and the Philippine Statistics Authority (PSA) and the accredited citizen's arm

to ensure that the ballots counted through automation are free of anomalies. In the May 2019 elections, LENTE served as the accredited citizen's arm group. The random manual audit of the 2019 mid-term election reached a record high of 99.99%. In 2016, it was at 99.90%, 99.97% in 2013, and 99.6% in 2010.

The second measure is through the parallel count conducted by the PPCRV. It is conducted by a third-party body to ensure its impartiality. The parallel count is conducted to check the accuracy of the transmitted results. In past elections, the parallel count by the PPCRV yielded the following results: 99.93% in 2016, 99.92 % in 2013, and 99.87% in 2010.

Together, the PPCRV's parallel count and random manual audit are counter-checking measures of accuracy that serve as a guarantee that the results of the 2019 elections are accurate and reflective of the votes cast by the people.

We also note the increasing transmission results as a sign of the improvement of the AES. The 2019 elections had a 99.5% transmission rate. This is 3 points higher than 96.1% in 2016 and was a significant improvement from 76.0% and 90.0% in 2013 and 2010, respectively. This means that the votes cast in voting precincts nationwide were scanned, counted, and transmitted to the servers for proper canvassing.

Number of Voters Turned Away and Spoiled Ballots
A well-run election is where voters are not disenfranchised. Rules governing the AES provides mechanisms to respond to issues and to apply contingency plans. The number of spoiled ballots is a measure of how the personnel or BEIs responded.

There is no readily available data on the number of voters turned away or the total number of spoiled ballots for 2019, or any other Philippine elections for that matter. While social and traditional media mention that some voters claim that they were registered but unable

to vote, the magnitude of the problem is difficult to ascertain. The post-election survey by Pulse Asia for the 2019 mid-term elections, however, allow us to make some rough approximations.

Figure 2 . Pulse Asia Post Election Assessment

REASON FOR NOT VOTING IN THE MAY 2019 ELECTIONS
June 24-June 30, 2019 / Philippines
(In Percent)

Base: Those who are registered voters but did not vote in the May 2019 elections, 9%

Which among the following is the primary reason why you were unable to vote in the May 2019 elections?

	LOCATION					CLASS		
	RP	NCR	BAL LUZ	VIS	MIN	ABC	D	E
Was unable to go home/ go to the province where I am registered	33	37	31	26	34	39	29	48
Became ill	19	11	32	15	7	0	19	23
Had to go to work	19	38	12	21	10	47	18	16
Could not find the name in the voters' list	10	7	4	2	28	0	12	8
Registration was deactivated	4	0	2	0	12	7	4	0
Do not trust the electoral system	1	0	3	0	0	0	1	0
The vote counting machine or VCM in our precinct broke down so I was not able to vote	1	3	0	0	0	0	1	0
Did not like any of the candidates	0.3	0	0	2	0	0	0	2
Could not locate the precinct	--	--	--	--	--	--	--	--
Encountered harassment/ threats	--	--	--	--	--	--	--	--
Do not trust the COMELEC	--	--	--	--	--	--	--	--
Others	13	4	16	34	8	7	16	3

Q31. Alin sa sumusund ang mga panginahing dahilin kung batik hindi kayo nakaboto o bumoto noon eleksyon ng Mayo 2019?

Source: Pulse Asia

Around 9% of respondents in the Pulse Asia survey claimed that they were registered but did not vote in the May 2019 elections. About 71% of this group reported they were unable to vote because they were unable to get to the province where they are registered, sick on election day, and/or had work obligations. Around 16%, however, reported that they were not able to vote because of machine malfunctions, their names not in the voters list or deactivated registration.

The main reasons they gave for this are: the inability to go home to the province where they are registered (33%), sickness on election day (19%), and work obligations (19%). The population sampled were those who were registered but failed to cast their ballots on election day (see Figure 2).

Other election management-related reasons include the inability to find names on the list of voters (10%) and deactivated registration (4%).

The breakdown of the 9% registered voters who reported they did not vote for one reason or another provides us a basis for a rough estimate of how many of those who did not vote were unable to do so involuntarily because of a system related issue. We acknowledge that these are rough approximations that are still subject to the Pulse Asia survey margin of error, which at this sub-level is very likely significant. The total of those who reported they were unable to vote because of this is 16%. As in previous Philippine elections, the main problem still appears to be problems with the voters list (see Kimura, 2009; Schaffer, 2009).

Only 1% of the 9% of respondents who claimed they were registered but did not vote cited that the VCM in their precinct as the reason for not voting. This is a very small percentage, suggesting that VCM problems were not a major obstacle to voting. We also note that the COMELEC put viable alternative voting processes in place in case the

VCM failed. The affected voters were given the option to come back and cast their votes once the machine was operational, or to shade the ballot and leave it with the election officials to be scanned later. The drawback to the latter option is that the voters cannot verify the receipts from the VCM.

Voter Confidence

On August 7, 2019, the Social Weather Station (SWS) published their Second Quarter 2019 Social Weather Survey, where they reported that 4 out of 5 Pinoys were satisfied with the conduct of the May 2019 elections. Specifically, 38% were highly satisfied, while 43% were satisfied. Only 7% were undecided, while only 12% expressed that they were dissatisfied. SWS stated that the 2019 mid-term election had a +68 net satisfaction rating. The highest score was in Mindanao, which recorded a +77 score (Excellent) followed by the Visayas with a +71 score (Excellent).

The recorded scores for the rest of Luzon and Metro Manila were Very Good, +66 and +54, respectively (Social Weather Stations, 2019). Pulse Asia reported similar results: 91% of Filipinos want the AES. Only 7% answered otherwise, and 2% stated that they do not know.

In addition, 82% of Filipinos believe that the results of the 2019 mid-term elections are credible and 83% believe that the results were delivered in a timely manner. Pulse Asia survey indicated that 84% of Filipinos had "big trust" in the May 2019 mid-term elections; 23% answered "very big" and 61% answered "big." Only 3% answered "small trust," and 13% answered "maybe big and maybe small."

Compared to the May 2016 elections, the net satisfaction rating for the conduct of the 2019 elections was 5 points lower than the "record high" +73 points of 2016. The 2004 election rated +18, which corresponds to Moderate satisfaction levels. In 2007, satisfaction

Figure 3 . Trust in the Election Results

TRUST IN THE 2016 / 2019 ELECTION RESULTS
July 2016 and June 2019 / Philippines
(In Percent)

Base: Those who voted in the May 2016/ May 2019 elections								

Please indicate how big or small your trust in the results of the 2016/2019 elections is. Would you say this is...?

		LOCATION				CLASS		
	RP	NCR	BAL LUZ	VIS	MIN	ABC	D	E
UB JUNE 2019								
BIG TRUST	84	82	83	92	81	91	84	85
Very big	23	11	16	28	40	21	22	31
Big	61	71	67	65	41	70	62	54
MAY BE BIG/MAY BE SMALL	13	14	16	5	11	6	13	10
SMALL TRUST / NONE	3	4	1	2	8	3	3	5
Small	3	4	1	2	6	3	2	5
Very small / None	1	1	0	0	2	0	1	0
UB JULY 2016								
BIG TRUST	74	73	62	83	89	60	75	79
Very big	22	11	11	34	36	18	24	16
Big	52	62	51	49	53	42	50	62
MAY BE BIG/MAY BE SMALL	22	21	33	14	9	32	21	19
SMALL TRUST / NONE	4	6	5	3	3	8	4	3
Small	4	4	5	3	2	8	4	2
Very small / None	0.4	2	0	0	1	0	1	0

Q. Pakisabi kung gaano kalaki o kaliit ang inyong pagtitiwala sa naging resulta ng eleksyon ng 2016/2019. Masasabi ba ninyo na ito ay (SHOWCARD)?
Note: Figures may not add up to 100% due to rounding off or to Don't Know and Refuse responses
Source: Pulse Asia

remained at Moderate levels at +19. The satisfaction rating rose to Very Good, +60 in 2010, and +59 in 2013 (Social Weather Stations, 2019). Overall, more Filipinos are satisfied with the automated elections compared to the previous manual elections in 2004 and 2007.

Surveys showed 86% of Filipinos found the results for the senatorial elections credible, and 88% believe that the results of the Congressional elections were credible. Eighty-four percent (84%) believe in the

credibility of the gubernatorial race and 89% in the mayoral race results (Social Weather Stations, 2019). The SWS also published survey results regarding COMELEC and its personnel. They reported that 79% of Filipinos agree that COMELEC conducted its job impartially and independently without favoring any person, group or party.

The SWS survey reported that 80.5% of Filipinos are satisfied with the way the 2019 mid-term elections were held. The said elections also garnered a +68 net satisfaction rating. In a similar survey conducted by Pulse Asia, they report that 91% of Filipinos agree that the AES should be continued. In relation to this, 82% of Filipinos agree that the results of the election are credible. The 2019 mid-term election was "well-run," as seen in the high voter satisfaction and confidence scores.

Figure 4 . Preference for an Automated System

CONTINUED USE OF AUTOMATED VOTING IN FUTURE ELECTIONS
July 2016 and June 2019 / Philippines
(In Percent)

Base: Those who voted in the May 2016/ May 2019 elections

Would you like to see automated voting continued in future elections or not?	LOCATION					CLASS		
	RP	NCR	BAL LUZ	VIS	MIN	ABC	D	E
UB JUNE 2019								
YES	91	89	90	97	89	96	90	94
NO	7	6	9	3	10	3	8	5
DON'T KNOW	2	5	1	0	1	2	2	0
UB JULY 2016								
YES	89	89	86	93	91	83	83	91
NO	9	10	12	6	6	17	17	7
DON'T KNOW	2	1	2	3	3	0	0	3

Q. Gusto po ba ninyong ituloy ang automated voting sa mga susunod pang eleksyon o hindi?
Note: Figures may not add up to 100% due to rounding off or to Don't Know and Refuse responses
Source: Pulse Asia

Protocols, Reporting, and Investigation of Issues
Arising on Election Day

Issues Arising on or Before the Election Day

Approximately 961 VCMs developed issues on election day according to COMELEC (Legaspi, 2019) and 1,000 VCMs according to LENTE (ABS-CBN News, 2019). In comparison, around 801 VCMs malfunctioned in the 2016 elections (Legaspi, 2019). COMELEC spokesperson James Jimenez notes that 400 to 600 of the malfunctioning VCMs were replaced as of 2 PM on election day in the May 2019 elections. In the May 2016 elections, only 188 of the total 87,000 VCM's which is well within the 1% normal range, had issues and needed replacement.

The significant number of the reported issues were caused by the quality of the marking pens and the ballot papers, which, in the case of the 2019 elections, were not supplied by Smartmatic. These issues included ballot misfeeding, ballot rejections and paper jams. These accessories used to be supplied by Smartmatic in previous elections when these were not major issues.

In public statements, Jimenez admitted that the 2019 election experienced more issues in its automation system compared to previous elections (Esmaquel, 2019), while emphasizing that said issues did not affect the credibility of the polls which he describes as "one of the most credible and trustworthy elections."

According to Smartmatic, many the issues were attributed to consumables such as ballot paper, marking pens and SD cards used on election day. The ink from the marker pens created smudges on the ballot paper because it did not dry fast enough. The VCMs, being equipped with the technology to detect dirt and ink smudges, is cited as the reason for some of the VCMs rejecting ballots.

SD cards from Silicon Valley are used by the VCMs to store the data scanned from the ballot paper. On election day, 1,665 SD cards were found to be corrupted and had to be replaced. The average failure rate of SD cards in the aggregate was 2.58%, but in Region 9, the failure rate was as high as 14%. In comparison, only 120 SD cards failed in the 2016 elections. As well, around 1.2 million marking pens were replaced because of blotting and bleeding (Yee, Salaveria & Santos, 2019). The COMELEC is investigating the possible liability of the Triplex Enterprises Inc. and JV of S1 Technologies Inc. for supplying them substandard marker pens and SD cards.

Despite this, COMELEC urged people to focus on the scale of the issue and put it in perspective. Out of the 85,000 VCMs, only 961, or 1.1%, of VCMs were reported to have had issues on election day according to COMELEC.

The May 13, 2019 election was also marked by complaints of missing names in voters' lists as well as reported confusion over polling places and insufficient information and support for people with disabilities (PWDs) and pregnant women, some of whom reportedly had to climb stairs to vote.

Another issue that arose is the substantial number of voters failing to vote for the party-lists because they failed to notice there was a second portion at the back of the ballots. Undervoting for party-list in the 2019 elections was estimated to be at 40%, higher than the reported 205 undervoting for party-list groups in the 2016 elections. This was reportedly due to the COMELEC's decision to print the party-list candidates at the back of the ballot to save on paper rather than printing a longer ballot (Ilagan, 2019).

A new issue in the May 13, 2019 election relates to the use of the voter's registration verification machine (VRVM). This technology was supposed to be piloted by COMELEC in selected precincts in the

2019 mid-term elections to replace manual verification through the use of thumbprint and biometrics. The system was put in place to avoid "flying voters," (voters who are registered more than once), and other similar anomalies. However, only around 33% of the 27,747 VRVMs were actually used. Most were not used due to machine malfunction, procedural problems, and other technical issues. As a result, many Board of Election Inspectors discontinued the use of VRVM and utilized the Election Day Computerized Voter's List (EDCVL) instead. The VRVMs were supplied by companies Gemalto Philippines Inc. and NextIX Inc., who won the PhP 987 million supply contract (Ilagan & Mangahas, 2019). The issue is still under investigation.

How COMELEC Addressed the Issues

The COMELEC made plenty of preparations and contingency measures prior to the May 2019 elections to address possible issues. To this end, it has promulgated Resolution No. 10460, known as the "General Instructions for the Election Results in Connection with the 13 May 2019 National and Local Elections," on Dec. 6, 2018. It also issued on January 23, 2019, Resolution No. 10485 entitled "General Instructions for the Board of Canvassers on the Constitution, Composition, and Appointment; Consolidation / Canvass and Transmission in Connection with the 13 May 2019 National and Local Elections." On Feb. 13, 2019, it promulgated Resolution No. 10497 entitled "Contingency Procedures in Connection with the May 13, 2019 National and Local Elections."

The contingency measures prescribed procedures on how election officers will deal with issues and problems on election day. Among other things, the contingency measures allowed the repair and/or replacement of malfunctioning VCMs. They also provided measures for when components, such as SD cards, malfunctioned. They also

provided a comprehensive set of guidelines for other foreseeable scenarios, such as loss of power, failure to transmit, ballot jams, non-functioning VCM buttons, missing ballots, printer errors, erroneous time and date stamps, etc. The contingency measures helped address most of the issues that arose on election day.

Results Transmission

Results transmission show the quantity of votes accounted for. In the 2019 mid-term elections, the results transmission rate was 99.5%. This transmission rate is 3 points higher than the results of the 2016 elections. The official results transmitted to the COMELEC and to the public website was continuous, complete, and accurate. In fact, the 2019 mid-term election had the fastest transmission rate of all the automated elections in the Philippines with a 92.12% transmission rate after only 10 hours. This is significantly faster than the 2016 elections, where the transmission rate was 87.05% after 10 hours. In the 2013 and 2019 elections, the results transmission rate after 10 hours was 58.95% and 73.16%, respectively.

Results transmission in the May 13, 2019 elections reached 99.5% at 6 PM the next day. Transmission from clustered precincts to the official COMELEC server took 25 hours to complete. The mid-term election was faster than the 2016 elections, which was completed after 30 hours. Pulse Asia reported that 83% of Filipinos believe that the results were delivered in a timely manner.

All winners of the Senatorial positions were officially proclaimed by COMELEC on May 22, 2019, nine days after the election. In comparison with what was still the manual system of the 2007 mid-term elections, winners were proclaimed in a slow staggered manner with the last Senatorial winners finally announced two months after election day.

Summary of Assessment Based on the
Performance-Based Measurement Evaluation Metric

In this section, we assessed the Philippines May 13, 2019 mid-term elections using Alvarez, Atekson, and Hall's (2013) performance-based evaluation metric. The eight indicators in this framework are: (1) integrity – elections must be free from fraud and anomalies, (2) number of people turned away – the majority of the electorate are able to cast their votes, (3) high voter confidence, (4) poll watchers and other election officials follow standards and procedures, (5) precincts are accessible, (6) issues arising on election day are reported and investigated, (7) results are transmitted in a timely manner and, (8) low rate of invalid or spoiled ballots.

Overall, we argue that the Philippines May 13, 2019 mid-term election was well run based on the eight indicators. There is no evidence to suggest that the election was marred by fraud and anomalies, despite the malfunctions of some VCMs, SD card errors, and the glitch in the transparency server. The random manual audits exceeded the minimum expected level of accuracy with a record rating of 99.99%. The low number of electoral protests filed is also a testament to the integrity of the results.

Although data on spoiled ballots and invalid votes are scarce, our rough approximation based on the Pulse Asia post-election cited previously that there was significant under voting for party-list possibly due to the ballot design. As well, the registration list was problematic due to malfunctions with the automation and the VRVM system. This issue needs investigation.

Post-election surveys show a high degree of public trust and confidence in the AES in the 2019 mid-term elections and a majority preference to keep using AES. Poll watchers and officials appear to have generally followed protocols and established contingency

measures during the elections and issues that arose appear to have been reported and investigated. The majority of the issues that arose prior to and during the elections were addressed promptly.

We note, however, that the existing protocol did not appear broad enough to cover the transparency server glitch and existing policies hindered the technical team from addressing the issue promptly. In the future, the rules will have to be amended to allow quick action without sacrificing transparency and accountability.

Finally, the election results were counted and transmitted quickly and extensively. The mid-term 2019 elections reached a 99.5% transmission rate. This is the fastest and highest transmission rate in the Philippines and substantially higher than the 2013 and 2019 mid-term elections. The speedy transmission of results allowed votes to be canvassed quickly and the winner of all Senatorial posts to be officially announced by COMELEC nine days after the election.

B. COMELEC Key Performance Indicators

Magno & Panelo (2017) note that after the 2016 presidential elections, COMELEC provided a scorecard to facilitate a quantitative measurement of their election performance with the purpose was to improve future performance. COMELEC operationalized credibility using two factors. First, the credibility of an election rests on the absence of fraud and other anomalies. Second, credibility is also measured using public perception, wherein the voting public agrees that it is credible. Aside from credibility, COMELEC also aimed to make the election more "voter-centric."

The COMELEC scorecard included seven key performance indicators: voter turnout, ballot printing, presence of efforts for voter education, accuracy in transmission and canvassing of votes cast, the security of the votes during transmission, transparency of the electoral process, and the quality of election services.

Table 1 . Voter Turnout

	2010 (Presidential)	2013 (Mid-Term)	2016 (Presidential)	2019 (Mid-Term)
Total Registered Voters	50, 653, 828	51, 345, 478	54, 363, 844	61, 843, 750
Turn Out	74.99%	77.57%	81.95%	74.89%
Total Overseas Absentee Voters Registered	589, 830	737, 759	1, 376, 067	1, 822, 173
Turn Out	25.99%	16.11%	31.25%	18.34%
Total Local Absentee Voters Registered	25, 663	12, 732	24, 727	34, 693
Turn Out	74.33%	65.59%	77.76%	77%

Source: COMELEC

The 2019 election and 2013 mid-term elections had similar voter turnout. The 2019 mid-term elections saw an increase in both local and overseas absentee voting.

Ballot printing took longer in the 2019 mid-term election compared to the 2016 election but was still completed two weeks prior to the deadline. Table 5 compares ballot printing for elections from 2010 through 2019.

Table 2 . Ballot Printing

	2010 (Presidential)	2013 (Mid-Term)	2016 (Presidential)	2019 (Mid-Term)
Total Printed	50, 850, 439	52, 333, 801	55, 736, 801	66, 662, 481
Number of Days Completed	81	57	49	77

Source: COMELEC

Table 6 shows the data on voter education. In the 2019 elections, the debates were led by media sponsors. According to COMELEC, the preparation time was not enough for them to organize a debate similar to the 2016 presidential elections. Television networks and the media served as partners of COMELEC in organizing senatorial debates. We note, however, that several administration and independent candidates refused to participate in the debates.

Table 3 . Voter Education

	2010 (Presidential)	2013 (Mid-Term)	2016 (Presidential)	2019 (Mid-Term)
Candidate Debate	Media Sponsored	Media Sponsored	COMELEC Led	Media Sponsored
Elections Signages and Posters	None	None	Yes	Yes
VCM Roadshow	Yes	None	Yes	Yes
Separate Information Website	Yes	None	Yes	None

Source: COMELEC

High credibility is often associated with accuracy. Accuracy in the elections assures the voting public that their votes are scanned, recorded, and properly accounted for. In 2019, a QR code was added to the voter receipt as an additional assurance of the authenticity of their vote. The random manual audit conducted by COMELEC with the Philippine Statistics Authority and citizens arm LENTE is higher than all previous elections using the AES.

Table 4 . Accuracy

	2010 (Presidential)	2013 (Mid-Term)	2016 (Presidential)	2019 (Mid-Term)
Number of Precincts for Random Manual Audit	235	235	715	715
Random Manual Audit Accuracy	99.6%	99.97%	99.90%,	99.99%
Transmission Result	90%	76%	96.14%	99.55%
Voter Receipt	None	None	Yes	Yes + QR Code
Audio Support for Disabled Voters	None	None	Yes	Yes

Source: COMELEC

Security is the assurance that every vote is secured. The 2019 mid-term election has additional security features in comparison to earlier elections as shown in Table 8. The use of higher levels of encryption along with the Write-Once-Read-Many (WORD) SD cards, as well as an improved digital signature, help protect the election data.

Table 5 . Security

	2010 (Presidential)	2013 (Mid-Term)	2016 (Presidential)	2019 (Mid-Term)
Digital Signature	Machine	Machine	Machine + 3	Machine + 3 EEC
Data Encryption	128 bit	128 bit	256 bit	256 bit
Protection of Memory Card	None	None	Yes + WORM	Yes + WORM x 2
UV Detection	None	None	Yes	Yes

Source: COMELEC

Automation of elections has improved the transparency of certain aspects of the electoral process. Having transparent elections means that the electorate has access to processes and information. For the 2019 mid-term elections, COMELEC provided at least four means for the public to gain a good understanding of how the system works. These included mock elections, source-code review, public ballot printing system and the results website.

For the 2019 elections, the COMELEC increased the number of locations where mock elections demonstrating the system were held to 57 locations, up from 40 locations in 2016. The source code of the system was made available to stakeholders for review for a period of 11 months, significantly longer than the 7 months in 2016. In the 2019 mid-term elections, the ballot interface could be accessed through the COMELEC website. The transmitted election results were also made accessible to the public in real-time through a designated website. With this, the voters had direct access to the election results.

Table 6 . Transparency

	2010 (Presidential)	2013 (Mid-Term)	2016 (Presidential)	2019 (Mid-Term)
Mock Elections	9 locations 09 February 2010	28 locations 02 February 2013	40 locations 13 February 2019	57 locations 19 January 2019
Source Code Review	1 month	4 days	7 months	11 months
Public Ballot Printing System	None	None	Yes + Tracking System	Yes + Website
Results Website	None	None	Yes	Yes

Source: COMELEC

Election services refer to the quality of the voting experience. For the 2019 elections, these services include accessible polling places, legal assistance, medical assistance, and satellite centers in malls and schools for voter registration. COMELEC is yet to publish data on the election services for this election.

Table 7 . Election Services

	2010 (Presidential)	2013 (Mid-Term)	2016 (Presidential)	2019 (Mid-Term)
Legal Assistance	None	None	14 regions	No data
Medical Assistance	None	None	2,466 voting centers	No data
Election Related Violence	166	109	90	43
Accessibility Audit	None	None	479	No data
Mall Registration	None	None	Approximately 500, 000 registrations in 190 malls	Satellite registrations in malls and schools

Source: COMELEC

Summary of Assessment Based on the COMELEC Key Performance Indicators

The latest available data on the 2019 mid-term elections to the data compared with the 2016, 2013, and 2010 elections shows improving COMELEC performance over time based on the seven indicators. The preparations and improvements adopted by COMELEC in the system, the technology, the contingency measures, and the services appear to be paying off. If the scorecard and the seven indicators are the sole basis, we can objectively say that the 2019 mid-term elections may be the best AES election yet.

The available information suggests that many of the issues surrounding VCM performance were related to supplies used, in particular to the quality of SD cards procured for the elections

One major difference that may have contributed to the issues in the 2019 elections is the sourcing of election-related supplies from different suppliers. The issue may lie in the poor quality of the supplies and in their compatibility with other components. In the future, a single supplier and extensive testing may be warranted.

Conclusions and Recommendations

2019 Mid-term Election was Accurate and Efficient

The study has determined that the 2019 mid-term election can be considered as credible and well-run based on several factors. Credibility can be measured using two metrics, the first being the performance of the electoral system using indicators that measure accuracy and efficiency. Accuracy is measured using the random manual audit, the PPCRV parallel count, and the transmission rate of precinct results. Though the PPCRV is yet to publish the actual results, based on interviews with its representatives, the projection of the score will be in the high 90s range.

Table 8 . Mid-term Election Performance

Measure of Accuracy	2019 Mid-term Election
Random Manual Audit	99.90%
PPRCV Parallel Count	Within high 90s range *(exact results are to be determined)*
Results Transmission Rate	99.5%

Source: Comelec and Interviews with PPCRV Representatives

Stronger Credibility and Bigger Trust in Automated Elections

Credibility, the second criteria, is measured using public perception. The people's opinions and trust of the system and the election results are indicators of credibility. In Pulse Asia's survey, 89% of Filipinos prefer the automated system, a comparable yet increasing trend since the first automated elections in 2010.

In terms of voter satisfaction for the 2019 mid-term elections, 83% of Filipinos were satisfied with the conduct of the elections. This is relatively consistent with all other elections under the AES. People's opinions surveys resulted in 84% believing that the election results in 2019 were credible. This is a significant jump from 74% from 2016.

Another indicator is the consistently low number of electoral protests of the automated elections compared to previous elections that used manual counting. There were no electoral protests filed for national positions, and around 30 cases filed for local positions.

How Can We Trust the Automated Election System?

Election stakeholders need transparency for elections to be credible. The AES guarantees this through the digital transmission of results to the three channels discussed previously. This ensures that ordinary citizens can take part in the monitoring of the canvassing of the votes that would determine the winners of important government seats.

Credibility Despite Hyped Controversies

Despite the controversies sparked by the SD card, the substandard ink of the marking pens and paper jamming the VCMs, and the transparency server glitch, national surveys confirm the high confidence and credibility of the 2019 mid-term elections. People's perceptions expressed increasing preference since the first automated elections.

In turn, the administration gained even more political capital as shown by high approval and trust ratings in recent national survey.

Transparency and proper information dissemination are necessary guarantees, especially considering the irregularities mentioned previously. For instance, the transparency server glitch was sensationalized and created unrest among the public. Information such as the process of escalation, the need for the approval of the COMELEC en banc, and the actual nature of the display issues are vital in understanding that the results were still being continuously transmitted to the national board of canvassers and to the partial official results published on the COMELEC website.

Accuracy is also necessary for people to trust the election. Stakeholders need to be assured that their votes are counted and that the ballots are secure. The election technology used in the AES assures this accuracy through various measures, as discussed previously. The digital scanning of the ballot, receipt printing, and other security measures secure the votes. Apart from this, various measures are also in place to check the accuracy of the results.

The random manual audit done by the COMELEC verifies the match between the digital results and the manual canvass through random sampling of precincts and manually cross-checking of votes based on printed election returns. In the 2019 mid-term election, 715 clustered precincts were sampled, and the result was a 99.99% match between the automated results and the random manual audit's data. Aside from this, the PPCRV parallel count also monitored and audited the transmission of results for irregularities.

Recommendations
Contrary to media hype, the data and reports from PPCRV and the post-election evaluation of COMELEC show that the election results

were accurate. This was verified through random manual audit, independent parallel count, and result transmission rate. COMELEC also released the error logs of the transparency server for an independent investigation by third-party bodies and watchdogs. These are sound measures that help build confidence in the AES.

The minor operational problems cited herein should spur the COMELEC to adopt a better strategy for quality control. While this might seem trivial, it is difficult to expect stakeholders to accept that a 2019 election that uses the same equipment and systems as the 2016 elections had run into more problems "because of defective SD cards." COMELEC is expected to continuously improve election administration and succeeding elections should be better than previous ones. COMELEC should seriously consider abandoning the multi-vendor procurement strategy to minimize the possibility that sourcing from multiple suppliers results in incompatibility issues.

As well, rigorous quality controls should be adopted, and testing should be conducted well ahead of the elections. COMELEC must improve platform testing and quality assurance long before the elections to prevent small problems that impact on the credibility of the elections. For example, the "Java app error" that caused the transparency server issues was a highly preventable problem that could have been addressed by proper testing. This still happened on the second run of a national election using more or less the same AES machines and systems used in the 2016 elections detracts in the overall credibility of the election or the handling by COMELEC.

There is also a need to improve protocols for handling issues during the election day so that immediate response can be taken. By all accounts, resolving the transparency display issue was not complex. Rather, the delay was primarily due to the COMELEC protocol for resolving technology-related problems. While the involvement of the

en banc is arguably a necessary measure to ensure accountability, this should be balanced with the need to respond to the issues quickly and decisively. And as such problems have been noted before, even small technical issues can easily be magnified if it is not resolved immediately.

There is a need to ensure that the ordinary Filipino has access to as much information on the workings of the automated system. There is also a need to better communicate the actions taken by the COMELEC and other bodies to ensure the election's credibility beyond the election season. Ample information that is easily digestible for the ordinary Filipino is vital for the electorate to trust the system.

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[1] Automated Election System Watch or AES Watch is a broad multi-sector coalition of non-government organizations, civil society and faith-based groups, policy studies centers, IT experts, and members of the academe advocating transparent automated elections.

[2] page 46 image credit: panaynews.net/senate-house-to-probe-2019-midterm-elections-glitches/

APPENDIX

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The Glitch Story

After the polls closed on May 13, 2019, the voting precincts proceeded with the transmission of the results. Results transmitted to the transparency server were made available to the media, election watchdogs, and other third-party bodies. The said groups are supposed to receive partial and unofficial results every 10 to 15 minutes. Upon checking at 12:05 AM the following day, however, the display only showed received data from 359 precincts, which was timestamped at 6:15 PM. Succeeding files were not displayed by the computers connected to the transparency server (Rappler, 2019. 1).

COMELEC conducted a briefing with the concerned groups at 9 PM on election day. In the briefing, COMELEC Director Teopisto Elnas Jr. said that the transparency server housed at Pope Pius XII Catholic Church Manila's computer tasked to send out data to the aforementioned groups experienced technical issues (Bagayaua-Mendoza & Bueza, 2019). He explained that it was only the computer in charge of transferring data to the media and watchdog groups that encountered problems. The computers connected to the transparency server of the COMELEC continued to receive the results from the VCMs across the country. COMELEC spokesperson James Jimenez also mentioned that there were no problems encountered with the server on their end. COMELEC still received the data and election results on their servers (Rappler, 2019; 2).

COMELEC addressed the public and provided a statement on the seeming seven-hour stoppage in the transmission of results in the transparency server the following Tuesday, May 14, 2019. Commissioner Marlon Casquejo explained that the transmission of partial and unofficial results was delayed after the technology, specifically the software transmitting the results from the COMELEC transparency server to the third-party organizations, experienced a glitch after the polls closed at 6:00 PM. The seven-hour delay was the result of the overwhelming amount of data being transmitted that caused the software to glitch (Yee, Salaveria & Santos, 2019).

Election officials escalated the issue to the COMELEC en banc, which then authorized the election officials to access the transparency server and solve the issue. Personnel from Smartmatic resolved the issue in front of the COMELEC, party representatives, the candidates, and election watchdogs (Bagayaua-Mendoza & Bueza, 2019). The problem, which was claimed later by the COMELEC to be a display error rather than a transmission error, was resolved in a matter of minutes. The escalation protocol might have delayed the resolution of the issue and could have caused speculation to spiral out of hand, thereby affecting public perception.

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