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Technological Change of ONPE, an Electoral Management Body in Peru – Voters and civil servants' perceptions

Master Thesis

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Abbreviations

ASS	Automated Scrutiny System
EMB	Electoral Management Body
ICT	Information and Communications Technologies
JNE	Jurado Nacional de Elecciones (National Jury of Elections)
ONPE	Oficina Nacional de Procesos Electorales (National Office of Electoral Processes)

1 Introduction

This research seeks to explore the relationship between the State's application of technology and how it influences the administrative capacity of its entities, this is what the authors called technological capacity (Lember et al., 2018). The concepts of technological capacity and administrative capacity will be explained in more detail in the next section. However, the former relates to how the application of new technological solutions affects the performance of public organisations (Lember et al., 2018); while the latter relates more to having, managing and being able to apply organisational, managerial, administrative, and technical tools and knowledge to achieve the institution's objectives (Farazmand, 2009). It is important point out that the interest of this research focuses on how it affects the organization as a whole but how it also affects street-level bureaucrats (Lipsky, 2010). Lipsky defines street-level bureaucrats as those officials who effectively deliver the service provided by the state; they play a vital role in that they are the ones who interact with citizens in the course of their work, and a great number of the decisions depend on their judgment (2010).

In this research, it will be investigated how the Electoral Management Body applies technology in the vote counting process. The objective is to find out how technological changes in a particular service provided by this public sector entity affect its administrative capacity and that of its officials, based on the feedback they can obtain and the selection mechanisms they use for the application of technology. The importance of analyzing this case lies in the citizenry's perception of Electoral Management Bodies and how they engage with technology. In this sense, most electoral bodies —as well as all state entities— are in the process of including technology for some years to improve the services they provide (Tula, 2012).

However, involving technology in the voting process leads to suspicion from citizens because it is a moment in which each person feels that he/she is exercising his/her rights. This is further exacerbated in a place like Latin America, a region where although democratic processes have become significantly more transparent and honest, irregularities in elections—amplified by the media—lead citizens to doubt the validity of the process (Carreras & Irepoglu, 2013). This includes the use of technology, as it is seen as a "black box". Here lies the importance of unveiling how technology works in the electoral process, to ensure transparency and to review whether its implementation corresponds to the objectives sought.

As previously mentioned, in Latin America the Electoral Management Bodies are still in the process of validating and making their work transparent in order to eliminate any suspicion that may arise in the electoral process. As part of this improvement, technology serves as a tool to make the service provided to citizens more efficient and effective. However, it is necessary to corroborate whether the technological change applied by these agencies is achieving the proposed objective. This type of analysis has not been conducted before in Latin America because it is usually the urgent reality that determines technology application, as has occurred in these two years of pandemic (CEPAL, 2020). However, it is important to carry out this type of research to strengthen technological change in organizations and improve the process in terms of citizen confidence in elections.

In order to carry out this analysis, it is necessary to know the case in question and the background of the service provided, as well as what is sought to be achieved with the application of this technology.

Since 2014, Peru has been using the Automated Scrutiny System (ASS). The ASS consists of recording results, printing the voting records and automatically transmitting the election results to ONPE's headquarters with the support of computer systems and equipment. For this purpose, polling station members use a laptop, a cryptographic USB token and a printer provided by ONPE officials.

The objective of implementing the ASS is to shorten and minimize human error in the process of consolidation and public dissemination of election results; in this sense, the ASS allows for the simplification of the process of issuing the tally sheet with the support of computer systems and equipment (ONPE 2020).

So far, it has been used in twelve electoral processes and was used in the April 2021 General Election. This system was implemented in 8 districts of the city of Lima with the purpose of speeding up the voting process of 3029 polling stations (corresponding to almost a million voters). In the context of the pandemic, the ASS seeks to reduce the time polling station members must remain in the voting premises. Furthermore, compared to manual processing, ASS allows up to ninety-nine percent of the electoral minutes to be processed on election day. This compares to only 10 per cent in similar locations in previous years (ONPE 2020).

Electoral members using ASS must undergo different training as they must understand ONPE’s system for scrutiny. However, the first instance of vote counting is carried out

in the same way. That is, the count is done manually, recorded in the draft tally sheet; and subsequently. transcribed into the system. Although the information is transferred more quickly, the tally sheets still need to be printed and signed by the polling station members and observers from the political parties to be valid.

The importance of researching the implementation of ASS lies in how the Electoral Management Body (EMB) wants to improve its administrative capacities based on the application of technology in the electoral process. Likewise, is important to mention that this will be the only type of technology that will be applied in one of the most crucial elections in Peru and in which people are worried to go to the polling stations because of the pandemic.

In this regard, it is important to mention that Peru has experienced other instances with the use of technology, such as in-person electronic voting. However, these are currently not in use. There are being audited and rethought in order to improve their implementation. Likewise, the new head of ONPE (Piero Corvetto Salinas) wishes to initiate the piloting of non-presential electronic voting, which could be implemented next year for regional and municipal elections. Therefore, it is of vital importance to analyse how the implementation of technology affects a public entity, so as the perception of the citizens using this technology.

As mentioned, it is vital to understand how citizens accept the introduction and use of this new technology, in order to provide feedback on the EMB's implementation processes and technological changes. With the arrival of the new national chief of this EMB, the plan is to improve processes and rely on different technologies that could benefit voters. However, the idea is not simply to implement technology without support. The first step is the implementation of ASS, which will speed up the vote count in a country where it can take weeks to reach certain locations. But for the future plans of this entity to work, it is necessary to understand the needs of the people and the acceptance rate for the implementation of this technology. In this way, it will be possible to weigh the expectations of the entity with the perception and use of the voters.

Therefore, the objectives of this research are twofold. On one hand, there is a need to understand the expectations and changes that occur in the Electoral Management Body—and of the civil servants who assist citizens in the election process—with technology

implementation. And in turn, to find out whether these technological changes can improve the administrative capacity of the entity.

On the other hand, it is imperative to understand whether the EMB's implementation of technology is reciprocated by the citizens in terms of acceptance. In other words, whether the EMB's expectations go hand in hand with those of the voters during the electoral process.

Finally, one could say that the research question is: how does the application of ASS affect the technological and administrative capacity of ONPE based on the results proposed by the organization and the opinion of the stakeholders involved? And a sub-question is whether or not the citizenry accepts the application of technology in this process and if their expectations and perceptions collide with those of the entity?

2 Research background

In this section of the paper, the literature review within the scope of this research, an explanation of the concepts used throughout the research, and the conceptual framework used for this research will be presented.

2.1 Literature Review

For this research, a literature review was carried out based on the concepts of administrative and technological capacities or technological change within public administration.

It was also necessary to analyse the concept of e-government as much of the information on the concepts of technological change in the public sector falls within the framework of e-government.

Although these concepts will be developed in the next section, it is important to mention some ideas about the existing literature in this field, and on which this research is framed.

As for administrative capacity, this is not a new concept, as mentions of it can be found since the 1960s (Addison, 2009). However, the firsts meaning of the concept was more focused on the way in which political systems absorbed or reply to the new demands of their users and the modern world.

It is important to mention that this response was also understood not only as changes in the political system but also as the actions of public officials within it (Ellis, 2010). The importance of the concept of capacity lies in the fact that it is the way in which organizations effectively implement policy plans and programs, something crucial for any State (El-Taliawi & Van Der Wal, 2019).

For this research, and as discussed below in the definition of the concept, what is most important in terms of what concerns administrative capacity is its relationship with the technological capacity (technological change) of public organizations. This relationship is what causes changes in the organization, services and work of the public sector. This leads to greater communication with the various stakeholders with whom the State communicates and allows for feedback and the evolution of public organizations and their servants.

As mentioned by Dreschler (2004), technological changes and the new techno-economic paradigm cannot be ignored by the State. On the contrary, they must be integrated in order for the State to fulfil its objective of providing better services to citizens and achieving better governance. This idea is related to that mentioned by Ellis (2010), on one of the perspectives measured in the "balanced scorecard" created by Kaplan and Norton in 1992 to measure strategy development, performance measurement, and goal accountability of public organizations. Here, he mentions the perspective of innovation and learning, which highlights the importance of learning and the use of technological tools to facilitate problem-solving, i.e., the organization's capacity.

It is here where the importance of technological capacity resides, a concept that is also described below. As mentioned by Lember et al. (2018), technological change affects the administrative capacity of public organizations and their employees. In this sense, the work done by Lember et al. (2018) tries to find out how the technological capabilities (technological change) of the public sector in Estonia are shaped and fed back through selection and feedback mechanisms with citizenship, markets, organizational networks and hierarchical behaviour. This type of research is new in the field of public administration. It is worth noting that in other fields it has not been extensively treated either, but some works can be found such as Hackler & Saxton (2007) on how the strategic use of technology increases the capacity of nonprofit organizations.

This is why the studies conducted by Lember et al. (2016, 2018) will serve as a guide for this research and for the analysis of the application of technology in the selected service.

To conclude, it is important to mention that this is framed in what is understood as e-government. Therefore, it is also necessary to analyze how the use of technology changes the logic of public administration (Zouridis & Thaens, 2003). As mentioned by Bekkers & Homburg, e-government is the strategic use of ICTs in the public sector (Grafton, 2006). In this sense, the limits of what is understood as public administration may change through the use of ICT (Snijker, 2006). This is why administrative capacity and technological change are intertwined and need to be studied in the public sector.

2.2 Concepts

Based on the literature review, this section presents some key concepts for this research.

e-Government

The concept of e-government has gained increasing importance and has been used more and more in the research literature. This in turn has led to the concept having multiple definitions, some broader and others narrower. There is no universally accepted definition (Yildiz, 2007); these vary according to their use and the nuances that authors or organisations wish to give them. However, in its broadest definition, it can be understood as the changing roles and activities of the public sector due to the integration and use of information and communications technologies (ICT) (Brown, 2005).

To illustrate the concept, here are some definitions used. Almarabeh & AbuAli (2010) define it as the use of ICTs by the government to offer citizens and businesses a new opportunity to interact with the public sector. It is about how the government organizes its administration, rules and regulations to carry out better service delivery and to coordinate, communicate and integrate new processes within the government.

A broader definition could be that of the United "utilizing the Internet and the World-Wide-Web for delivering government information and services to citizens" (UN & ASPA, 2002, p. 1). Brown and Brudney (2001) define it as the use of technology, especially web-based applications, to improve access to and efficient delivery of government information and services.

It is important to note that not only definitions are central, but also the literature indicates different purposes that may exist when thinking about e-government such as the use of information, the use of services or engaging in electronic transactions with government, and to participate in decision making and policy research (Yera et al., 2020). Further definitions of e-government can be found in the literature of the last two decades.

As mentioned by Shareef et al. (2010) most concepts of e-government come from a technical perspective and the combination of a socio-economic and a public administration perspective. Similarly, Hofmann et al. (2012) mention that most definitions are based on the idea that e-government is an instrument that supports the exchange of necessary information between users (citizens, businesses or other administrations) and the administration using ICTs.

Furthermore, it is important to mention that the e-government "fashion" is a phenomenon that is currently found in almost every country in the world and at different levels of government (Zhang et al., 2014).

This research will use a broad concept of e-government, whereby e-government will be understood as the change in the roles, services, processes, and organization of public entities that occur due to the adoption of new ICTs, and which allows them to provide a better service and exchange information with the users of public administration (citizens, businesses and other entities).

E-Voting

The definition of e-voting is still quite diffuse; this is demonstrated by the fact that within this concept researchers differ on what should be included within it. Some consider voting through electronic means and also counting through technology (Buchsbaum, 2004). However, most of the discussion has focused on identifying two types of e-voting; face-to-face voting, which takes place on electronic voting machines; and remote voting, in which citizens cast their votes using systems created for the election without government oversight (Braun, 2007).

Nevertheless, for this research, the concept of e-voting is understood at a macro level. In this sense, as mentioned by Kumar & Walia (2011), within this concept is the use of ICTs during the entire electoral process, both in casting and counting votes. This definition of e-voting is also shared by the Council of Europe (2017), which included counting as part of the e-voting process (Driza, 2017). Similarly, International IDEA uses a broad definition of e-voting that encompasses the recording, casting or counting of votes in an election through ICTs (2011).

Administrative & Technological Capacity

The concept of administrative capacity is quite broad and confers a multiplicity of dimensions, functions, processes, values, and other issues that may require attention in the public sector (Farazmand, 2009). As mentioned by Ellis (2010), the concept was defined as the capacity to carry out the functioning of political and economic systems and how it has translated political and collective will into action through management and implementation. Similarly, another definition used has been the aggregation of the

individual capacities of public servants in that it is they who determine how the service is delivered.

Authors such as Nelissen intertwine the definition of administrative capacity with the type of governance of each country. In this sense, he defines it as the degree to which new types of governance efficiently manage the social and administrative problems for which they were created (2002).

Thus, the definition of administrative capacity seems to vary according to the activities to be carried out (Ellis, 2010). For Honadle (1981) this is a conceptual problem, he argues that it is very unlikely to reach a consensus on the concept of capacity. This could be one of the reasons why the concept of managerial capability has been little addressed as a core concept in different fields of research (Addison, 2009). What most definitions of capacity have in common is that they conceptualize it as power, ability, or faculty (Addison, 2009).

For this research, the concept defined by Lember et al. (2018) will be used, in which administrative capacity is understood as the capacity for "delivering tasks within a given framework of resources (human, financial, relational) and authority (reputation, coordination practices, politics)" (Lember et.al, 2018 pp4).

In the same way, the concept of technological capacity is diffuse regarding its relationship with the public administration. After reviewing the literature, it is also important to note that the term "technological capability" is used in the public sector as a synonym for technological change. It is because of this that the definition used by Lember et al. (2018) could also be described as the technological change made by public organisations. In this sense, it is key to understand that for this research the concept in question refers to technological change in the public sector.

It is important to understand this relationship because technological capabilities in the public sector, while they have been developed in recent times, have usually relied on external advisors, be they individuals or consultancies (Brown, 2005).

For the purpose of this research, the concept of technological capability coined by Lember et al. (2018) will be used. These authors propose that technological capabilities are critical aspects of the administrative capacity. Furthermore, they are formed through coevolutionary selection and feedback processes between public organizations and certain stakeholders such as the market, policy networks, and citizens (Lember et al.,

2018). For the practical purposes of this research, the concept of technological capabilities and technological change in public organisations will be used as synonyms.

In that sense, technological capabilities are intrinsically related to administrative capabilities in the public sector. Therefore, when talking about technological capabilities in this research it will refer to the administrative capabilities generated—or adapted—due to the change and/or use of technology in the work of public servants.

Automated Scrutiny System

As mentioned, automated counting is part of what is considered electronic voting. It is important to specify what is meant by the automated counting system in this research and what ONPE uses.

As pointed out by the National Democratic Institute (2021), the electronic counting of results can be partial or total. For this institution, the definition of electronic counting is that scrutiny in which a device is used to count the votes cast by citizens (2013). Likewise, as they point out, it is not mandatory to have a totally electronic system, in which votes are cast through a device and counted. This is the case in Peru, where votes are cast manually and the ASS helps in the vote count.

In the case of Peru, the ASS was used in parallel to the existing manual process. For this reason, it is important to explain the electronic process and how it differs from the classic manual one.

According to ONPE (2020), the ASS consists of recording the results in the tally sheets directly in the system to automatically transmit the election results to headquarters. In other words, in the ASS process, the polling station members count the votes by political organization and/or candidate manually, and then record them in the device. This allows them to print the tally sheets instead of filling them out and transmit the results directly without going through the typing process at the computing centre.

Figure 1 shows the flow in which the polling station members use the ASS as part of the tallying process. In this flow, at the end of the manual part, ONPE personnel hand over the equipment for the recording and transmission of results. This equipment consists of a laptop in which the system is installed, a printer for printing the tally sheets that will be

subscribed and a cryptographic USB (and its envelope with password) for data transmission.

Once the equipment is available, the polling station members must enter their data by entering their National Identity Card. Then starts the so-called “zeroing” process, which consists of verifying that no data is pre-registered in the system. The system then run and prints the tally sheets with the results so far. Once this task is completed, the appointed chairman of the polling station members records the installation and closing times, so as the number of votes registered (ONPE, 2021).

At this point, poll station members enter the results obtained by each political organizations, verifies the data, and adds observations if applicable; then, they register the representatives of the political parties who attended the vote-counting process, and the tally sheets are printed.

Once all these tasks are complete, the polling station members give the cryptographic USB to the technical coordinator of the polling station. He is responsible for taking the USB to the transmission point at the polling place and transmitting the data to ONPE headquarters.

Once the data is transmitted ONPE will forward the data to the Computing Center of each jurisdiction to consolidate it with the rest of the tally sheets issued manually, in order to verify that the data recorded in the system coincide with those of the tally sheets printed and signed polling station members and party representatives.

The flow of results ends at the computing centres. Where a team of data entry clerks computes the results of the manual tally sheets that arrive from voting centres without ASS. In the case of voting centres with ASS, they conduct quality control, in which they make sure that the results on the system reflect the results in the printed tally sheets. This process is mandatory, as per the current regulations.

Figure 1 ASS use flow (ONPE, 2017)

In this sense, as International IDEA indicates, what ASS does is a typical function of an electronic voting system (2011). The ASS turns out to be a results transmission system in which both manual and digital devices are used. As Goldsmith (2011) points out, the implementation of these electronic tallying systems provides several benefits (cost and time reduction, decrease in tally sheets errors, ability to deal with complex elections, etc.) Likewise, it presents challenges for EMBs (trust in the systems, lack of transparency, consequences of system failures, confusion in illiterate or uneducated citizens, etc.).

Street-level bureaucrats

As mentioned in the introduction, the street-level bureaucrat concept has been mainly worked on by Michael Lipsky. For this author, street-level bureaucrats are those public servants who interact directly with the beneficiaries of public sector services and who have a great capacity to influence how these services can benefit or affect these users (Lipsky, 2010).

These street-level bureaucrats are in charge of "delivering" state services, whether through the delivery of goods or conferring status to citizens. In this sense, access to benefits and citizenship rights is in the hands of these actors (Lipsky, 2010).

Because of this, the decisions that street-level bureaucrats make, the routines they establish and the mechanisms they use to cope with uncertainty and workload effectively become the public policies they carry out in the citizen's view (Lipsky, 2010).

In the case of street-level bureaucrats in the electoral process, as Kimball & Kropf (2006) point out, these would become the local election officials. They have the task of interpreting the norms and rules given by the Electoral Management Bodies and making sure that citizens can exercise their vote. This is important because the type of knowledge and capabilities of these public servants is very dissimilar, which can lead to problems in the process and undermine the credibility of the election (Clark, 2016).

For this research, street-level bureaucrats are composed of two groups of actors. On the one hand, there is the polling station members, who are citizens chosen at random to try not to be affiliated with any party. They are composed as the electoral authority on election day and deal with the rest of the citizens who want to exercise their vote as well as the political party officials who oversee the election.

On the other side are the technical coordinators of polling stations, they are personnel hired by ONPE to support the members of the polling stations during the different tasks they must perform on election day. In this sense, they are in charge of making sure that the polling stations are set up, that voting can take place, that the scrutiny is carried out and that the results are published.

In this case, both are temporary for the process and as part of the organization (Atkeson et al, 2014). But they comply with the characteristics described by Lipsky when defining street-level bureaucrats, they have power, a certain level of autonomy from the entity and are the ones that provide service to citizens (Atkeson et al, 2014).

In this research, street-level bureaucrats include both polling station members and polling station technical coordinators. Later, it will explain the differences in the perceptions of both and how technology affects their capabilities based on their jobs and the objectives they have on Election Day.

2.3 Conceptual Framework

To achieve the objectives, first there will be an analysis of the expectations generated by technology implementation in the administrative capacity of the entity and what their real effects so far. For this, the process will be analyzed using the framework of Lember, Kattel & Tonurist (2018); this framework evaluates the impact of digital capabilities in the administration of public entities through the analysis of "routines".

The authors mention that routines in the public sector can be seen as technological capabilities. They typify two technological routines, the internal ones (those standard procedures of the organisation) and the external ones (the standard procedures of key partners). However, in order to feedback and allow these procedures to evolve, there are selection and feedback mechanisms. These mechanisms aim to reinforce what was done by the entity and guide the following processes. These mechanisms are given through citizens, market type behaviour, networks, and hierarchical feedback.

Therefore, the two key elements are the routines (both internal and external) and the selection and feedback mechanisms. It is necessary to break it down on the basis of what the authors suggest. In the case of internal routines, the authors state that these are a mix of the standard procedures of public organizations, such as their recruitment processes, their funding activities, etc. While external routines are the practices of key partners (citizens, businesses, other entities, etc.). These routines are intrinsic to the process of technology development in the public sector and in turn evolve under the influence of the external environment through selection and feedback mechanisms.

In the case of selection and feedback mechanisms, it is understood that they are extrinsic to the technology development process and can reinforce or counteract what the organization has learned and implemented, either at the individual or organizational level (Lember et al., 2018). As already mentioned, there are four selection environments that exist in parallel and therefore can influence each other: citizen feedback, market, policy network, and hierarchical politico-administrative processes. The importance of each of these may vary depending on the type of activity or public service they reference. In this sense, activities related to e-democracy or electronic voting will be much more influenced by citizen perception than e-procurement, which would be more influenced by the market. This is important because the strength and perception of external actors and the

organization can collide and lead to conflict, which can lead to changes in the way processes are carried out.

Table 1. Technological routines and selection mechanisms in public sector.

	Selection mechanisms through:			
Technological change is affected by and affects:	Citizens/users	Market-type behaviour	Networks	Hierarchical behaviour
Internal technological routines	E.g. citizens' expectations and needs may change due to technology	E.g. procurement practices can influence the nature of competition and technological advancement	E.g. access to policy design might be conditioned by internal routines	E.g. use of predictive mobility models might enable better policing and/or increase organizational productivity and/or change organizational structures
External technological routines	E.g. citizens' technological skills may affect government legitimacy	E.g. monopolistic skills might drive prices for new solutions very high (e.g. health care)	E.g. the skills of partners, expectations might change policy contents	E.g. the state audit of evaluation models might deem the above policing model to be too expensive

Figure 2 Conceptual Framework by Lember et al. (2018), p.6

As mentioned above, this research will focus on applying this framework to the application of technology in the voting process, particularly regarding voting count. This process includes citizen intervention, since it is the drawn citizens who fulfil the role of polling station members during election day, they will count the votes and then use the ASS. For this, they must be trained in the use of the tool and become familiar with it prior to election day. This leads to certain expectations, which are accompanied by the external situation of a pandemic and a continuing political crisis in the country; and after its use, lead to certain ideas about the application of this technology—which ONPE plans to increase in future elections. As for the market, this is a tool developed in-house by ONPE, which facilitates its operability and varies with each electoral process. However, it is important to understand it in the Peruvian context, where the same technology cannot be used throughout the country and the ONPE is not an entity that has a nationwide presence at all times. Here is where market players come into play and affect the service provided.

As far as policy networks are concerned, the current pandemic has allowed most of the implementation of technology to reduce times to be welcomed by the legislative and executive branches. Likewise, it is important to remember that in Peru the EMBs are autonomous organizations, so they have greater decision-making capacity over their actions. However, there is work to be done with Congress in order to continue implementing this technology, which also depends on citizen perception on the real advantages it may bring. Regarding political will, ONPE needs to convince Congress and

the Executive branch to obtain funding and regulate the use of technology in the electoral process.

Finally, in terms of hierarchical behaviour, it is important to see the relationship between what ONPE's senior management expects and what ends up happening in the voting centres, so as the capacity of capacity of the street-level bureaucrats who perform their functions on election day. ONPE in the electoral processes works like a sponge, going from 400 workers to more than 17,000; this leads to problems in terms of whether the training provided to personnel—and in particular to those who will use the ASS—is sufficient and adequate. Here, the ideation of the service must be examined for evaluation. The same is true at the macro level; as mentioned, ONPE will have to be accountable to the congress and demonstrate that this service is good enough to be reapplied.

All this must be accompanied by an analysis of the users' perception of technological tools and their acceptance. The analysis of acceptance and use, plus an understanding of how the application of technology changes the administrative capabilities of the organization, will make possible to establish whether this service should and can be implemented in future processes. Or what should be changed to improve it so that the institution also evolves with it.

3 Research Design

This paper is composed of a single case study, aiming to apply the technological routines and selection mechanisms in the public sector conceptual framework to ONPE's case, one of the peruvian EMBs. The goal is to assess if and how the implementation of technology affects the administrative capacities of the entity. Especially considering the expectations of the top management of ONPE and the perception of the citizens.

A single-case design can be vulnerable and can provide lower analytical benefit than a multiple case study design. As Yin (2018) stated, analytical conclusions from multiple-case research are more potent and give more insights than those from a single-case (Yin, 2018). However, according to Yin (2018), selecting a case should also be related to the research interests in theoretical proposition. It should also be a critical, extreme, or unusual, common, revelatory, or longitudinal case. As this paper aims to apply the framework to one service, the focus on this single case hopes to be revelatory of the internal rationale of the organization, and can be justified because of this (Yin, 2018). By seeking to be revealing, it is proposed that some of its findings can be replicated in other similar interventions. Therefore, this case seeks to shed light that may be useful for further research and future technology implementations in the Peruvian public sector, especially concerning electoral management bodies.

As mentioned, a crucial step to consider in a single case study design is the rationale behind the case selection. According to Yin (2018), it should follow a rationale linked to the research interest and theoretical framework. ONPE's case was chosen as the subject following Yin's (2018) rationale for representing a revelatory case. ONPE is one of the Peruvian State entities most trusted by citizens (INEI, 2020); it has also undergone a recent change in terms of organizational leadership (Gestión, 2020) and is considered one of the leading entities in terms of technology application in its services (PCM, 2020). Therefore, ONPE can be a revelatory case in any relevant research on e-government in Peru, as the insights of this paper may reveal findings on how the change in technology may affect the administrative capacity of an evolving organization.

Therefore, in view of the fact that this research proposes to provide an in-depth description and analysis of the aforementioned service, a case study is the best approach to achieve the proposed objectives (Creswell & Poth, 2018).

Apart from the scientific-analytical presented for the case of ONPE in Peru, the reason to choose this case was the availability of material and data for this research. Furthermore, at the time of the investigation the researcher was part of the ONPE's office of advisors, giving him a privileged access to data and been able to do participant observation of the use of the Automated Scrutiny System during the first and second round of elections. As ONPE is currently generating data on the entire electoral process in order to improve its processes, they have allowed the use of their resources to collect information on some of the stakeholders involved and there is openness to apply the different data collection instruments to the institution's public servants.

Furthermore, due to the position and objective of this research, the approach to be taken is one of action research. Having defined the topic to focus, the aim is to collect the data, analyze it, and report the results to the organization’s top management, so that they can take informed action on the future use of ASS.

As this paper seeks to provide an in-depth study of the current situation of the technological and administrative capacity of an organisation (ONPE), it was decided to use mixed methods of data collection. The reason behind this decision is that in order to understand more fully the perception of some stakeholders such as citizens, it is necessary to apply a quantitative method (survey) that allows us to reach a larger number of users in a shorter time. However, for other stakeholders (such as public officials, system creators or even legislators), a more qualitative methodology should be used to allow for a more in-depth investigation of certain individuals.

The idea of using mixed methods does not imply for this research that one data will have more weight than the other. Following Creswell's (2009) typology, it is proposed that this research uses mixed methods that are non-sequential, weigh the same, and are integrated for the final analysis, within an explicit theory, which is the framework of Lember et al (2018).

As mentioned, the idea of the survey is to reach the opinion of as many citizens as possible because they are one of the most important stakeholders. This survey will be attached as part of the questions that ONPE asks the polling station members before and after the survey. The first one is conducted after they finished their training for the election and seeks to understand their perception of the use of the tool without having the previous contact with it. That is if they find the tool easy to use. The second survey will be

conducted after the election and will seek to identify if, after having used the technology proposed by the ONPE, citizens found it useful and easy to interact with.

Meanwhile, the interview seeks to know the perception and ideation of the service by the other actors. For this research, it was proposed to use semi-structured interviews to guide the conversation but at the same time allow stakeholders to elaborate on other topics related to the service and technology. It is important that public officials, legislators, and possible market representatives be fewer in number. A qualitative information-gathering tool is better for in-depth information. This is important given that, as Turner (2010) says, the coding of semi-structured interviews can be more complicated. However, as this is a new topic in research and is on the move due to the electoral process, it was considered the most appropriate way to collect information.

The first survey should reach every polling station member who chooses to be trained through the ONPE's web platform. The second will probably be conducted through an email link as there will be no incentive for polling station members to contact the entity again.

As for the semi-structured interviews, it has been considered to interview some of the public officials who exercise the role of "polling station technical coordinators" (who are in charge of each polling station and support the polling station members in any doubts that may arise), the Manager of Electoral Information Technology (who is the head of all the ICT projects and is in charge of ensuring that the use of technology is carried out in the electoral process), one of the Assistant Managers of Electoral Information Technology (who is the head of the ASS project as well as being part of the team that designed the software), the National Chief (being the highest official and who decides on the future actions to be carried out in the electoral processes and in the organization), lawyers (especially those related to the last laws involving the use of technology and electoral process), and some other stakeholders that may be involve in the process.

In this sense, in order to obtain the information necessary for the evaluation of the implementation of ASS. First, the ONPE staff in charge of the implementation process and the staff that will carry out the processes on election day will be interviewed. Semi-structured interviews will also be conducted with senior officials of the entity in order to learn about their expectations and feedback. In the same way representatives from the government and legislative power and from the suppliers will be interviewed.

For the analysis of the feedback from the voters who will use this technology on polling day, there will be a survey prior and after the elections in order to achieve the second objective, which will also provide feedback on the first.

Finally, it is necessary to indicate that due to the Covid-19 pandemic, the collection of information had to be done virtually in most cases. Thus, the input survey applied was attached on ONPE's platforms and the output survey was sent through the database e-mails. While the interviews with field officials had to be conducted by telephone or through video-call platforms. The only interviews conducted in person were those with senior ONPE officials.

To summarize, in terms of respondents there are all polling station members eligible to carry out their work for the general election day (on 11 April) and whose polling station will use the ASS (18,174 polling station members). Of course, as it is embedded in the official ONPE website, the number of responses obtained will depend on those who are trained virtually and then wish to answer the survey. After this entry survey, an exit survey will be conducted with those who "effectively" carried out the work as polling station members (9087 polling station members) and from which contact details were available in the submission form. This differentiation is due to the fact that six citizens in total are drawn for the position, including incumbents and substitutes, but only three carry out the work on election day, hence they will be the ones interacting with the ASS. The final results of the surveys per tranche can be seen in Table 1.

Table 1 Number of respondents per tranche

Tranche	Entry	Exit
Universe of polling station members	18174	9087
Total number of responses	3967	351

Similarly, in terms of interviewees, individuals were selected who could shed light on how this technological change at ONPE affects its technological capacity, they will give the internal hierarchical input. For this reason, management personnel who make decisions on the changes to be made were selected. On the other hand, the personnel who come to apply the technology and who will serve as support to the citizen members of the

polling station were identified. For this reason, it was decided to include personnel in the roles of polling station coordinator.

Outside ONPE—and based on the information necessary to evaluate the technological change on the theoretical framework— it was decided that it would be important to interview someone from the Secretariat of Digital Government, because although ONPE is an autonomous body, they provide guidelines on the use of technology in the public sector. As far as networks are concerned, the most important entity to consider is the jurisdictional electoral body, the Jurado Nacional de Elecciones (JNE), so it was also decided to get their opinion. And in the case of the network, as it is an in-house solution, it was decided that it would be best to interview an expert in the field external to the organisation, a digital lawyer who has legally challenged ONPE and for which the face-to-face electronic voting has been set aside. Table 2 shows the list of people interviewed and their roles.

Table 2 Interviewees per role, organization, and selection mechanism

Name	Role	Organization	Selection Mechanism
Piero Corvetto	National Chief	ONPE	Internal Hierarchical
Bernardo Pachas	General Manager	ONPE	Internal Hierarchical
Roberto Montenegro	Electoral Information and Technology Manager	ONPE	Market type behaviour
Christian Gomez	Electoral technology projects Assistant Manager	ONPE	Market type behaviour
Arturo Chea	Polling station technical coordinator	ONPE	User
Rafael Mena	Polling station technical coordinator	ONPE	User
Marushka Chocobar	Head of the Secretariat of Digital Government	Secretariat of Digital Government	External Hierarchical

Erick Iriarte	Technology lawyer	CEO EBIZ Latin America	Networks
Daniel García	General Director of Planning, Innovation and Development	JNE	Networks

To briefly summarize summarize the interviewees and their position: From ONPE, the National Chief, Piero Corvetto, is the highest authority of the institution and the face before the public. The General Manager, Bernardo Pachas, oversees all of the organization's management and proper functioning.

The Electoral Information and Technology Manager, Roberto Montenegro, oversees the development and implementation of any technology that the ONPE uses as part of the electoral process, along with the deputy Manager of Electoral Technology Projects, Christian Gomez. Gomez was directly in charge of the implementation of the ASS as part of the electoral process evaluated.

It is important to mention that although the first three interviewees had previous experience in ONPE and other Electoral Management Bodies, they are charge since September 2020. This is crucial, since they were appointed when the electoral process was already underway.

On the other hand, Arturo Chea and Rafael Mena were street-level bureaucrats. Like the majority of the ONPE staff working in the elections, they were hired one month before the first round of the election and up to two weeks after the second round. In total, they worked for the ONPE for two and a half months. However, both had participated in at least four previous election processes in different roles. This was the first time they held the position of polling station coordinator with ASS.

In terms of external actors to the organization, Marushka Chocobar is the Head of the Secretariat of Digital Government. Although this is an entity of the Executive Branch and ONPE is an autonomous organization, some directives and laws concern the entire State apparatus. In this sense, the Secretariat also evaluates and promotes the implementation of technology in different services provided by the State.

Daniel García is one of the senior officials of the JNE, another of the electoral bodies in Peru that deals with all matters pertaining to jurisprudential decisions. This entity is in

charge of overseeing the work of the ONPE and between them they carry out the electoral process.

Finally, Erick Iriarte is a renowned technology lawyer in Peru. He has an ongoing lawsuit against ONPE due to the use of the in-person electronic voting. What he is demanding the audit of the technological system been used in the past. This is one of the reasons why non-presential electronic voting was not used in the 2021 general elections.

Regarding the limitations, in the first place are those caused by the pandemic. For this reason, interviews with all the external actors at ONPE headquarters had to be conducted through video calls. This somewhat limited the interaction with some of the stakeholders.

Primarily, the group of polling station technical coordinators was difficult to reach due to the technology. As this group is mostly made up of people of middle or low socioeconomic level, internet access was a bit more complicated.

A second limitation was the polling station member surveys. For the first stage, the survey was linked to the online training provided by ONPE. However, training is not mandatory, which is why many citizens choose not to be trained. This impeded obtaining a greater number of responses.

As for the exit poll, the same limitation is with the polling station technical coordinators. The email database of those polling station members who had previously interacted with any of the ONPE platforms was used. However, connectivity limitations also influenced this survey. Additionally, due to the polarized results and the general public's perception of those who carried out this position and of the EMB itself, it is possible to interpret that many polling station members chose not to participate in the second survey because.

And a third and last limitation was that some members of Congress were contacted, since their opinion on the current regulations concerning technology and the electoral process would be interesting. However, no further responses were obtained. This was probably due to the ongoing electoral process and the quarrels between the legislative benches.

Nevertheless, this research is expected to improve the impact of the use of ASS as a tool to speed up the counting process carried out by polling station members. In this sense, this analysis on the use of technology seeks to demonstrate to ONPE how stakeholders perceive and understand the tool, to then propose improvements in the implementation

plan at the national level and as an institutional policy. Similarly, it is important to verify that the tool is useful and efficient for users. Therefore, it is necessary to corroborate whether the perception of its use goes hand in hand with the effects obtained when used; in other words, to verify whether this tool improves the user administrative capacities in terms of reduction of counting time and reduction of errors in the results reports.

4 Analysis

As for the entry survey, two variables were considered for evaluation by the citizens who would interact with the tool. The first was about their perception of how easy it would be for them to use the automated scrutiny system. Here, the survey presented a question with a range of values from very easy to very hard. Considering the two variables of perceived ease versus the two variables of perceived difficulty, it can be seen that, without having interacted with the device and only having had training in its use, 52% of citizens considered that it would be difficult to use (Figure 3).

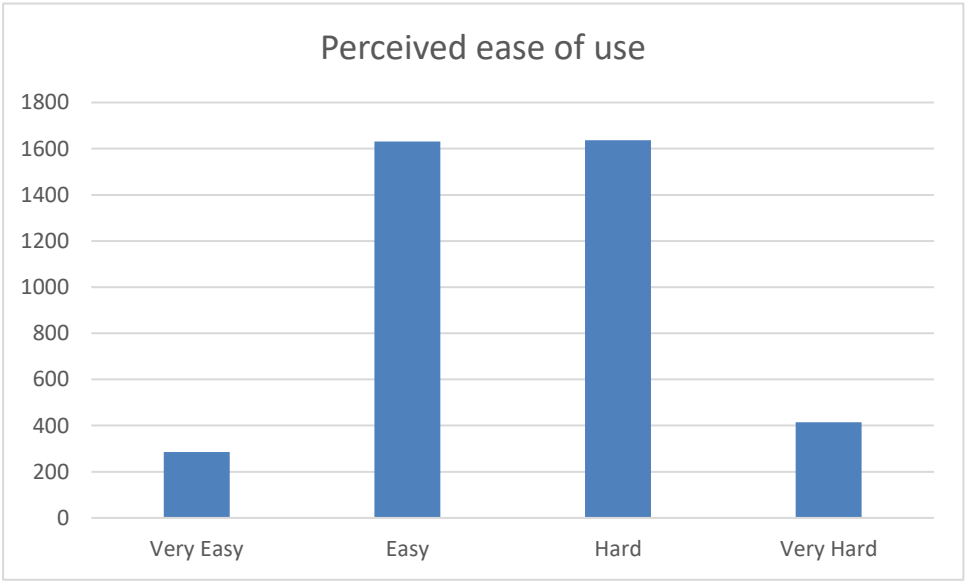

Figure 3 Perceived ease of use in entry survey

Regarding the second question, citizens were asked how useful they thought the mechanism would be for their work as polling station members. Here it can be seen that the perception of usefulness is considerably higher than that of uselessness. In this sense, 78% of the responses are in the usefulness spectrum (Figure 4).

What can be observed is that, without having interacted with the system, users' responses are more in line with the benefits of the possible use of the tool and a possible simplification of their work on Election Day.

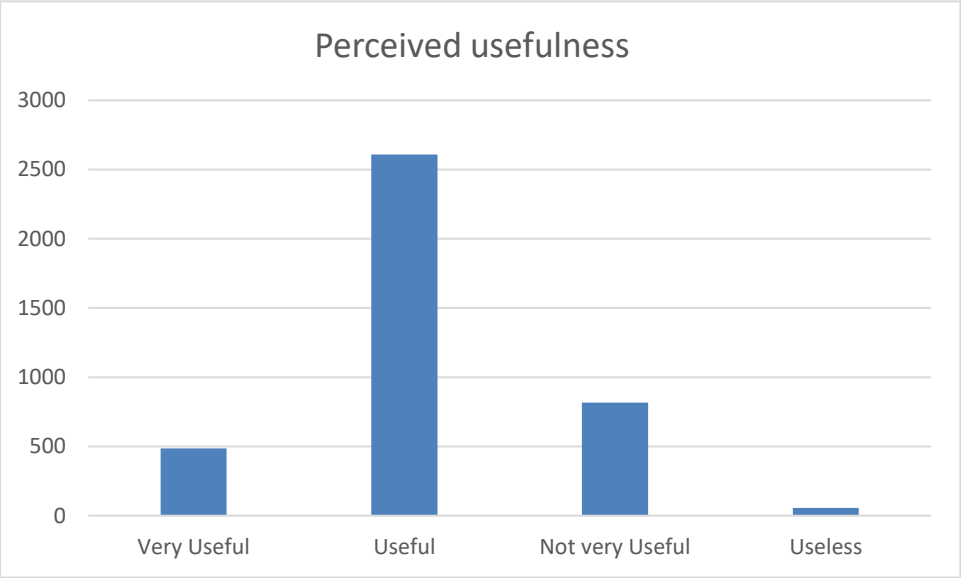

Figure 4 Perceived usefulness in entry survey

Contrasting with the entry survey, the exit survey was conducted after citizens had already interacted with the ASS. Therefore, the idea of the second survey was to corroborate whether the perception of usefulness and ease of use was maintained after having interacted with the system.

The first variable was the ease of use of the tool. Here, compared to the first survey, the percentage of responses rating it as difficult dropped drastically. While the percentage of citizens who rated it as very easy to use increased (Figure 5).

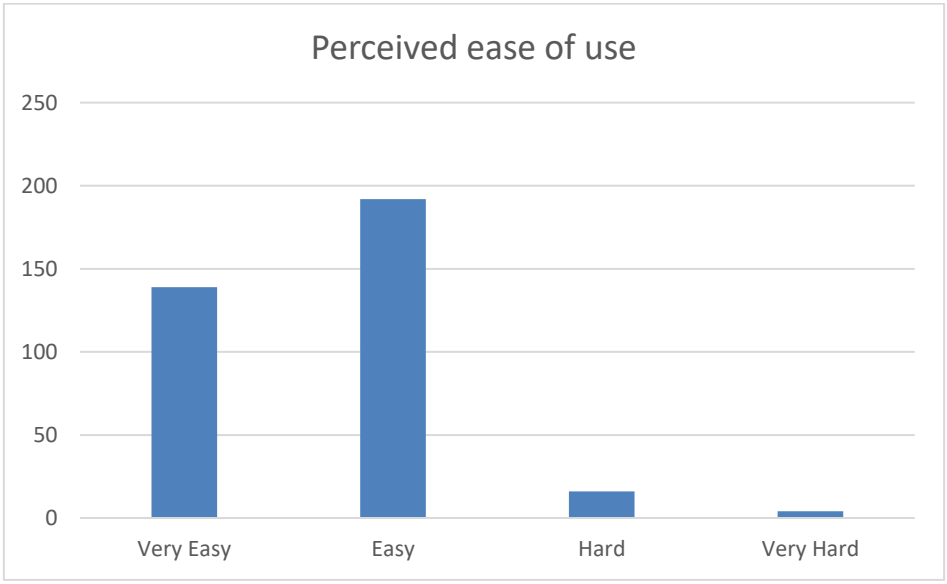

Figure 5 Perceived ease of use in exit survey

Regarding the second variable assessed, it was found that most respondents found the tool useful or very useful (95% of respondents). The trend presented in the entrance survey was maintained as the majority perceived the tool in the useful spectrum (Figure 6).

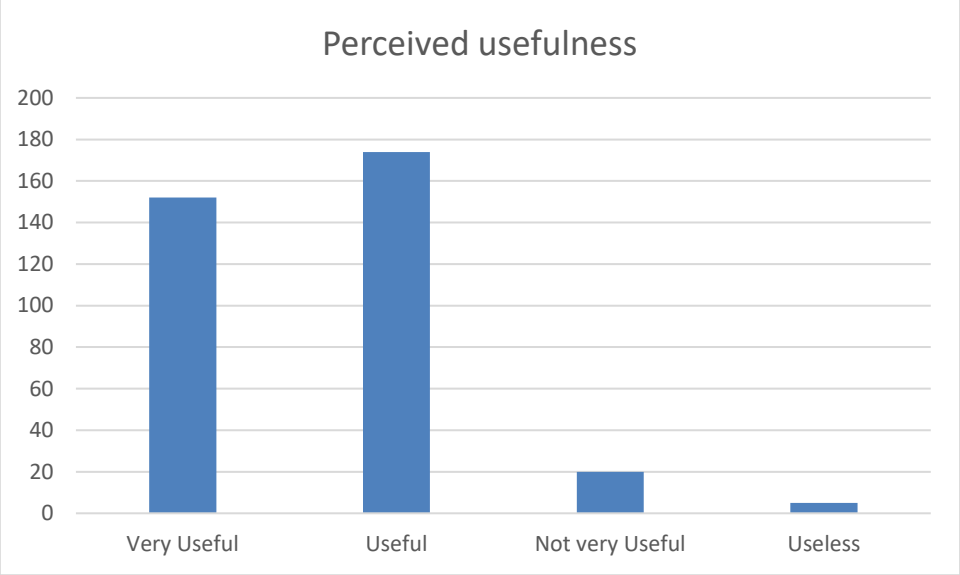

Figure 6 Perceived usefulness in exit survey

The exit survey also asked what they considered to be the greatest benefit of using the ASS, or whether it benefited both of the tool's intended objectives equally. Consequently, citizens were asked whether they considered that there was a greater benefit in the elimination of errors, in reducing the scrutiny time, whether it achieved both, or whether they did not feel that it led to any benefit at all.

61% of respondents said that the use of ASS brought both benefits, 32% said one of the options and 7% said that the use of the system did not bring any benefit over manual scrutiny (Figure 7).

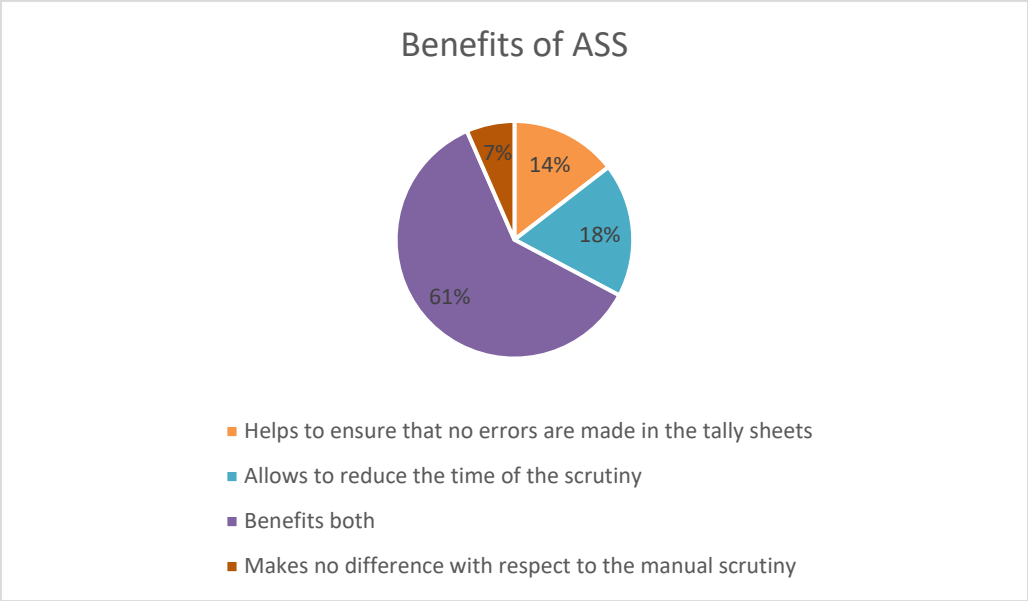

Figure 7 Benefits of the ASS

A final question in the exit survey was whether or not citizens felt that the use of ASS had improved their experience as polling station members.

Here it was found that 92% of respondents did feel that their experience had been improved by the use of ASS (Figure 8). This compares with citizens who exercised the same role but in polling stations with manual processes.

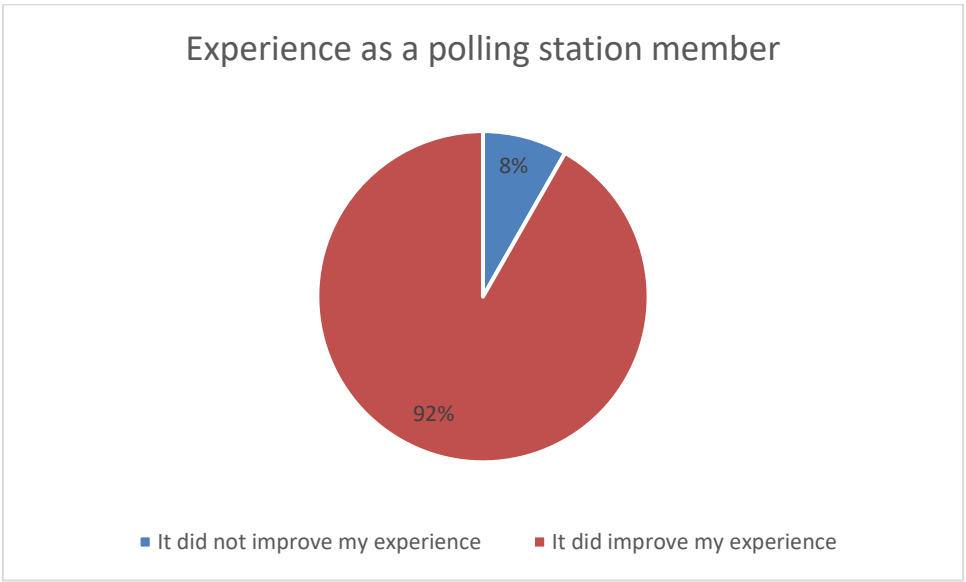

Figure 8 Experience as polling station members

The citizens who served as polling station staff are in the user group. However, these stakeholders also include ONPE street-level bureaucrats. Semi-structured interviews

were conducted with these users of the tool, about their interaction with the system on election day. Unlike the citizen users of the tool who perform a civic duty, these officials (the polling station technical coordinators) are hired only for the election process. They are trained by ONPE staff to monitor the polling stations and assist the citizens members of the polling station in the different milestones of the voting day. In the case of the polling station technical coordinators, from the moment they were hired, they were required to meet certain technical knowledge requirements to be able to carry out their duties. In this sense, most of them were students or recent graduates of ICT-related careers. These street-level bureaucrats are in charge of providing the service to citizens and monitoring the entire process throughout Election Day. ONPE recruited a total of 1551 people for this process.

To better understand how the polling station technical coordinators work, it is necessary to know the profile of these street-level bureaucrats and the tasks they perform. Most of these users have participated in several electoral processes in different roles but all of them related to technology. In the case of both interviewees, they had participated in four electoral processes each. However, this was their first time in charge of polling stations with ASS; as they previously performed the same job but in polling stations with in-person electronic voting or in the same decentralised office of the ONPE as tally typists. As polling station technical coordinators, they are responsible for setting up the space where voting will take place, assisting in the installation of the polling stations, monitoring that there are no problems during voting, installing the technological equipment for the use of the ASS, monitoring the vote counting, and ensuring results transmission.

In the perception of these actors, and with the experience of previous electoral processes, technology facilitated their work in the final part of the voting day. As they indicated, with the use of ASS most of the voting remains the same (installation and voting). There is only one change regarding the counting and transmission of results. However, they considered that this tool allowed to eliminate the number of errors in the manual minutes. In this sense, they felt that the tool made their work more efficient and effective.

For this group, the application of technology in the electoral process, such as the ASS, gave them an advantage over polling station coordinators who did not have an ASS. On the one hand, they felt that citizens were less tired after using this tool. Here it is important

to consider that Election Day lasted twelve hours and polling station members spent seventeen hours on average in the first round and fourteen hours in the second round.

They also mentioned that the tool was quite understandable even without training, even in their case the training had been minimal but it was quite easy to use. Nevertheless, they did perceive that older citizens were more reluctant to use the tool due to fear of doing something wrong.

Consequently, one of the coordinators mentioned that in comparison to doing the work without ASS, the technology had been beneficial for their work in that it allowed them to have fewer errors in the tally sheets, to be less tiring for the citizen members of the polling station, and to transmit the results more quickly.

Networks are the second group of stakeholders, important in assessing how technology affects the administrative capacities of the institution. To understand more about the networks surrounding ONPE, it was sought to interview one of the partners in the electoral process, in this case, an official from the JNE (the other electoral body in charge of the process) and a technology lawyer in a legal dispute with the ONPE over the audit of the electronic voting system and who has helped draft laws such as the one on access to personal data.

In the case of the specialist, one of the biggest obstacles to the implementation of technology in the electoral process is the need for transparency. In his perception, it is necessary that any technology implemented can be audited by any citizen before its implementation. Similarly, all technology should be designed with the users of such technology in mind. In the case of ASS, he indicated that people must have the necessary technological capabilities to be able to use it.

On this matter, he indicated that ONPE was not responsible for generating these capacities, but that it was necessary to rethink whether the capacities of the current society were sufficient or whether the entity's expectations were much higher than the national reality. In this sense, he indicated that technology must be traceable and must facilitate the service to users. Likewise, he mentioned that the expectations of society and users should guide the process of technology implementation. Furthermore, that this implementation should in turn be guided by ethical principles such as the protection of personal information.

Summarizing, he mentions is that in Peru a manual option must still be maintained due to the disparity between the capacities of the citizens who fulfil the civic task of polling station members. But with the right transparency and objectives focused on facilitating citizens' work, they could be very efficient and effective.

In the case of the JNE representative, the opinion about the ASS was that it allowed for greater control of the process. For him, the electoral process could be developed without major outbursts and in a more efficient way with the use of technology. He also emphasized the importance of transparency for citizens, but that once obtained and with awareness, the tool allows to eliminate the uncertainty in the experience.

On the point of uncertainty in the Peruvian case, is that the proclamation of results has taken place almost a month and a half after the election. This has led to multiple protests from both sides and a multiplicity of disinformation and accusations regarding the process. For the JNE representative, technology could have helped even more to avoid this if it could be massified. Faster results are one of the objectives of both bodies.

Additionally, he indicated that a cultural change is required. The custom of such a manual process and the difficulty to adulterate it makes the application of technology more difficult as well. Unfortunately, applying it leads to mistrust in certain sectors. For EMBs, prestige is one of the most important assets, so it must be taken care of at all costs.

Regarding the expectations of their counterparts at ONPE, he considered that there was a lack of coordination between both entities that lead to slower results. In the same way, both are looking for the elimination of the greatest number of errors in the minutes. For the JNE, errors in tally sheets affect the budget, since they imply having more offices open for a longer period. Therefore, the ASS is considered as a solution that in the long run could save money.

Making a balance, he indicated that technology solves problems but generates new obstacles. This is what they have experienced throughout this process. Technology must change the habits of people and institutions to generate new procedures.

The third group of interviewees are those who could shed light on market type behaviour. In the case of ASS, the technology was developed in-house by the ONPE. According to the interviewees, the idea of the ASS was born through a review of comparative

experience with other countries and the existing offer of companies with technological solutions for electoral processes.

However, the development of the tool was entirely in-house for two reasons. On the one hand, they wanted to ensure control over the tool, as the Electoral Technology Projects Assistant Manager mentioned, electoral processes are not a service that is provided constantly. Therefore, acquiring the technology with a company could have meant that this technology could have disappeared over time, without maintenance or updating services.

The second reason—as indicated by both interviewees—was that, as part of the organisation's policy, they should attempt to keep software development in-house. This was because of the political cost of outsourcing such a service. For the Electoral Information and Technology Manager, the experience of fraud in 2000 and other similar experiences with large companies in Latin America was crucial in deciding to develop most of the technological tools in-house. This eliminated a possible future political cost for the organisation.

For these stakeholders, ASS was the "perfect combination" of the manual and the technological aspects. They mentioned this because they considered that with the ASS, the counting of votes could be done manually, but data validation to sign the minutes was done digitally. This reduced the amount of work for polling station members and helped in process transparency for citizens and representatives of political organisations.

It also reduced the most recurrent errors in the tally sheets, such as the addition of values, illegibility due to people's handwriting, and incompleteness (tally sheets without totals or signatures). According to what they indicated; these errors should not occur since all citizens who exercise the role of polling station members undergo training. However, they do occur frequently and this is where the ASS seeks to reduce the amount of errors. It is important to emphasise this idea of reduction since, by regulation, the system allows for error. As indicated, the system cannot force the correction of a citizen's misplaced data. That is, if a citizen makes an erroneous count, the system issues a warning message but does not automatically correct it. This is because the priority on what is recorded in the minutes is what the citizens indicate, allowing the error to exist.

The other major benefit of the ASS is the reduction in data transmission time. In the normal process, once the tally sheets of a locality have finished being filled with the votes

counted, they are taken to a Computing Centre in the jurisdiction. Most polling stations are within 30 minutes of the tallying centre. However, in more remote areas of the country, it may be hours or even days away from the tallying centre due to the availability of transportation. In this case, the ASS allows the transmission from the polling station to the ONPE Central Office, reducing transport time to the counting centre so as typing time in the centre itself. According to those interviewed, by using the ASS at the national level, it would be possible to have the results on the same night of the election, as opposed to the current situation, which takes approximately four days for the results to be available at the national level.

For those interviewed, the ASS facilitates the work of the citizen polling station members. This is as long as the tool is used correctly and there are no errors. In order to ensure greater ease of use, it was indicated that when setting up polling stations with ASS, efforts are made to choose younger people and to have well-trained polling stations technical coordinators. In their view, the tool is easy to use but it is always necessary to have support from someone in case an error occurs. As they mentioned, it is more difficult to fix a mistake at a polling station with ASS than at a manual one. Nevertheless, as they indicated, without proper training, especially for the coordinator, the tool is not as useful as there are small things that could be done better to avoid errors but due to lack of knowledge are not done. This was one of the lessons learned in the first presidential election.

To sum up, as long as the procedures of the tool and the training are sufficient, the technology benefits and speeds up the work of the polling station members and therefore helps ONPE's objective of having results sooner and with fewer errors.

The fourth group of interviewees were the senior management officials at ONPE, corresponding to the internal hierarchical selection mechanism. As mentioned in the previous section, the General Manager and the National Chief of the institution were selected because of their high positions in the institution. It was important to know their perspective on how technology affects the electoral process, as long and some specifics about the implementation and the objectives to be achieved through the use of the ASS.

As for the previous group, the idea of what the ASS seeks to solve seems to be institutionalized from the top down. According to the National Chief, the ASS was the tool that they were most looking to exploit in future elections. According to him, this

technology solves two problems for the polling station members and one for the institution.

From his perspective, the ASS seeks to alleviate the workload of street-level bureaucrats by making the filling out of the electoral minutes a more friendly process. Additionally, it reduces the number of errors in the minutes thanks to the system notifications to the citizens. Equally, the system allows ONPE to provide results faster. This was the benefit he pointed out for the institution, which is achieved by eliminating steps in the typing of the electoral minutes in the computing center.

Another aspect mentioned by this group of interviewees is that there is a need for users to be from the younger age group to make better use of the tool. In this regard, the institution is aware that, although it is a very user-friendly tool, there is still a gap in technological capabilities among its users that prevents proper interaction. According to those interviewed, therefore the training of polling station technical coordinators and the citizens that were polling members is so important. This helps older people to lose their fear and aversion to technology in the electoral process. Similarly, ONPE's senior management understands that training must be carried out in an intensive and specialized manner to achieve the organization's objectives.

Besides the advantages that the ASS can bring, they also mentioned some disadvantages. On the one hand, the cost of using the tool. In the future they would like to massify its use and not only in a few targeted jurisdictions, but they must find a way to reduce the costs of equipment due to the number of polling stations at the national level. Additionally, they mentioned that technology is a means to facilitate the process, but this does not mean that the manual process can be eliminated. The issue of trust is basic for an EMB, especially one such as the ONPE, which is only an entity that organizes elections. To continue implementing this tool and other technologies, there is a need for discussion with political organizations and citizens for them to evaluate its necessity and effectiveness.

Moreover, the National Chief mentioned that implementing technology in the public sector is not complicated, but it is necessary to have the political will and administrative decision-making capacity to do so. The interviewees pointed out that there is a fear of innovating so as not to be judged and because many institutions feel comfortable with what they do despite having the possibility of improving it. In this way, the National Chief

mentioned that for internal use there are no obstacles, but for external use there must be a process of sensitization of the different actors involved in the electoral process. In this way, ONPE should seek to generate consensus and not only impose its ideas regarding what and where technology should be used. The technological services that ONPE puts into operation must be auditable, transparent, and accessible to anyone.

Additionally, it should be considered whether there are internal factors, such as budget and administrative processes for equipment acquisition or rental. As well as external factors, such as whether the market can provide the necessary equipment that may be required incrementally for each electoral process.

Finally, what they mentioned about the ASS's plans for the future is that they plan to implement some improvements such as digital signatures with legal value and then go through a process of auditing and certification of the system. As mentioned by the general manager in the electoral field, the rational, prudent, and efficient use of technology allows them to disseminate the results as soon as possible, with security and confidence. The use of ICTs is becoming almost mandatory in most aspects of daily life and professions, so the electoral field should not be alien to them.

Within this group, the head of the Peruvian Digital Government Secretariat was also interviewed. This is the entity that dictates the regulations regarding the use of technology and digitization of the State in terms of guidelines. It is a relatively new office and does not yet have enough power to enforce the changes it proposes. In the case of ONPE, there are guidelines that align with the rest of the State entities; however, being an autonomous body, they have the licenses to implement technology according to their objectives.

From this interviewee's perspective, technology should be focused on the user and therefore the whole process of technology implementation should revolve around user needs. Additionally, there is a need to ensure system security, data protection, and tool scalability. She considered that technology helps to improve, streamline, and make public sector processes more transparent. This would go hand in hand with the objectives of ONPE when proposing the ASS.

To summarize, Table 4 contains with the main findings of the interviews and surveys conducted. Here you can see the perspectives of the different selection mechanisms (represented by different stakeholders) and how they affect and are affected by the technological change, in this occasion the ASS.

Table 3 Interview results

	Citizens/Users	Market-type behaviour	Networks	Hierarchical behaviour
Internal Technological Routines	Users, both polling station members and technical coordinators consider it a useful and easy-to-use tool. What is expected is that the use of the tool becomes widespread and can be used for other aspects of Election Day. Likewise, the tool must be sufficiently transparent and auditable by any citizen so that it is not hindered.	By having a monopoly on the development and production of technology for the electoral process, there is no real competition to generate better systems for the electoral process. In this case, the decision to develop everything in-house and to be an autonomous agency allows ONPE to decide what it wants. This has positive effects in that it allows them to better control their systems. Although, it does not allow the "competition" that could generate better tools.	Technology implementation decisions at ONPE are easy to make during the electoral processes since they are autonomous and the heads of the institution are quite open to change. However, there is a recognition of the need to validate the technology with the different stakeholders to be sure that they do not implement unnecessary things that could make them lose the confidence of the population.	The practices and procedures by which the organization decides whether or not to implement technology are currently fairly centralized between the technology area and top management. There was no external consultation on functionality, nor was it based on data for its creation. It came from the first identification of the problems to be solved and from comparative experience. However, the ease of decision making and the generation of information are available to improve the tool.
External Technological Routines	Users, especially polling station members, need to have some knowledge about the use of technological tools so that they can interact efficiently with the ASS. Although this is currently mitigated by choosing younger citizens, people could become averse to certain changes in the tool if there is no prior sensitization and validation process with users and other stakeholders.	Due to ONPE's policy, the system has been developed in-house. This avoids possible political costs despite possible savings in monetary costs. As long as the institution's IT team remains the owner and custodian of the system, there are not many market effects that could affect it. However, a factor to be considered is the amount of budget allocated to the electoral process and the rental costs that could complicate the mass use of the tool. Lowering costs is still one of the important points to be addressed for the massification of the ASS.	There is an expectation on the part of the citizenry and the other EMBs to generate transparent tools that allow for greater control and clarity regarding electoral results. This leads to changes in the tools, including the ASS. Likewise, capacities must be strengthened in terms of inter-institutional relations with the other EMBs.	External control focuses more on what is culturally known. Some of the entities have a certain amount of control over the ONPE, however, this clashes with the wave of digitalization and facilitation of services for citizens. The autonomy of the entity allows maintaining control over the technological tool but always trying not to generate a political cost and distrust that leads to complaints of fraud and to desist with the use.

As mentioned, Table 3 summarizes what was found through the interviews regarding how the capabilities and perceptions of the different stakeholders affect and are affected by technological changes. It is necessary to specify how these changes do or do not lead to greater administrative capacity. As Lember et al. (2018) indicate, technological change is a critical aspect of managerial capability.

The idea of technological change improving the administrative capacity is reflected in the interviews in that multiple stakeholders recognize the importance of using technological systems to benefit users and the institution. Specifically, there is a relationship between the use of technology and obtaining better results. In the case of the ASS, users are the street-level bureaucrats (whether ONPE workers or citizens). For this group, technological tools allow them to do a better job and facilitate their work. However, this only happens if it is accompanied by the right training to be able to navigate the tool as it should be used. Additionally, the tool must be sufficiently explicit and transparent so that the rest of the electoral stakeholders can trust it.

As seen in the interviews, one of the most important components of the use of technology as part of the electoral process is the trust that citizens and political organizations have in it. Without audited and transparent systems, it does not matter how useful it can be for public servants. There will always be groups that will be against its use and will debate the results that can be obtained through these means. This is in part what happened in this last election. After Election Day there were many allegations of fraud without hard evidence. But one of the latest allegations to support these statements is about the use of technological tools such as the ASS.

Regarding ONPE, one can see that the logic of implementing technology is not a decision of the institution's top officials. What is sought is to provide means to the users so that the institution can obtain better and faster results. In the case of the ASS, this could be seen as a tool for massification and improvement, since it contains the attributes sought by the institution so that it is not misinterpreted politically or generates mistrust. In this sense, it maintains a manual part that is still necessary to have credibility in the counting process. Nevertheless, it allows to minimize the number of errors and, with certain changes, save time in the counting process.

From the interviews, it is clear that there is a mostly positive view of the ASS on Election Day. It is understood that this is not a perfect tool and that the process should be improved

and made more transparent so that citizens and political organizations do not see it as a black box within the process. However, it is necessary to juxtapose this positive view with the results obtained as part of the general election process. The following section will analyze the most relevant points mentioned in the interview with the election data.

5 Discussion

Based on the analysis of the key stakeholder interviews and the information obtained from the electoral process, it is possible to discuss the effect of the use of technology on the administrative capacities of the organization and the street-level bureaucrats.

To discuss the effect that ASS had on administrative capabilities this research must focus on the three components mentioned during the interviews that seek to be solved through the implementation of this technology. As indicated by high-ranking ONPE officials, the idea behind the implementation of the ASS was to reduce the amount of time for obtaining the voting results, to minimize the number of errors in the tally sheets completed by the polling station members so that the results would not be annulled, and to facilitate the work of the polling station members in conducting the scrutiny on election day.

The first point to discuss is whether the use of the ASS helped to reduce the processing time in results. There are two factors to consider here. On the one hand, there is the importance of the ASS in speeding up the work of the polling station members. In this sense, what should happen is that in the voting centers with the technological tool, the street-level bureaucrats of the electoral process should have finished their work earlier than in comparison with the rest of the country. To corroborate this, the data from the post-first round surveys where polling station members were asked at what time they left their polling place was used. It is important to emphasize that the first election held on April 11 was a long process since there were three simultaneous elections (presidential, congressional, and Andean parliament).

However, the reduction in time should be seen in those jurisdictions where ASS was used versus those where it was not. As can be seen in Figure 9, there is no significant difference in the finishing time between one and the other. This would indicate that the use of the technological tool does not have an effect in speeding up the process for the work of the street-level bureaucrats such as polling station members and technical coordinators of the polling station.

When contrasted with the responses of the surveys of polling station members who used the ASS, a discordance can be found between the greater benefit indicated by these actors and the de facto results of the election. As indicated in the analysis, 79% indicated the reduction of time for the scrutiny as a benefit of the use of the ASS. This does not seem to have occurred based on the responses obtained in the surveys. In this sense, it could be

said that the use of ASS does not affect terms of performing the scrutiny task more efficiently.

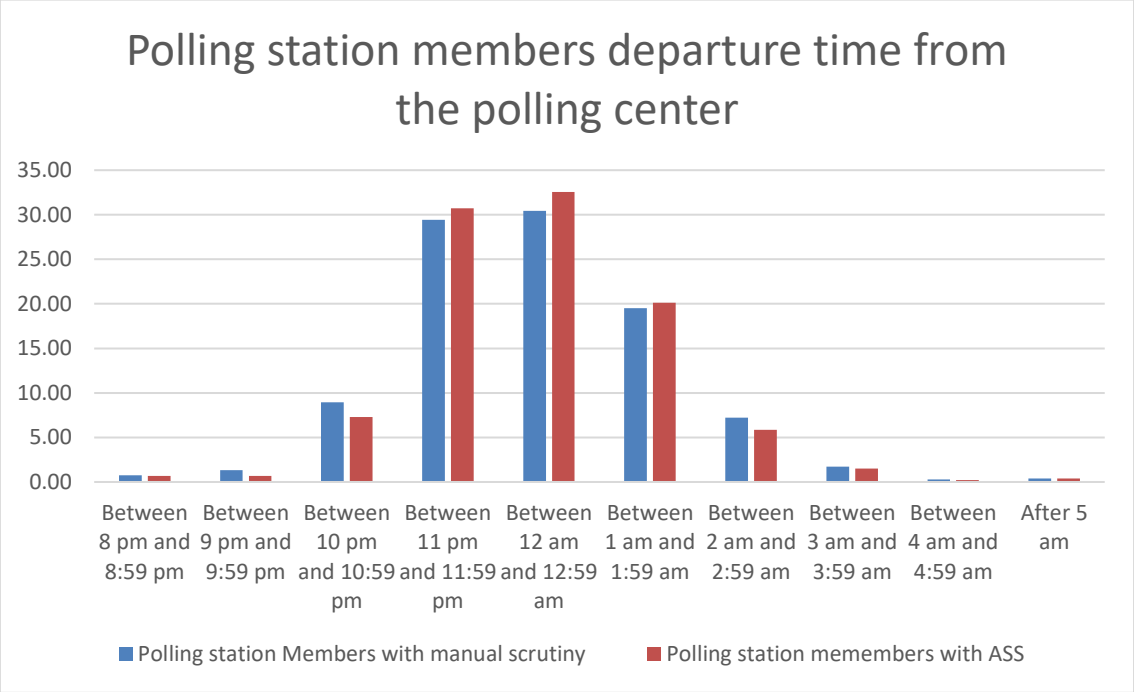

Figure 9 Polling station members departure

Despite this, on the other hand there is the need to evaluate if the ASS affects the administrative capacities of the organization. For this, what was proposed was to analyze the time it takes to transfer the tally sheets between the voting centers to the computing centers where the results are tabulated and transferred to the central office. Here, it is necessary to consider the process of transferring the tally sheets in a voting center with ASS and a manual one.

In the voting centers where the ASS was not used, at the end of the manual canvass, the tally sheets are signed and then collected to be sent under police custody to the computing center of the jurisdiction. In the case of the voting centers where the ASS was used, the results are transmitted from the voting table to the ONPE central office and from there they are sent to the corresponding computing centers. The transmission occurs in the central office since the computing centers are not fixed locations, but rather they are installed for each election. Therefore, it is easier to configure the transmission to the ONPE central office and from there send the data.

For this research, the times recorded automatically in the ONPE monitoring system (SIDE) and later in the results computing suite (S-Core) were compared. Furthermore,

only the results from Metropolitan Lima were analyzed because the jurisdictions with ASS were also located in this city. Since the country is quite diverse, there are rural areas where it can take up to five days to send the tally sheets. For this reason, the data in Figure 10 compares the presidential tally sheets from Lima, the city with most polling centers, an average of thirty minutes from the computing center, versus the presidential tally sheets from the polling places with ASS.

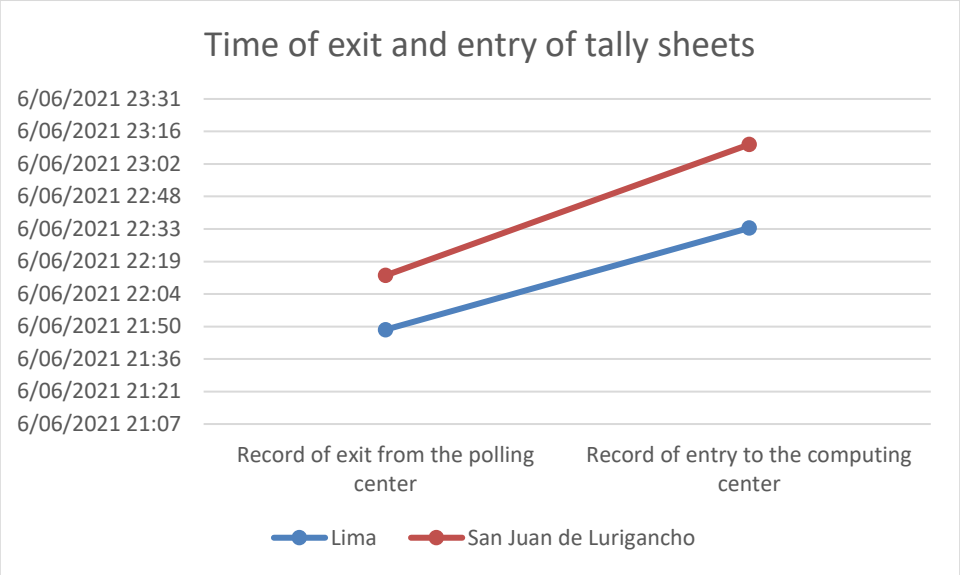

Figure 10 Exit and entry times

As can be seen in Figure 10, on average, the polling stations in which ASS was used finished and sent the tally sheets to the computing centers later than those in which it was not used. This data can in turn be corroborated with the information declared in each tally sheet. Here it was found that in the polling stations without ASS in metropolitan Lima, the average time of completion of the scrutiny was 19:43:23, while in the case of the polling stations that did use ASS, the average was 19:59:30. As can be seen in Figure 10, the average transfer time in the polling stations without ASS was 45 minutes; and in those that used ASS, the information transmitted took 58 minutes to reach the computing center.

Because of this, it could not be said that the ASS is a tool that speeds up the results computation process. However, something that should be emphasized is that the typing process is simpler as the results tabulated by the polling stations members are already in ONPE's servers. However, based on the current procedure, they must still be sent to the computing center for registration and verification with the physical tally sheets.

In conclusion, due to the current procedures of verification with the manual tally sheets. The use of the technological tool does not make the process more efficient and therefore it could not be said that it improves the administrative capacities of the organization in that sense.

The second component on which the effectiveness of the use of ASS in terms of the organization's administrative capabilities can be analyzed is the reduction in the number of tally sheets with errors. It is important to understand that tally sheets with errors can lead to the tally sheet not being computed and the votes of the citizens at that polling station not being taken into account. In this sense, according to the regulations in force and the ONPE procedures, there are different causes for a tally sheet not to be counted. Among the most common are material error (errors in the addition made manually by the citizens acting as polling station members), lack of data entry (totals and signatures especially), tally sheet or vote contested (action taken by the representatives of the political parties and/or the polling station members themselves), and illegibility of the tally sheet.

To analyze this component, data on observations per tally sheet was used; to facilitate the analysis, the district of San Juan de Lurigancho (the only one in which ASS was used in 100% of its polling stations) was compared with the rest of Metropolitan Lima. Table 4 shows that the percentage of observations is relatively low, only 2.57%. However, this represents 580 tally sheets that could not be counted, which is equivalent to approximately 174,000 votes. This is important to understand since the election in question was decided by slightly more than 44,000 votes.

As for the effectiveness of the ASS in reducing observations, it can be seen that in the district where it was used in its entirety, the percentage of observed tally sheets is 1.74%. Considering the margin in the results that usually define elections in Peru, 42 000 votes in the 2016 presidential election and 44 000 in the 2021 election, it is of utmost importance to minimize the number of voided tally sheets due to errors or observations.

Table 4 Percentage of observations in tally sheets

Jurisdiction	Total of tally sheets	Tally sheets with observations	Percentage of tally sheets with observations
Lima	22607	580	2.57%
San Juan de Lurigancho	2649	46	1.74%

To better understand where these errors come from and how they are handled, it is necessary to know the processing of the electoral reports from scrutiny to tallying. In a manual process, polling station members count the votes and then fill out the tally sheets, at least in quintuplicate, with the number of votes obtained by each party. These electoral minutes are taken to the computing centers to digitize them, then two random digitizers compute the results written in the minutes. If both digitizers have the same results, they go through a second quality control that compares the digitized results with the digitized tally sheet. If what was typed matches what was digitized, the results remain in the system and are published.

The types of observations found in the electoral reports have been mentioned above. The ones that the ASS seeks to solve are material errors, illegibility, incomplete minutes, lack of signatures, and incomplete tally sheets. Figure 11 shows the percentage of tally sheets according to each type of observation in Metropolitan Lima. This is explained by the fact that it was a close election and the representatives of each party took advantage of errors in votes or tally sheets to challenge them and have them resolved at a higher instance. In second place is the material error (32%), which refers to errors in the summation made by the members of the polling station. This usually occurs due to the capacities of the citizens who exercise this position, and due to the fatigue related to twelve hours of continuous work during election day, counting and filling out the tally sheets. And in third place are the tally sheets with more than one observation with 11%.

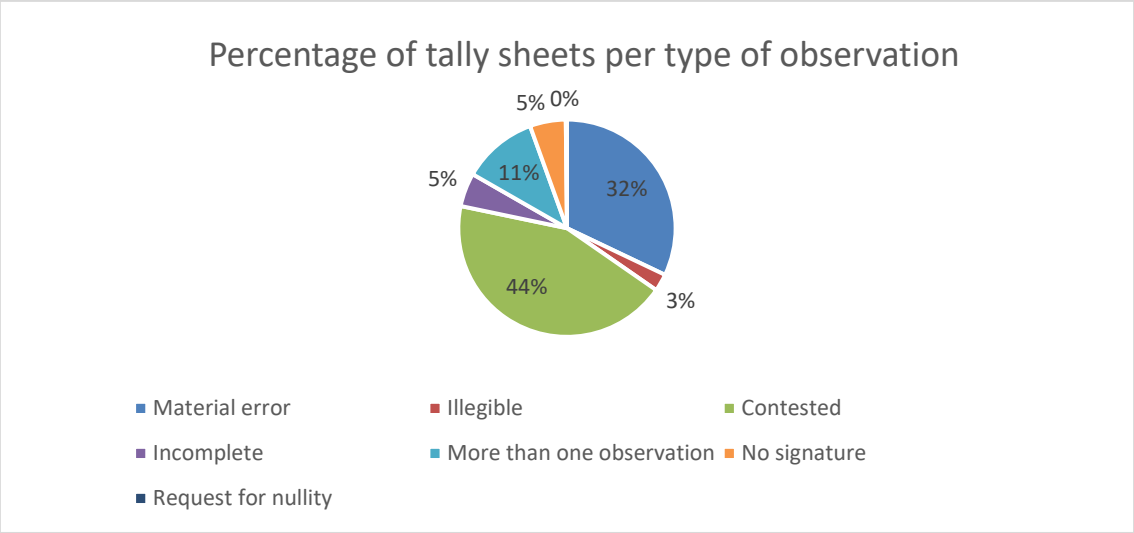

Figure 11 Percentage of tally sheets per type of observation in Lima

When reviewing the most common observations in the district with ASS, the order changes (Figure 12). First is material error with 37%. In theory, this is one of the errors to be minimized through the use of the ASS. However, what is currently happening is that the system cannot contradict what the citizens enter. In this sense, the ASS notifies the error but cannot make the automatic change. If the polling station members wish to keep what they entered, the machine will accept it. This leads to the fact that in the subsequent typing process the record is observed for having an error. This happens because the current regulations do not allow the entity to correct this error, always giving priority to what is entered by the citizen, even if it is wrong.

The second observation with the highest percentage is the contestation (26%). As in Metropolitan Lima, it is understood that the challenge process is due to the need to take advantage of errors made by voters and/or polling station members to void the tally sheets. However, there is a considerable decrease compared to Metropolitan Lima, thanks in part to the use of the technological tool.

In third place, the reason “more than one observation” remains in the same spot as for Metropolitan Lima with 15%. Here it is also important to note that, unlike Metropolitan Lima, not having signatures on the electoral registry also has a high percentage (11%). This is because, although the electoral tally sheets are transmitted directly, a physical copy must be sent for later verification. In the case of ASS, these minutes are printed by the system and the polling station members forget to sign them. This leads to an observation in quality control.

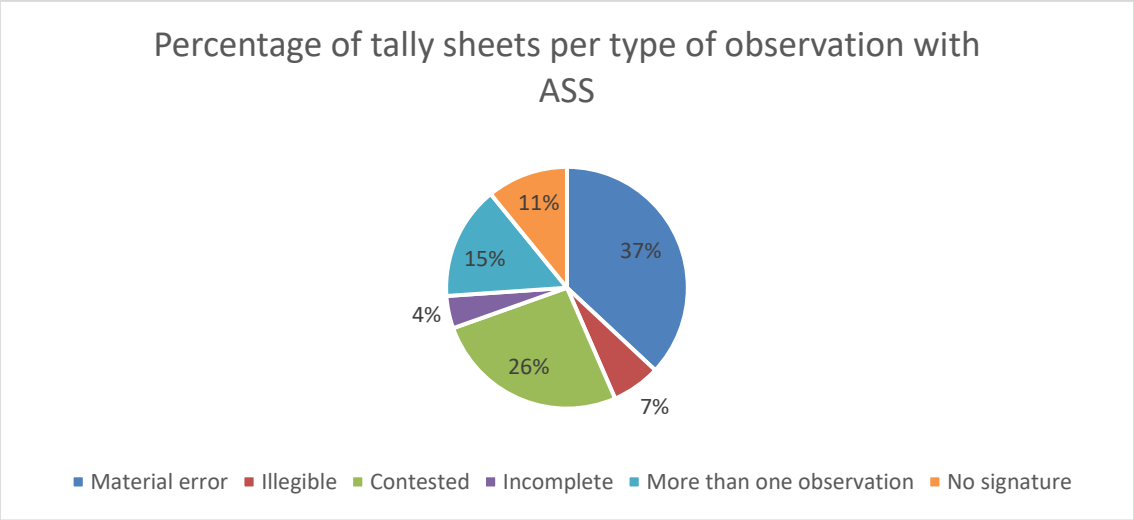

Figure 12 Percentage of tally sheets per type of observation in San Juan de Lurigancho

Finally, it is observed that the number of errors decreases with the use of ASS. Therefore, it can be said that its use does have a positive effect on the administrative capacities of the entity, since it minimizes the incidence of observed polling places and therefore allows for a greater number of votes to be counted. Something worth mentioning is that with the use of the ASS, there are only three causes for observation during the transmission. Since the results are transmitted directly, at the beginning they only found electoral minutes with material error, contested, and with both types. The other types of observations occurred due to the subsequent verification with the physical tally sheet.

As for the improvement in the capabilities of the street-level bureaucrats thanks to the use of the tool. It can be observed a reduction in errors since the ASS allows result completion and subsequent printing of the necessary copies. As mentioned by ONPE senior and technology managers, errors are also reduced because the system alerts you when something is not properly completed, and thus reduces the number of tally sheets to be filled out manually.

However, as mentioned by the polling station technical coordinators, although the tool is useful, without the correct training, errors still occur. As can be seen in Figure 12, there are still cases that should not occur, such as material error, illegibility or incomplete tally sheets. Overall, there is an improvement in their capacities, understood as performing their work more effectively and efficiently thanks to the use of the ASS.

The third component—mentioned during the interviews—upon which the ASS seeks to act is alleviating the workload of the street-level bureaucrats, in this case, the polling station members and the polling station technical coordinators.

When consulting with polling station members, it was found that, in the places where the ASS was not used, the perception of the degree of difficulty in carrying out their work during Election Day was the inverse of the places where it was used (Figure 13). On a scale of 0 to 10, what it can be seen is that the ranking for those who used the ASS is in the spectrum of difficult.

Therefore, to better understand whether the ASS reduced the work complexity or not, there was a cross-examination on the degree of difficulty associated with the scrutiny (Figure 14).

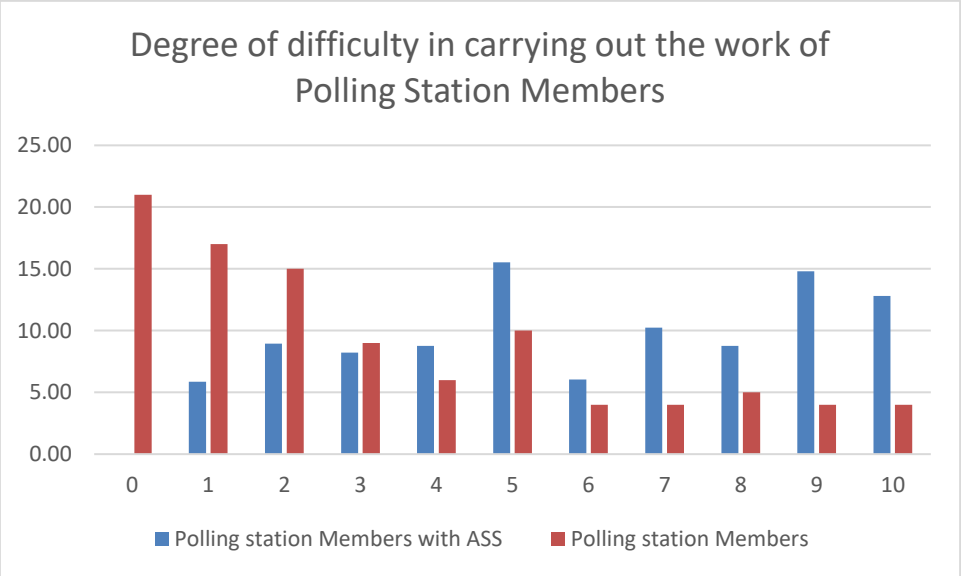

Figure 13 Degree of difficulty of performing tasks for polling station members

As already mentioned, the tallying process—even in the polling stations with ASS—continues to have a manual part. This manual part is the vote counting. According to the specialists consulted, this makes the votes more transparent in a society used to the manual process. In this sense, doing all the counting through technological tools made the process more complex, as it could bring a political cost for the institution because there were more parts of the process in a "black box". For this reason, they saw it as the perfect combination, the polling station members and the representatives of the political organizations can audit the process and then result registration and transmission is digitalized.

Figure 14 shows that there is a slight difference between those who used ASS and those who did not. There is a higher percentage of ease of use among those who had the ASS, 40% versus 36%. It can be seen that the use of technology has a slight positive effect on the complexity of this task. Although it is strange that at the level of the whole election day, the group of polling station members with ASS rated the performance of their tasks as difficult.

As seen in the previous section, the majority of polling station members who used the ASS perceived the tool as useful or very useful (95%). Considering that they described the tool as useful and that they felt that it was easier to conduct the scrutiny in these places, it is possible to think that the workload for this group of users was less than for their peers who did not have the tool.

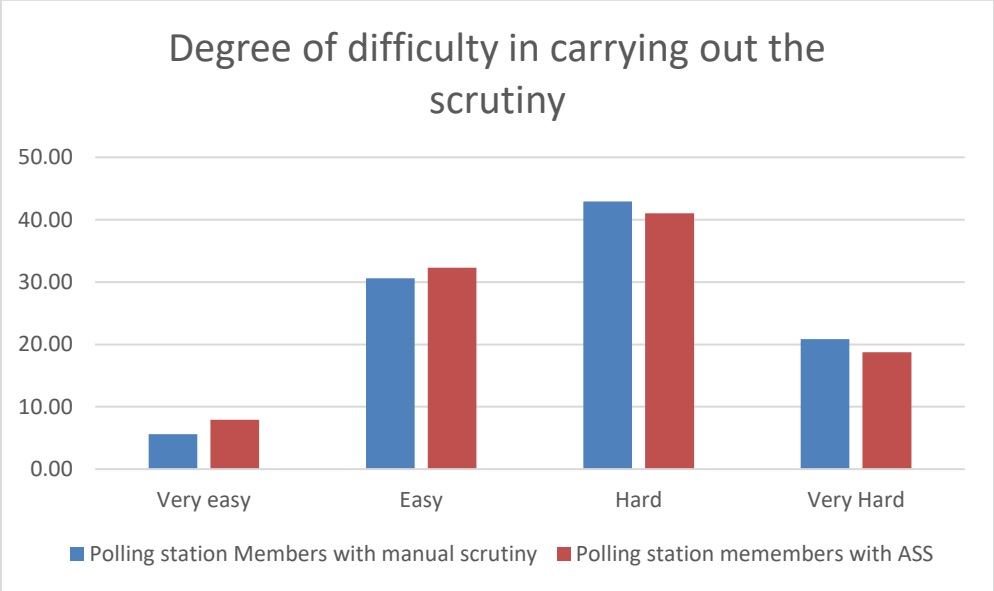

Figure 14 Degree of difficulty of performing the scrutiny for polling station members

Going into greater detail, Figure 14 shows the greatest difficulties in filling out the tally sheets according to the polling station members (where the ASS should have the greatest effect). Here it was found that the greatest challenge in locations without ASS was sealing the tally sheets, making legible numbers, and making sure that all duplicates were the same. In comparison, the tables with ASS stated that the greatest difficulties were in dealing with the representatives of the political organizations, making sure the duplicates of the tally sheets are the same, and in the equipment.

Some important points to highlight about these results are that the polling stations with ASS do not need to write tally sheets and only print duplicates. Under this logic, making

duplicates should not be a problem, except that they must all be signed by all those present due to current regulations. Likewise, it is understandable that equipment and dealing with party representatives are among the most frequently mentioned problems because, on the one hand, they must become familiar with the technology and the training, which was voluntary, may not have been sufficient; and on the other hand, the party representatives do not have sufficient knowledge about the operation of the equipment either.

Based on what was mentioned by the other users of the tool, the polling station technical coordinators, the experience in the process showed them that polling station members who used the tool broke the monotony of counting. In this sense, as the filling out of the tally sheets is the last part of Election Day, it is normal for errors to occur due to citizens' tiredness or laziness. For them, the ASS had an advantage in that it presented a novel way of performing this task and allowed them to avoid the duplication of tally sheets.

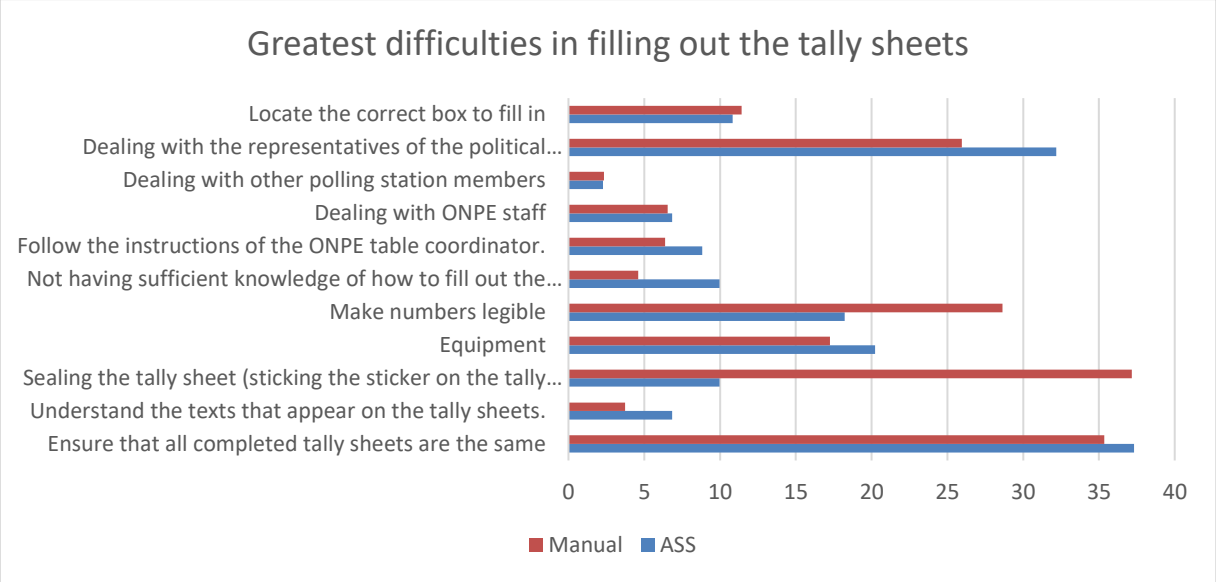

Figure 15 Difficulties in filling out the tally sheets

Similarly, for the coordinators the use of the ASS implies new responsibilities but also fewer worries. As they indicated in the interviews, and which was also a concern of the polling station members, the interaction with the teams is a minor difficulty. Here the most important point is about the responsibility for the devices. As they indicated in the interviews, it is not that the tool is difficult to use. The problem arises from the fear of damaging the equipment due to lack of knowledge. In the case of older people, there was a fear that they would be blamed for damaging the equipment. This fear is also present in

the polling station technical table coordinators, since they are responsible for moving the equipment inside the polling places.

However, what they also pointed out is that—with the right training—a polling station technical coordinator has an advantage over their peers who do not use ASS, in that they do not have to worry as much about errors in the minutes. As one of the interviewees indicated, it is easier to correct errors in the minutes with the system than with manual procedures. Nevertheless, it is important to point out that the coordinators face different problems, such as what happens if the data cannot be transmitted or the system does not respond. For this, they have a help desk at the ONPE's Electoral Information and Technology Office.

After looking at the results of the three components mentioned in the interviews, it is necessary to establish two elements. The first is to evaluate how the tool benefited street-level bureaucrats in carrying out their work. Here, it is important to understand whether the tool only provided support to the entity's objectives or whether it was also important for the performance of this key group that provides service to the public.

The second is the relationship between the perception of the interviewees and the results of the election to understand whether the implementation of technology improved the capabilities of the entity and how it also affects the subsequent improvement of the tool.

Regarding the first problematic issue, as mentioned by Atkeson et al. (2014) in most countries polling station bureaucrats are temporary. This is the same for the case of Peru, in the groups evaluated in this research, polling station technical coordinators who have approximately 2 months of hiring and polling station citizen members who are contacted from a month and a half before election day were found.

This leads to one of the main problems in work performance: insufficient training. In the case of the technical table coordinators, the first training was entirely virtual due to the pandemic. This was shown to be insufficient based on the results of the first round of elections. Likewise, as they mentioned in the interviews, the first training was given without the technological tools, which increased the gaps in terms of how they would perform on election day. This leads to the following problem, as mentioned by Kimball & Kropf (2006), the street-level bureaucrats in an electoral process have a great power of interpretation over the applied regulations. In the case of Peru, although there are

standards and procedures defined for each situation, in practice it can be seen that errors occurred because of how some coordinators decided that their work should be carried out.

In the case of citizen polling station members, who serve as street-level bureaucrats on election day, it can be seen that their perceptions, decisions, and practices can affect the process. As Clark (2017) suggests, standards can vary due to the perceptions of these actors about the electoral process and this can damage the credibility and integrity of the process. In fact, this occurred in the case of Peru. By having a conformation of polling station members by draw and in the face of a wave of misinformation regarding minor errors at the polling station, the losing political organization put forward the idea of fraud at the polling station, in which they postulated that the winning party had infiltrated the polling stations through poll workers (both citizens and coordinators) to change the result or cause errors. Although it was proven that there was no fraud, the accusation undermined the credibility of the institution and the work of the polling station members.

As Lipsky (2010) mentions, street-level bureaucrats are the focus of public controversy because they are the ones who interact with citizens and impact their lives. This is why it matters a lot whether or not their capacity in the electoral process was sufficient to manage the existing tension.

Understanding that street-level bureaucrats have a certain degree of autonomy from the entity, that due to the nature of their short time contracts they are not as rooted in the culture of the institution (Atkeson et al., 2014), and that this leads them to be under the magnifying glass of the citizenship. In the case of the general elections of Peru 2021, it was found that all these points occurred.

However, the use of ASS allows reducing this to a certain extent. When talking about the administrative capacity of the street-level bureaucrats in the case of this election, it is seen that there was a lower number of errors and a greater sense of ease in the tasks by those who used the devices. This was corroborated with the data from the electoral process, in the interviews with the actors, and with the results of the pre-and post-process surveys. In other words, although there is an improvement in their capabilities thanks to technological change, they continue to encounter the same difficulties as any street-level bureaucrat.

According to those interviewed at the institution, ASS seeks to facilitate the work of these stakeholders. However, as the JNE representative also indicated, implementing

technology solves certain problems but creates others. In the case of the implementation of ASS, it was found that errors in the minutes were due to a lack of knowledge of the use of the equipment and technical problems that they were not prepared to face at the time. Therefore, although one could say that the ASS increases the administrative capacities of the street-level bureaucrats, it is not possible to affirm that it is a panacea.

Perhaps the most important point to add is how to maintain the integrity of the organization as part of the street-level bureaucrats' job. As is, there are two ways of conceptualizing electoral integrity. The first is the one advocated by Norris (2014) and refers to its integrative scope in all dimensions of the electoral cycle in compliance with global standards and international conventions. The second conceptualization is reflected in what Nohlen (2016) says about the quality of elections, precisely to the relationship between values and practices. These are not exclusive but rather complementary, understanding that the first focuses on compliance with the rules in the electoral process and the second on the quality of the same.

It is important to make this differentiation because the affectation that the work of the street-level bureaucrats may have is given in the first conceptualization. By breaking with the electoral process as such, because their decision-making capacity may diverge from what is stipulated, they lead to the loss of the integrity of the process. This then leads to the institution as an entity being affected in the second conceptualization, integrity as the quality of the process. This is why the organization needs to improve the administrative capabilities of the street-level bureaucrats as part of the process, by doing so they can avoid diverging from the stipulated procedures. Easing their workload means that they have fewer decisions to make and can provide better service, safeguarding the integrity of the process and the election in general.

Furthermore, as to whether the use of ASS increased the institution's capabilities, it is necessary to look at the effects of technology implementation for each stakeholder with the process data. And then how each of these groups influences the organization to improve the implementation.

As can be seen, the use of ASS contributes—to a greater or lesser extent—to the three points evaluated. According to the citizens/user group, it was found that the ASS changes user needs in terms of its use to facilitate their work. On the citizens' side, the tool is presented as user-friendly and efficient, which would mean that its mass use would be

accepted and expected. However, it is necessary to have better training, with the appropriate tools, and preferably more practical than theoretical. Even with this tool, errors are seen as “should not” occur, such as problems in summation or illegibility. This is because the technological change must be accompanied by a change in the regulations as well. As a result, the technology generates a new need for practical knowledge in the citizenry to better use the tool and further suppress errors, decrease the time for results, and facilitate its use.

Concerning the technical coordinators of polling stations, the tool presents a benefit compared to their peers who perform their work manually, since the proper training and care reduces the errors in the minutes, the citizens' fatigue, and the time to transmit results. However, the expectations of this group also vary in that they assume that the tool should suppress all errors and should not fail. This is where the problems occurred during the election. On the one hand, the carelessness of citizens to make mistakes and rely on technology to fix them. And on the other hand, dealing with the technology and not having sufficient capabilities to solve problems not specified in the procedures.

As feedback, users’ skills are still not sufficient to be able to interact with technology without prior training. This is an obstacle due to the fact that training is voluntary. That is to say that users’ capabilities influence the entity in the sense that it will have to change the technology used.

Failure to do so will lead to compromises in the legitimacy and integrity of the electoral process. This has happened, but only minimally in this electoral process.

On the side of the market as a selection mechanism, what is found is that there is a leadership culture in the institution that supports the decisions of the technology area. The development of technology in the institution is carried out according to the objectives set by senior management and on the errors found in each process. There is no competition in the development of technology since they are the owners of the development and responsible for the implementation. This is seen in the case of the ASS, which was an idea adopted from comparative experience and has been efficient for the entity's needs. However, the control and autonomy of the same also prevent them from proposing better things, the lack of competition leads to a lack of points of comparison with what is being developed.

Based on the results, it can be seen that what was proposed by the ONPE's technology area regarding the ASS has been fulfilled (reduction of errors, time and facilitation of tasks). But no major changes are made to the tool unless they come up against an error or come from another instance. This means that there is no process of continuous improvement in which other stakeholders are integrated. As mentioned, the political cost is quite high and trust in the tools is basic. This is why everything is developed in-house, but the lack of involvement of the rest of the participants is what generates the errors during the process.

It is important to point out that, despite the efforts of top management to allow innovation in a simple way and the application of the ASS in test modes, there is a possibility that service and technology procurement processes may truncate the implementation. The issue has not yet been addressed since its use has not been massified, but it was one of the barriers that may affect changes in the tool.

Apart from this, it can be seen that the market affects the entity and the use of ASS as its implementation may be affected by the cost of technological equipment. Here, trying to minimize costs by using simpler equipment and eliminating manual steps can lead to multiple obstacles. One can be that the tool is seen as a black box because of the existing manual culture in the electoral process, another is that new errors that may occur cannot be solved by users (as already seen in this process and as stated in the interviews).

On the networks' side, ONPE's autonomy helps in easing the implementation of public policies, such as the use of the ASS. Being an autonomous EMB, it has the decision-making capacity to generate and implement in any part of the process. This could be observed in the process with computer systems used in the installation of the polling stations as well as in the counting and tallying However, this autonomy should go hand in hand with greater coordination with the other agencies of the electoral system. As the representative of the JNE mentioned, both have expectations and issue resolutions with procedures, but there is no greater conversation between the two entities. Likewise, the regulations issued by each institution could affect the work of the other. For example, the JNE is responsible for defining what an observed act is, but changing the characteristics of this definition could affect the use of the ASS. Another important network to consider is what is sought with the approval of major regulations, since having to go through Congress, where there are many political organizations dissatisfied with the election results, may make it difficult to pass bills.

Concerning how networks influence the entity, what could be obtained from the interviews is that there are certain matters in which stakeholders with more or less power will try to influence the implementation of technology. As already happened with electronic voting, what is sought is that any technology implemented should be transparent and auditable. As long as it does not meet these requirements, it will be judged and attempts will be made to delegitimize it. ONPE has already gone through a lawsuit process in the face of the presential electronic vote. But the ASS is not seen as a black box due to its existing manual process. This, as pointed out by senior management workers, benefits it in that it gives some security to users.

However, it is important to note that there are also pressures to implement technology without necessarily going through these filters because of the benefits it could bring to certain groups. An example of this is the position of the current Congress in which it was sought to implement electronic voting so that the military could vote. These dissonant voices around the technology implementation process will influence the entity according to the amount of power they may have and what the top management seeks to implement in the long term. While it is an autonomous body, there are certainly more political aspects to be considered.

In the case of ASS, there does not seem to be a major effect on its implementation by the networks. There is an expectation that transparency will be maintained and that it will be massified to benefit certain allies and keep the users at ease.

Regarding Hierarchical behaviour and the stakeholders that are in this group, what was found was that the decisions that are made are roughly based on the use of data obtained in the process. In this case, one of the observations was the lack of signatures one, which led to one of the proposed changes in the use of digital signatures for the ASS. This could be improved considering that there is much more information as part of the process, given the massification of the tool.

Another important point is the autonomy of the entity, as mentioned by senior officials. There is a great willingness from management to apply technology, when necessary, as long as it does not affect the legitimacy of the entity and the process. Therefore, it is known that it will be necessary to raise awareness among citizens and political organizations. Moreover, the decision to do everything in-house to retain control and avoid political attacks is also something that affects the implementation process. Here, it

is important to note that the ASS could be much more effective with slight adjustments, but it will depend on whether there is a true interest in efficiency and not only in showing the tool as such.

Finally, the advantage that ONPE has over other public entities is its autonomy. This is reflected in its budget, although there is always a struggle of prioritization among the many actions to be carried out. During electoral processes, ONPE can spend as they see fit without having to go through any filters other than respecting the basic spending rules imposed by the Peruvian State. The speed of the process allows to skip certain steps and innovate in technology, since the institution does not have to be accountable for something that should benefit the users. As a counterpart, after the electoral process ONPE will enter a recession period with a much smaller team, which will probably hinder major changes or developments in new technological systems.

Concerning this last point, what can be seen is that externally it will affect the entity insofar as the budget reduction will reduce the capacities of its ICT teams. Also, as mentioned by the representative of the digital government secretariat, every public entity should align with the technology policies that this entity provides. In this sense, although ONPE is autonomous as it is part of the State but not part of the Executive Branch, it still must deal with certain pressures about aligning with existing regulations.

A final point to understand how technological change affects the administrative capabilities of the entity and its officials are the constraints encountered in the implementation of technology. Although this is not a topic addressed as part of the theoretical framework of Lember et al. (2018), it is an important factor as it pertains to electronic voting.

There are two aspects on which it is possible to think about the limitations that have not been addressed but appear throughout this research. On the one hand, there are the limitations around the implementation, in which the different dimensions that can affect the process and that go beyond the entity must be considered. An example for this is the framework of Krimmer & Fischer (2017), where they work with macro and micro dimensions to identify recurring components in the implementation of electronic voting.

Under this perspective, what has not been done with the ASS is to evaluate how it was going to work with the country's current technological infrastructure. Although there have been advances, as mentioned in the interviews, the ASS started as a web-based tool and

became an encrypted application due to the difficulties for the transmission of information in certain regions. This problem has not yet been completely solved; in the last elections, there were transmission problems even in the city of Lima. The city with the highest Internet penetration in the country. This should be contemplated when thinking about the massification of the tool, as for the moment it has been limited to consider it a tool for urban areas that, although the most populated, should not be a reason to exclude the rest.

This was one of the things mentioned by the user group: the lack of tool usage in other regions. For them, the is citizenry's capacities to use the tool, but the issue of connectivity escapes ONPE and no action has been taken to change this reality. A possible solution could be the one used by the Ministry of Education, in which the information is collected on site but transferred to a point in the country.

The legal dimension is another of the aspect mentioned in this theoretical framework, necessary to address throughout the analysis. The current regulations end up colliding with the objectives that the entity seeks to achieve with the use of the ASS due to the restrictions on the tool. Logically, the output of the system is subordinated to the input of the street-level bureaucrats. However, there should be changes to how the system responds to certain errors, such as summations.

The ASS is intended to be a tool that facilitates the work of this group. By minimizing it, one objective is to perform the mathematical operations correctly. Currently, the capacities of the members of the polling stations are disparate and therefore there may be places where these errors appear more frequently. Additionally, using physical tally sheets to compare the results transmitted to ONPE's computers drastically saves time. In this sense, there is no confidence in what was uploaded to the system until it is corroborated with the physical tally sheet, because this is how the manual tally sheets work. A final point on which the regulations must be adjusted is the use of digital signatures. Having a whole process on a computer and then requesting the printing and signing of the tally sheets sort of loses the sense of technology use. With the use of digital signatures in the tally sheets, printing can be avoided since they would be certified by the members of the polling station. Then, a repository can be generated so that political organizations, citizens, and observers can audit the tally sheets being computed as they have been filled out at the polling stations.

The third dimension that should be considered is the theoretical framework in society. This is related to what was mentioned in different interviews with the current electoral culture. As has been mentioned, the Peruvian electoral process was manual and therefore difficult fraud due to the number of stages in which the result is verified. This leads to the fact that the mentality of the citizens and political organizations is that the manual modality is the one par excellence. All technology as part of the process is seen as a black box.

It is the responsibility of the ONPE to sensitize the different stakeholders in the use of the ASS so that this does not happen. In the current process, the losing political organization tried to use the ASS as an argument to establish fraud, since they were different from the manual tally sheets. There is a generalized lack of knowledge of how the electoral process works for the citizenry, which is even greater concerning the use of technology as part of the process. It is necessary to involve them in the improvement process, demonstrating that it is transparent and auditable. As the technology lawyer mentioned. The system should be transparent enough for any citizen to be able to audit it.

The pandemic has led to a large group in society calling for more digital services in the public sector. The fear of transmission in the elections was one of the big debates before the process. While the elections were conducted in a safe and orderly manner, they did not lead to an increase in transmission . Perhaps this was the right context to increase the implementation of technology and expand the ASS to test the receptivity of more population to its use.

The fourth dimension is the political one, which is related to the previous point on the need to sensitize political organizations. As mentioned above, the use of technology can be used by political organizations reluctant to the results as an argument to backfire on the election, as seen during this process. It is for this reason that the ONPE should be required to have more contact and information with the contending parties, so that they cannot use technology usage for their purposes.

Technology should also benefit political organizations insofar as it allows them to have results more promptly and with fewer tally sheets observed. But it is not only during the process that this sensitization is necessary. Now that the process culminated, these organizations that discredited the process and the ONPE will take their positions in the legislative branch and will be in charge of accepting or denying the use of technology in

the electoral process. As interviewees mentioned, the political cost of using technology such as the ASS is important. The entity must be able to keep its autonomy and integrity intact to continue implementing improvements in the service it provides. It is here where future work with the different congressional benches to improve the tools and expand the use of the ASS should be considered.

The other perspective to be considered—which escapes the theoretical framework—is that of electoral integrity. It is important to understand this concept due to the value given to integrity in the entity. Many interviewees mentioned this point and is one of the reasons for deciding whether or not to implement changes. In this sense, technological change is also defined by how it can affect electoral integrity.

As mentioned above, there are two ways of conceptualizing electoral integrity. On the one hand, there is the one worked by Norris (2014) that refers to compliance with global standards and international conventions throughout the electoral cycle. The author mentions that the electoral cycle has eleven sequential stages: legal framework of elections, electoral procedures, constituency boundaries, voter registration, party and candidate registration, electoral campaign, campaign financing, election process, vote counting, results, and electoral authorities.

Additionally, it is important to point out that for this author, most of the visible electoral malpractices occur in the last stages of the process. Although they can occur at any time during the electoral cycle, it is most common that problems occur at the election or immediately after. It is important to point this out since the ASS is a tool that used in the final part of the process.

Corresponding to what Norris points out, the ASS is used as part of the electoral process and in the counting of votes. This is why its implementation and use are sensitive to being misinterpreted, as it happened. In this sense, technology implementation such as the ASS must be in line with the notion of electoral integrity, so that it does not damage the image of the organization and affect the process in general.

The second conceptualization of integrity is the one proposed by Nohlen (2016). For this author, electoral integrity refers to the quality of elections, especially concerning the relationship between values and practices (Nohlen, 2016). In this sense, what he proposes is that electoral integrity is an ethical postulate that aspires to honesty in the face of the challenges of a democratic electoral process.

In this concept, what is sought is that the different actors of the electoral process act with integrity to protect the honesty of the process. Here, the ASS can also be a key element as it seeks to make the process transparent. An important part of an honest process is the transparency of its procedures and results. It is here where the ASS is a useful technology for the entity as it allows to quickly make the results transparent.

However, as indicated in the interviews, this tool must be auditable and not appear to be a black box to citizens and political organizations, otherwise, it will have the opposite effect. Claims of fraud in the use of ASS are based on a lack of knowledge about the process in general and about the technological tool, an aspect that must be worked on if ASS is to be used on a mass scale.

These concepts are not antagonistic; on the contrary, they are complementary. It is necessary to comply with all existing rules and conventions as part of the process. But also, the actions of the different stakeholders involved must be governed under the premise of honesty. If electoral integrity fails in either of the two conceptualizations, problems occur in an election.

ASS can be evaluated from both concepts and can affect the credibility and integrity of the process and the institution as such. It is for this reason that when evaluating the implementation of technology to improve the administrative capabilities of the institution and the street-level bureaucrats that use it, it should be considered how it affects the integrity of the electoral process.

To conclude with the discussion, what is found is that while the theoretical framework elaborated by Lember et al. (2018) is rich to inquire into how technology affects the different organizational and external stakeholders and how they, in turn, affect this technology implementation process. It does not lead to encompassing all the aspects necessary to understand the why of the technology implementation process, which also affect the administrative capabilities of the entity.

As can be seen, the incorporation of ASS as part of the process brings positive effects for both users and the organization. However, this technological device cannot be exploited to its full potential due to certain limitations exogenous to the organization.

In the final section, an attempt will be made to answer the questions of this research and what has been discussed in this section, especially what is relevant to how the theoretical

framework helps to evaluate the effects of technology on administrative capabilities. Finally, some recommendations are made for the ONPE with the objective of improving the implementation and use of the ASS as part of its plans to expand its use in the next elections.

6 Conclusion

Based on the information gathered through interviews and surveys and after analyzing the data collected during the electoral process “General Elections 2021” in Peru, this research can shed some light on how technological change affects the administrative capacities of the entity and the bureaucrats at the street level.

First, it is obvious to point out that technology does affect administrative capabilities. As Lember et al. (2018) argue, technology is a critical factor in the life of public organizations. Furthermore, it is a critical factor in today’s society, so public organizations cannot escape the use of technology and, rather, must adapt the provision of their services to adopt technology to make life easier for users.

Evaluating the case of ONPE and the implementation of the Automated Scrutiny System, it was found that technology has positive effects on users and the entity. The purpose of this technology is to facilitate, accelerate, and make more effective the counting and tallying process carried out by polling station members on election day. However, this technology affects the different stakeholders and will be affected by them in the improvements planned for the following electoral processes.

Going into greater detail, what it was found is that the ASS fulfils its mission of improving the administrative capacity of the entity, understood as providing a better service to the citizens. This results in tally sheets with fewer observations, so that more votes are counted, less time to deliver the results, and improvements to the user experience. However, the current use of ASS is not as effective as it could be due to other limitations.

In terms of time reduction, the transmission to the entity’s central office and the retransmission to the computing centres takes more time than the manual sending of tally sheets. Likewise, in order to proceed with the computation of the tally sheets, it is still necessary to wait for the arrival of the manual tally sheets for comparison and quality control. This means that the results take the same or more time to be computed. Of course, the difference lies in the fact that, by being already computed from the voting station, time is saved in the typing at the computing centre.

In terms of facilitating user work, there is a perception of ease of use and a feeling of benefit. On this point, there is no hard evidence other than the perception of the users, since the time taken to perform their tasks is almost the same and the number of errors

has been minimally reduced. What remains is the perception in which the technology is identified as friendly, beneficial to the process, and as a change in the routine user experience.

The ASS is limited by the existing manual culture in the citizenry, the country's technological infrastructure, the restrictive regulations towards technological improvements as part of the electoral process and the political impact it may have, which could lead to the loss of electoral integrity of the process and of the institution itself.

For this reason, the entity must balance and adapt the benefits granted by technology with the national reality in order to provide a better service. Although some of these limitations are beyond the capabilities of the organization, some of them, such as the manual culture and regulations, could be addressed through a process of sensitization of the stakeholders involved and the search to improve the established norms corresponding to the electoral process.

This is part of the necessary work towards the future massification of this technology, greater involvement of other stakeholders in the improvements of ASS, and of the technology in the electoral process in general. In addition, ASS has proven to be an efficient technological change that speaks to reality. Although there are dissonant voices that seek to close the way to the implementation of technology. In this process it has been observed that they are minimal and have lacked support, so they have not penetrated society. In a country like Peru, where there is a lot of distrust in the electoral authorities and the public sector in general, it is important to maintain the legitimacy of the technology and the process.

In response to the research question, the application of ASS has a positive impact on the administrative capacity of ONPE, as it benefits the service provided and the users. This is reinforced to a lesser or greater extent by the different stakeholders involved. Those that consider this technological change in the process to be fruitful as long as it maintains certain characteristics, such as been transparent, easy to use and allow control over the process.

Regarding the sub-question on whether or not the opinion of the citizenry collides with that of the ONPE, it was found that citizens accept the use of technology such as ASS in the election process. In fact, what the evidence suggests is that they would be much more willing to continue using technology in more areas of the process if possible. Here, it is

important to highlight that, even without much evidence of this, the tool is recognized as useful and simple. This is also an important aspect of the user experience of these citizens.

However, it is also necessary to point out that the use of technology may lead certain political voices to criticize the entity and the process as part of a strategy to delegitimize the results. This was seen in the post-election stage, in which the use of technology in certain polling stations was held as another argument to raise claims of fraud at the polling station. This is where lies the importance of raising awareness among citizens and political organizations and making tools such as the ASS known. While the expectations of the entity reflected to a certain extent those of the users and citizens. There is a group that could demand that it no longer be used due to fear of the black box that the technology implies.

Strategies should aim at changing the manual process mindset and provide assurance that the process and the technology used benefit the citizens and the entity. As stated, multiple times in the interviews and throughout this research, the integrity of the institution is of utmost importance. This is why the different political costs are avoided at all expenses.

These conclusions can be used for any type of technology that is considered to be implemented in the electoral process. It is necessary to analyze the shortcomings and find out if they can be solved with the implementation of technological systems. Citizens expect public entities to behave more like the private sector and to digitalize at high speed. However, some limitations need to be addressed and solved before moving forward. ASS has proven to be a “perfect match” as ONPE officials called it. This is because it still maintains the manual part that is so much desired by a group of the society, but the cost of maintaining this lowers its efficiency. This is a cost that the entity is willing to pay to maintain stability and generate security for the citizens.

After a process like this, full of tensions and accusations of fraud from both sides of the political spectrum, the recognition that remains for the entity comes from other areas. International missions praised ONPE’s role in the process, the ASS was recognized for one of the awards for good governance and some sectors of the citizenry are happy about how the process was conducted. The problem is what will happen from here on, as fraud accusations already undermined its credibility and that of the ASS. Betting on this technological change, which has proven to be efficient and useful, could fan an existing flame of reluctance towards the entity.

The senior management should seek to appease the doubts about the tool by improving its operation with the technology area, talking more with networks and partners so that they validate the tool and support the dissemination of its importance. Users should be integrated into the improvement process to understand why failures and experiences occur during their work. All this while dealing with the different external powers that seek to put pressure based on their interests. This is an iterative process of continuous improvement to which all stakeholders must contribute. Indeed, technological change produces changes in the actions of stakeholders and also these actions in the organization and its technological tools.

As mentioned in the previous section, there are certain aspects that are not considered in the theoretical framework used that also affect technological change and, therefore, the administrative capacities of the entity.

The theoretical framework serves to outline how technology influences administrative capacities, which in the case of the ASS for ONPE has a positive effect. However, as found during the research, their use and implementation is limited by external aspects and this is treated very briefly within the existing categories.

If the objective was to improve the capabilities of the organization, what can be seen is that the ASS is not being used to its full potential. This is because the context is not yet ready for these changes and is therefore affected by the different dimensions of social reality.

In this sense, there is the need to adapt current regulations, which would lead to a better use of the tool insofar as digital signatures and corrections in the electoral records could be made in the same system.

Likewise, the necessary sensitization of the citizenship on the use of technology and the explanation of the black box as part of the electoral process may dispel fears and expose the level of transparency provided by the tool.

There is also the political factor, mentioned multiple times by the organization's officials. It must be levelled what the parties and forces in power want with the use of the tool. These decisions also have implications on how the ASS operates and restrict certain aspects that could further improve the administrative capabilities of the entity.

Finally, it is important to point out the value and weight of the concept of electoral integrity. This was emphasized as the greatest asset that ONPE can have and the habitus by which the entity should act. The need to maintain the integrity of the electoral process may lead to certain aspects of technology not being used in order not to disrupt the process in general. It is a long cycle in which minimal changes may affect the credibility and undermine the process. Here it is important the decision of the highest authorities of the entity and the reactions of the other actors involved.

As was seen in the process in Peru, the use of technology was used by one sector to talk about fraud in the process. This weakens the administrative capacities of the entity in a certain sense, so it should be considered as an important factor concerning technological change.

Another important point addressed throughout this research is how ASS affects the capabilities of street-level bureaucrats. Linked to the previous point, the work performed by these officials affects the electoral integrity of the overall process (Clark, 2017), which is why it is of utmost importance to understand how technology affects their capabilities.

As mentioned above, these officials carry out the service to citizens. In the case of the electoral process, this is interesting since those who fulfil this function are mostly citizens as well. As mentioned, in Peru polling station members are citizens drawn by a lot to perform these tasks who are trained and supported by a polling station coordinator.

Polling station coordinators hired by the ONPE do not belong to the organization for a long time. This is why the organizational culture of the institution may be affected. Commonly, street-level bureaucrats who perform these tasks do not feel completely identified with ONPE. In this electoral process, it was seen that the majority of fraud claims were made against those who fulfilled this role.

Basically, for this electoral process, the losing party presented a series of nullities and claims because it considered that the winning party had co-opted the polling stations and had carried out “fraud at the polling station”. This is where the notion of technological change to improve administrative capabilities becomes important. In the polling stations with ASS, there were no observations of the type of impersonation or fraud due to changes in the results. This did happen in many areas of the country. In this sense, the use of technology allowed many of these street-level bureaucrats to perform their duties without subsequent questioning by the losing party.

Although these officials do not have much time as part of the institution and most of them do not identify with it, ONPE should try to provide them with better tools to facilitate their work. Based on the surveys and interviews, it is clear that the ASS is a tool considered easy to use and that in effect reduces the margin of error caused by human error. Although many things are still left to the discretion of the street-level bureaucrats, the use of the ASS homogenizes and standardizes the process.

In fact, applying some changes to the ASS could make their job even easier. In a country where the qualifications of the citizenry are so heterogeneous and the selection, random, although it has certain rules. There must be a way to standardize the work they do to provide a better service nationwide. ONPE is in a position and capable of improving its capabilities through better training and better tools. But there is still a fear on the part of the organization's top management about technological capabilities in remote locations, in addition to other infrastructural problems related to technology.

From what can be gleaned from interviews with street-level bureaucrats, there is still some fear of using technology but it is recognized as a long-term benefit. Understandably, a sector of the citizenry is more reluctant to interact with these tools and that is why younger personnel are selected. But by facilitating their use and user experience, they could quickly massify ASS in a society where most of the population interacts to a greater or lesser extent with technology.

To summarize all of the above, the use of ASS does contribute to improving the administrative capabilities of street-level bureaucrats. Arguably, to a lesser extent than the capabilities of the entity understood as the objective of providing better service. As James (2012) mentions, the ONPE must include local knowledge in the future implementation of ASS. In this way, it could improve the tool and obtain better results for this group and the organization.

7 Recommendations

Evidently, the ASS is a perfectible system. For this reason, there are some changes that, in my opinion, the ONPE could make to improve the user experience and the efficiency of the tool.

First, there is a need to improve the training provided to the street-level bureaucrats who use the ASS. Regarding the technical coordinators of polling stations, in addition to being required to know the use of technological tools, it is ideal that they have trained with the tools before the process and are prepared for the contingencies that may occur in these stations. Currently, they receive the same training as the rest of the coordinators. Therefore, when faced with specific ASS problems, they do not have the capacity to deal with them and must resort to the help desk, which does not always have an immediate solution.

In order to achieve this, it is necessary that in the decentralized offices of electoral processes in which it is planned to use ASS and which are temporarily installed in each process, the necessary equipment is available so that the coordinators can interact. Although the pandemic has challenged this process and for which it was decided to digitalize almost all the training, the use of equipment is something that must be prioritized to carry out the process well.

Similarly, the training of the polling station members must change. Getting these actors to be trained is one of the most difficult tasks of the ONPE; in this process, the institution used a mixed technique that reached 57% of its target. However, in the first round, there were too many errors, so it was decided that digital training was not enough. In the case of ASS, since giving equipment to citizens is almost impossible, the ONPE should try to replicate a version of the software on its training website so that citizens become familiar with the tool. While it will not be the same interaction as on election day, it could explore how the tool works and prepare them with more expertise.

Secondly, it is necessary to generate greater awareness of the existence and use of the tool among citizens and political organizations. For this process, ONPE issued press releases about the use of the ASS as part of the process in different media and through its social networks. However, the final results have shown that this was not enough.

In processes with such closed results, it would be best for society to know how the electoral process works from start to finish. Unfortunately, most of the population is only interested every five years during the presidential election. This leads to the fact that many allegations of fraud are made due to the ignorance of the population and because they are based on the interests of some political organizations.

For ONPE to improve this situation, what should be done in the first instance is to present the different technological tools to the contending parties and where they will be used. In this way, at least it will be able to demonstrate that they were directly explained to them and that they knew firsthand the tool to be used.

As far as raising citizen awareness, the ASS ends up being a less attractive technological system than in-person electronic voting, but just as important. This is because the ONPE previously used many of its resources in making this technology known to the citizenry and now it is no longer used, while the ASS has improved and remains in force in the processes. In this sense, if the current head of ONPE plans to maintain the ASS and massify it, he should also use its resources and capacity to present the tool to the citizens. This would serve to eliminate the black box that is technology as part of the electoral process and help more citizens to accept and understand its benefits.

Thirdly, the ASS must make changes based on the results of the process it went through. As the theoretical framework indicates, the tool affects and is affected by the perception and capabilities of the different stakeholders.

In this sense, there are two important changes to what was observed. On the one hand, the notification received by users seems to be inadequate or insufficient. There are still errors in the electoral tally sheets. Although this is tied to the regulation that states that what counts are citizen records, even if it has errors, the system should generate a better alert as these errors can lead to the annulment of the entirety of votes of that polling station.

Here is important to ASS validate with users before continuing to use it. As obtained from the interviews, the tool was generated to solve a problem that senior management identified. And for its implementation they used the experience abroad, but it was never confirmed that the citizens understood and found the tool useful and easy to use. This study is a first indication that the tool does comply with these two points, but it can still be improved.

The other important change, also tied to the legal aspect that must begin to be implemented, is the use of digital signatures. As could be observed, another major error is the lack of signatures on the tally sheets, leading to observations. Moreover, having to print and sign the tally sheets also delays the process that the ASS seeks to accelerate. By having to take the physical tally sheets to be able to compare them with the results recorded in the system and having them signed by the polling station members, the process ends up being even slower than the manual one in this part.

This being so, there are technological gadgets that should be implemented to improve the tool. But they must also go hand in hand with changes in the electoral regulations. Here there must be no gap between what has always been done and the innovations that the ONPE seeks to implement. The manual procedure has become outdated with the ASS tool, so the ONPE should seek to better legislate the use of this device to provide a better service.

And fourthly, ONPE should seek to make the tool as transparent as possible. Based on the learning experience with presential electronic voting, and what was emphasized in the interviews, what is being sought externally is that any technological tool used should be sufficiently transparent for anyone to be able to audit it.

In this sense, what ONPE should propose is that the system can be audited not only internally but also by external entities. The citizens and academia should be invited to examine the ASS to corroborate the security of the tool and provide greater integrity to the process.

This strengthens the technological solution in that it gives greater validity and reduces a later political cost on the part of the losing parties. The ASS must make the results transparent to eliminate the concept of a black box, for which external assistance is useful. Control of the development and implementation of the tools has been very much focused on keeping it in-house due to security and political cost, but it has turned out to be a double-edged sword in certain circumstances because too much secrecy about something leads to suspicion from the outside eye.

To conclude, that the analysis, discussion, and statements in this research could be useful to the institution in terms of the application of other technologies to improve the service they provide: conducting elections at different levels.

After analyzing the ASS and the effects it has on the administrative capacity of ONPE, it could be observed that the integration of technology in the process has benefited the objectives of transparency, speeding up and facilitating the counting of results. This should serve as a basis for future technology implementations.

Of course, the idea is not to implement technology for the sake of it throughout the process. The ideal is to find the problems in the process and where they would not affect the integrity of the institution or the process itself. It is a delicate system in which good intentions may not be enough to improve the capacity of the institution and therefore the service. External factors must be considered and weighed when evaluating technology implementation.

However, it is likely that many of the obstacles faced by ASS will also have to be addressed by other technologies. Especially because of what could be a future implementation of non-face-to-face electronic voting and the reinstatement of face-to-face electronic voting. There are changes that the new management of the entity must make and changes within its reach. Starting with the technology it manages and the regulations by which it is governed.

Allowing the opening of the technology to the different stakeholders for their knowledge and scrutiny. The autonomy of the ONPE allows it the luxury of making these changes and testing to improve. Using technology as a means to achieve better results must be accompanied by new data and a user-centred approach. It is through this, that future implementations will serve the organization’s objectives, improving its administrative capabilities, but at the same time maintaining the integrity of the process.

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Appendix

A Entry Survey for citizens polling station members

1. Did you find the use of the Automated Scrutiny System ...?

   (1) Very easy (2) Easy (3) Difficult (4) Very difficult

2. Do you consider the Automated Scrutiny System to be ...?

   (1) Not useful at all (2) Not very useful (3) Useful (4) Very useful

B Exit Survey for citizens polling station members

1. Now that you have used the Automated Scrutiny System, did you feel that the use was...?

   (1) Very easy (2) Easy (3) Difficult (4) Very difficult

3. Now that you have used the Automated Scrutiny System, do you consider the Automated Scrutiny System to be ...?

   (1) Not useful at all (2) Not very useful (3) Useful (4) Very useful

2. Do you believe that the use of the Automated Scrutiny System was efficient in that: (check all that apply)?

   a) It reduced the time of the scrutiny

   b) It helped to ensure that there were no errors in the minutes of results

   c) It was not efficient in either of these two aspects.

C Interview Guide for Internal Hierarchical stakeholders

What is your name?

What is your position in the organisation?

How long have you been in the position?

What are the main functions of this position?

How was the implementation of ASS devised?

Who was consulted in the development of the tool?

What problems did the implementation of ASS seek to address?

What does the ONPE currently expect from the implementation of ASS?

How do you think ASS benefits the users of the tool?

Why is the use of this technology important to achieve the results sought by ONPE?

Do you consider that a different user profile is necessary for the use of ASS?

Do you think that the use of ASS allows for greater efficiency and effectiveness in the counting of votes? How?

What are the future plans for the ASS?

Do you think that ONPE's bureaucratic system makes it difficult to implement such policies?

D Interview Guide for External Hierarchical stakeholders

What is your name?

What is your position in the organisation?

How long have you been in the position?

What are the main functions of this position?

How do you engage with the use of technology in the public sector?

What do you see as ideal in the process of implementing technology in the public sector?

Do you think technology can help users?

In what ways?

How does your organisation relate to elections?

What are your views on the use of technology in electoral processes?

How do you evaluate the use of technology in the electoral process that has just passed?

Are you familiar with ASS?

How do you think ASS benefits the users of the tool?

Why do you think this technology is important to achieve the results sought by ONPE?

Do you consider that a different user profile is necessary for the use of ASS?

Do you think that the use of ASS allows for greater efficiency and effectiveness in the counting of votes? Why?

E Interview Guide for Market stakeholders

What is your name?

What is your position in the organisation?

How long have you been in the position?

What are the main functions of this position?

How was the implementation of ASS devised?

Who was consulted in the development of the tool?

What problems did the implementation of ASS seek to address?

How costly was it to implement ASS?

How difficult was the development of the tool?

Do you consider that ONPE's system for acquiring technology could affect the process of developing and implementing the tool? Why?

Why was it decided to go in-house and not to purchase a tool from a supplier?

What would happen if the development and implementation of this tool were outsourced?

How would it affect costs?

How would it affect the efficiency of the tool?

What parts of the implementation are outsourced?

What does the ONPE currently expect from the implementation of ASS?

How do you think ASS benefits the users of the tool?

Why is the use of this technology important to achieve the results sought by ONPE?

Do you consider that a different user profile is necessary for the use of ASS?

Do you think that the use of ASS allows for greater efficiency and effectiveness in the counting of votes? How?

What are the future plans for the ASS?

F Interview Guide for Network stakeholders

What is your name?

What is your position in the organisation?

How long have you been in the position?

What are the main functions of this position?

Do you think technology can help users?

In what ways?

What are your views on the use of technology in electoral processes?

What is your relationship with the use of technology in the public sector/elections?

How do you think your institution's expectations may affect the implementation of technology in ONPE/public organisations?

Do you consider that your organisation's capacities affect the implementation of technology in ONPE/public organisations?

What do you see as ideal in the process of implementing technology in the public sector?

How do you evaluate the use of technology in the electoral process that has just passed?

Are you familiar with ASS?

How do you think ASS benefits the users of the tool?

Why do you think this technology is important to achieve the results sought by ONPE?

What do you think the ONPE should change to improve the implementation of this technology?

How do you engage with the use of technology in the public sector?

Do you consider that a different user profile is necessary for the use of ASS?

Do you think that the use of ASS allows for greater efficiency and effectiveness in the counting of votes? Why?

G Interview Guide for Users stakeholders

What is your name?

What is your position in the organisation?

How long have you been in the position?

What are the main functions of this position?

Do you think technology can help you in your work?

In what ways?

What are your views on the use of technology in electoral processes?

Compared to other people in your position who do not use ASS, do you think this tool makes your job easier?

Do you think that using ASS is more efficient than purely manual scrutiny? Why?

For you, what are the main advantages of using ASS?

And what are the main disadvantages?

Do you think that to be able to use this tool it is necessary to have another kind of knowledge than those who do not use it or is it sufficiently intuitive?

Do you think that your work performance is affected by the use of the tool? In what way?

How do you evaluate the use of ASS in the electoral process that has just passed?

Why do you think this technology is important to achieve the results sought by ONPE?

What do you think the ONPE should change to improve the implementation of this technology?

Informed consent for master's thesis research

Technological Change of ONPE, an Electoral Management Body in Peru – Voters and civil servants' perceptions

Pablo Andres Hartill Montalvo
+51 980673322

- I have received sufficient information about the purpose of the research.
- I understand what is expected of me in the study.
- I am aware that I will participate in the following survey / interview(s) / experiment:
- I understand that my participation in this study is voluntary. I am aware that I can discontinue my participation at any time. I will not have to provide a reason for this and I will not suffer any disadvantages.

  Under the GDPR, the data collected during the study will be processed on grounds of public interest. This means that if I withdraw from the study, any previously collected data can still be lawfully processed and do not need to be deleted by KU Leuven.
- The findings may be used for research purposes and may be published.
- I understand that I will receive no/the following payment for participating in the research.
- I understand that I can contact Pablo Hartill for any questions or to exercise my rights (access to or correction of data, delete my answers from the research) after participating in the study.
- For any complaints or other concerns about ethical issues relating to this study, I can contact KU Leuven's Social and Societal Ethics Committee: smec@kuleuven.be.

I have read and understand the information above and have received answers to all my questions regarding this study. I agree to participate in the study.

Date:

Name and signature of the respondent/participant

Name and signature of the student researcher

Declaration of Authorship

I hereby declare that, to the best of my knowledge and belief, this Master Thesis titled "Technological Change of ONPE, an Electoral Management Body in Peru – Voters and civil servants' perceptions" is my own work. I confirm that each significant contribution to and quotation in this thesis that originates from the work or works of others is indicated by proper use of citation and references.

Lima, 02 August 2021

Pablo Andres Hartill Montalvo

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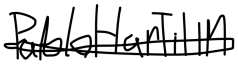

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