Digitalization in the public sector: The role of social and institutional factors in technology acceptance

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1. Introduction

The public sector has experienced a “digital revolution” transitioning to digital tools to deliver public services. With the introduction of Information and Communications Technology (ICT), the relationship between citizens and the public sector experienced equally fundamental changes. With the diffusion of internet access and the introduction of digital technologies in society, the belief was that it would positively contribute to the relationship between citizens and the public sector, for instance, by promoting civic participation. The digitalization of the government is arguably associated with higher efficiency, quality of services, and higher degrees of transparency and cooperation between public agencies (Alcaide Muñoz et al., 2017). This positive approach to the digitalization of the public sector stems largely from the Digital Era Governance (DEG) paradigm in public administration. The paradigm is based on the idea that, with the pervasive digitalization of society, technological innovation should be at the core of public governance and the delivery of public services (Dunleavy et. al, 2006). In doing so, technological advances would have the potential to increase government efficiency and improve the quality of public services.

As a reaction to these changes, scholars in public administration have sought to develop theoretical frameworks and models to explain the factors responsible for the effective implementation of digital technologies in the public sector (Klievink et. al, 2016). In developing these models, the Digital Era Governance (DEG) paradigm influenced the theoretical approach from the supply side of digital technologies in the public sector, meaning a focus on the organizational and structural side of the implementation of digital technologies. For instance, Klievink et. al’s (2016) public sector’s readiness for big data framework breaks down structural elements of the public sector to create a framework accounting for the organizational alignment, maturity, and capabilities of public organizations. Similarly, several other scholars explore the organizational changes necessary to accommodate the digital revolution. Dunleavy et. al (2006) argues that technological innovation in the public sector results in organizational changes. Hence, the literature on the topic is heavily influenced by the structural (supply side) and the wider organizational aspects of digitalization in the public sector.

On the contrary, the literature on the demand side of digital technologies in the public sector is often absent in the development of theoretical frameworks aimed at identifying the factors influencing the successful implementation of digital technologies in the public sector. The research on technology innovation is constrained by structural and organizational analyses, while the importance of social and institutional factors is often disregarded. Despite limited attention, one may argue that the digital revolution, as in several other big societal

changes, can be understood as having multiple levels of analysis ranging from the individual, societal and organizational levels (Scott, 2001). In the diffusion of technology, the process is not uniform and linear; as a result, different groups in society experience these changes differently. Here, it becomes pertinent to take into account the individual and social levels to have a more complete understanding of the dynamics of the digital revolution. For instance, in the study of e-government adoption, some scholars have focused on the digital divide between different demographics and the extent to which these characteristics influence citizens' adoption of e-services (Al Shafi & Weerakkody, 2009). Similarly, in understanding citizens' acceptance of technology, frameworks such as Davis' (1989) Technology Acceptance Model (TAM), emphasize the importance of (social and government) trust in technology acceptance. In sum, the literature on the demand side of digital technology can provide relevant insights into the acceptance and adoption of technology and, ultimately, help identify the factors influencing the successful implementation of digital technologies in the public sector.

This research contributes to the literature on the factors responsible for the effective implementation of digital technologies in the public sector. The guiding research question of this research is: *"To what extent do institutional and social factors influence citizens' attitudes towards technological innovation?".* The RQ addresses the gap in the literature regarding the effect of social and institutional factors in technology acceptance. As a result, the research departs from institutional theory to explore the demand side for digital technologies. It designs a model to analyze how social, economic and cultural factors influence citizens' attitudes toward technological innovation. In a systematic overview, the Citizens' Technology Acceptance Model is developed to illustrate the main theoretical assumptions of this research and to provide a visualization of the hypotheses. The model is composed of *government trust, social trust, political engagement, citizen-state interactions* and *demographic characteristics.* In the analysis, each category of the model is tested with the use of a dependent variable and different predictor variables that reflect each of the categories accordingly. The data is retrieved from the World Values Survey (2017-2022) and an Ordinal Logistic Regression is used to test the four hypotheses of this research. It is relevant to highlight that the literature on institutional theory and technology acceptance does not use the WVS survey in its analyses. Hence, this research contributes to the scholarly debate by being among the pioneers to explore technology acceptance with such a complete and international sample of individuals. In the second chapter, the theoretical framework is laid out with a systematic literature review of relevant theories, the Citizens' Technology Acceptance Model and the respective four hypotheses. In the third chapter, the methodology and operationalization are provided with a thorough definition of the variables and the

methodological choices of the analysis. In the fourth chapter, the statistical output is presented alongside the results and a discussion of the findings. In the fifth chapter, the research is concluded with a reflection on the findings, the limitations of the model and the prospects for future research.

2. Theoretical Framework

The theoretical framework in this thesis stems from the literature on Digital Era Governance (DEG), digitalization in the public sector, institutional theory and popular attitudes toward technological developments. This thesis explores the extent to which social and institutional factors influence citizens' attitudes toward technological innovation and reflects on its implications for implementing digital technologies in the public sector. The chapter begins by presenting the DEG paradigm and its dominant theoretical perspectives, and in contrast, it presents the institutional theory's contributions to understanding citizens' attitudes toward technological innovation. Lastly, it highlights the literature on the influence of social and government trust in technology acceptance and the role of demographic factors.

2.1 Digital Era Governance (DEG)

The public sector has always experienced several structural changes that contributed to new paradigms in public administration studies. Previously, the New Public Management paradigm shaped the public sector intending to increase its efficiency and productivity with the implementation of elements of the private sector and financial markets. However, the 21st century was marked by increasing digitalization and connectivity across the world. According to scholars, the New Public Management paradigm lost momentum to the digital era governance (DEG) (Dunleavy et al., 2006). Here, the DEG can be understood as a continuation of the NPM and sheds light on the influence of increasing connectivity and its impact on the interaction between citizens and the public sector (Dimeski, 2019). It can also be argued that the DEG in the public sector operates in the co-creation of public policies between the government and citizens, taking into account the higher participation of citizens in the definition of public policies and the delivery of government services (Białożyt, 2017). These processes are embodied in each phase of the system and allow for the co-creation to be realized efficiently (Białożyt, 2017). Hence, the DEG helped to cement the notion that the implementation of digital technologies in the public sector positively impacts the efficiency and quality of public services – contributing to theoretical approaches focused on the supply side of digital technologies in the public sector.

2.2 The supply side of technology in the public sector

With the rise of digitalization, scholars have been concerned with the extent to which the public sector can adapt to technological advances and the extent to which it can implement them in public processes to improve the delivery of services to citizens. Here, the question that arises is about the impact of implementing new technologies on governance and how it shapes the relationship between government and citizens. Influenced by the DEG paradigm, the literature is focused on the supply side analysis of technology implementation in the government. In this case, the literature focuses mainly on organizational and technical aspects, and oftentimes, underplays the importance of social and institutional factors. A prime example is the methods designed to assess the public sector's ability to implement digital technologies, such as Klievink's et. al (2016) public sector's readiness for a big data framework. The framework intends to provide a systematic way to explore the crucial structural and legal elements necessary to implement digital technologies. Additionally, it was defined to address the uncertainties that policymakers face when implementing big data technologies, as big data is expressed and understood in measurable organizational characteristics (Klievink et al. 2016). The framework categorizes and conceptualizes three different elements: *organizational alignment*, *organizational maturity* and *organizational capabilities* (Klievink et al. 2016). The categories stem from big theories concerning big data implementation in the private sector and are adapted to account for the dynamics of the public sector. The sum of all the three different elements in the public sector is understood as big data readiness (Klievink et al. 2016). In other words, a public institution is deemed ready to implement big data technologies if it can ensure that these structural and legal elements are present in the context of the public sector.

2.3 Institutional theory

While the Digital Era Governance (DEG) emphasizes the public sector's adoption of elements from the private sector to increase efficiency and productivity, there are theoretical perspectives that challenge the extent to which these elements alone can dictate innovation in the public sector. In this case, institutional theory challenges some of the assumptions of the DEG by highlighting the macro elements that shape the development of digital innovations in the public sector. In the literature, institutions are conceptualized as guiding human behavior in society (March & Olsen, 1984). The concept of institutions is often taken for granted in the study of digital innovations since they are usually identified as normative elements of society (Scott, 2001). However, the institutions-as-rules approach identifies a more defined place for institutions in the study of digital innovations. The approach understands the concept of

institutions as formal rules (laws) and informal rules, such as behavioral norms and customs (North, 1999). This understanding contributes to the idea that institutional factors help shape the dynamics of digital innovations in the real world beyond organizational and structural factors. It moves away from the idea of institutions as mere normative elements and emphasizes the significant role of informal rules as an expression of societal and behavioral norms. Hence, challenging the DEG paradigm and providing a new theoretical lens for the assessment of institutional factors in the public sector's adaptation to digitalization.

In parts of the literature, the narrative is that there is a need for a more critical approach to the study of digital innovations (Heeks, 1999). The narrative reveals that the theoretical perspectives stemming from the DEG provide little to no critical outlook on the institutional complexities around digitalization in the public sector. In terms of institutional theory, it is possible to affirm that it provides an alternative mechanism to explore institutional factors, avoiding the limitation of a rational approach that solely considers technical aspects. It highlights that public organizations reflect the social and cultural systems intrinsic to social expectations and behavior. For instance, one of the approaches used to understand innovation is that change results from certain structures and elements at multiple levels of analysis, including individual, societal and organizational levels (Scott, 2001). In this sense, institutional theory allows for a more holistic and complete assessment of innovation that is not restricted to the structural and technical elements in public administration. Accordingly, providing a critical approach to the study of digital innovations by providing an alternative and broader theoretical perspective for the analysis.

2.4 The demand side of technology in society

Undoubtedly, technological advancement in different areas of society has challenged pre-established societal and ethical norms. In doing so, it raises questions about privacy, discrimination and fairness with the increasing automation of services and the implementation of A.I. Systems. In the public sector, it is not any different. These innovations have been integrated into decision-making systems, leading to the automation of activities previously conducted by public servants. The diffusion of technology is understood as a social practice that expresses the ability of individuals to create and change social and cultural norms (Mordini, 2007). Among these, one may argue that technological advancements have challenged some of the most basic cultural norms in terms of the citizen-state dynamics with the automation of decision-making in the provision of services. As a result, the implementation of technologies may be subject to scrutiny by those individuals rejecting these changes. This phenomenon is supported by the idea that, despite the benefits to society, the increasing

adoption of technology can equally lead to risks (Gunter and Harris, 1998). In the case of discretion, the implementation of automated systems to conduct the decision-making process that previously relied on the discretion of street-level bureaucrats may lead to cases of discrimination, such as racial profiling. Therefore, there is a need to explore the impact of technology on the social and behavioral norms in society.

2.5 The case for social acceptance of technology

Considering the demand side, the social acceptance of technological innovations is arguably crucial for the adoption and, ultimately, responsible for its successful application. The regulation of digital technologies in the public sector should not only be suitable for the structures of public administration, but it also requires a degree of compatibility with wider societal interests (Brownsword, 2019). In its implementation, digital technologies in the public sector change important elements of citizen-state dynamics. For instance, the implementation of automated systems to process applications for welfare benefits completely changes the interaction between citizens and government welfare institutions. Since the decision-making is no longer subject to the discretion of a public servant, elements such as citizens' trust in the government and in public officials may shape the attitude toward implementing such technology. Similarly, technologies entailing the mass use of personal data or the surveillance of individuals may have their acceptability affected by citizens' views on the degree of legitimacy of government surveillance. Therefore, understanding the impacts of technological innovations on the citizen-state dynamics contribute to a better overview of societal acceptance and ways in which it can affect the successful application of these technologies.

In the literature, several frameworks are pioneers in developing mechanisms to explore the social acceptance of technological innovations. The Diffusion of Innovation Theory (DIT), coined by Rogers (1962), explains the diffusion of innovation as a process in which a product of ideas is diffused in society and it becomes widely adopted by the population. The adoption stems from the perception that the given product or idea is innovative and beneficial to society (Rogers, 1962). Similarly, the Technology Acceptance Model (TAM), coined by Davis (1989), understands that the factors influencing the acceptance of technology are the perception of usefulness and ease of use of the given technology. The two models provide an initial insight into the importance of individual perception and attitude toward technological innovations. It confirms the relevance of the institutional theory approach and the importance of the demand side of technology implementation. However, to delve deeper into exploring social acceptance, it is necessary to account for wider social and institutional factors that may influence individual attitudes toward technological innovations beyond those identified by the two models.

2.6 Social trust & government trust

In the literature, trust is regarded as an important element in understanding the dynamics of acceptance, for instance, when risks are attached to the adoption of a given technology. Here, trust is understood as both social and political trust and both are defined in different ways. In terms of social trust, it is broadly understood as the expectancy held by an individual that other individuals can be relied on (Rotter, 1971). In regards to political or government trust, it is defined as the expectation that government institutions are reliable and fair (Levi & Stoker, 2000). In institutional theory, the quality of public institutions is responsible for shaping the degree of social trust in society. It is argued that a higher trust in public institutions leads to a higher social trust through increased sense of security (Spadaro et al. 2020). In turn, social interactions between individuals may also antecede government trust and these social interactions and personal experiences acquired can determine the individual approach to public authorities and those in charge of making decisions (Seifert, 2018).

Regarding social trust, the ability to trust results from the individuals' disposition to rely on social entities and the belief in a better outcome when trust is established (McKnight et al., 1998). Similarly, it is also argued that trust is the translation of one's feeling of security given the available guarantees and other safety mechanisms (McKnight et al., 1998). Furthermore, the ability to trust is also correlated to the extent to which a person is willing to be vulnerable and depend on others (McKnight et al., 1998). Given the conceptualization of social trust, the disposition to trust others can be understood as an intrinsic element in one's decision-making to engage with new technologies. Technological developments have been increasingly subject to public scrutiny regarding the misuse of personal data, surveillance issues, and security risks attached to its use in one's daily life. In this case, a high degree of technology acceptance is dependent on the individual's assessment that the implementation of the given technology will not pose a threat to their personal data or be subject to surveillance. IT developers and data analysts are in charge of developing and implementing these technologies, so the use of these technological applications entails a degree of trust in the professionals designing the technology. Hence, to establish a trust relationship for the use of technology, the individual has to have the disposition to be vulnerable and have the tendency to rely on other social entities.

In regards to trust in government, it is defined as an institution-based trust, which entails an "individual's perceptions of the institutional environment, including the structures and regulations that make an environment feel safe" (McKnight et al., 2002 p. 3). In this case, other forms of institution-based trust are useful to provide a wider perspective on its influence on

the social acceptance of e-governance and other technological developments in the public sector. The trust in social services (public servants), and in parliament (legislators) are relevant factors that compose the element of government trust. The influence of government institutions in the implementation of technologies goes beyond its use in the delivery of public services. The use of technological advancements in the private sector is heavily regulated by government agencies created to set up the regulatory framework for the implementation of technologies and to oversee their application. There is empirical evidence that argues that government trust is positively correlated with the use of technology applications (Rogers, 1962; Belanger & Carter, 2008). Therefore, a big deal of an individual's tendency to use technology is related to the ability to trust the government in ensuring that its implementation is safe and reliable to use. Hence, a high degree of technology acceptance depends on one's perception that the virtual environment in which the technology operates is safe.

Therefore, based on the conceptualization of social and government trust it is possible to affirm that there is strong theoretical support for its effect on the public acceptance of technology developments. A large deal of the literature supports that these two forms of trust can help one understand the elements shaping public attitudes toward technology. Therefore, the first two hypotheses guiding this research are:

H1: *Perceived trust in government institutions will positively impact citizens' technology acceptance;*
H2: *Perceived trust in society will positively impact citizens' technology acceptance.*

2.7 Sources of government trust

In terms of government trust, the dynamics of citizen-state interactions are one of the elements that influence one's confidence in government institutions. In the case of e-services in the public sector, the implementation is usually intended to totally, or partially, replace the delivery of services otherwise provided by street-level bureaucrats and public servants. In this case, it is possible to argue that in the provision of these services, a negative or positive experience may shape the individual's attitude toward these technologies. The failure to meet the expectations of the individual receiving the service can decrease the level of trust and increase the opposition to e-government applications (Carter & Belanger, 2005). However, the opposite effect is also possible when accounting for citizen-state interactions. The automation of services that were previously provided by public servants may be seen as beneficiai for those who have experienced cases of racial profiling or discrimination. Hence, the expectation would be that those with a low degree of trust in the civil service are more

receptive to automation. The rationale is that with the absence of a public servant that can exercise discretion against the individual receiving the service, there is a decrease in the perception of risk of being a victim of discrimination. There is empirical evidence that black citizens are more likely to have positive tendencies towards automated services than public servants when there is no representation in government institutions (Miller & Keiser, 2021). Therefore, in certain situations, a low degree of trust in the government and civil services may result in a higher trust in technology since it is perceived as unbiased and less likely to discriminate against ethnic minorities and other marginalized groups.

In turn, there are theories, such as the racially representative bureaucracy theory, that defend that citizens belonging to ethnic minorities and other marginalized groups in society tend to benefit from diversity among public servants (Watkins-Hayes, 2011). The ability of street-level bureaucrats to have discretion in assessing individual cases in the provision of services may positively influence the positive experience of those ethnic minorities. However, organizational constraints may hinder public servants' ability to practice discretion in assessing such cases (Watkins-Hayes, 2011). Therefore, the relationship between trust in government institutions and technology acceptance is largely influenced by organizational factors. In this case, it is relevant for the analysis to provide a bigger picture of the relationship while accounting for the fact that there are contextual characteristics that may influence the individual attitude toward technology.

Furthermore, political engagement is another element that reveals the different sources of government trust. Interestingly, scholars have explored the role of the co-production of public services in the confidence citizens have in government institutions. The co-production of public services can take many forms, and it is not limited to instances of volunteerism. According to the policy feedback theory, the design of policies and the context shaping their delivery influences citizens' perspectives of their roles in society and public life (Campbell, 2003). Here, it is argued that civic engagement with political affairs and the participation in the production of public services tend to reduce the level of distrust in government institutions (Dalton, 2005). Similarly, some research points towards citizens' views of government agencies and public servants being influenced by their sense of fairness in these processes (Tyler, 2003). Therefore, one can argue that the higher the political engagement of an individual, the higher the chances of having positive views about the government and a higher trust in government institutions. Along the same lines, the individual experience of citizens in engaging with government institutions and other public agencies may influence the levels of government trust. Therefore, political engagement can be understood as one of the elements shaping one's government trust.

Based on the literature, both “political engagement” and “citizen-state interactions” are taken into account in the analysis to explore their effect on government trust, and ultimately, on technology acceptance. A large portion of the literature provides enough evidence that the two elements are important in understanding the origins of government trust and its overall effect on technology acceptance. Therefore, the third and fourth hypotheses are:

H3: Political engagement will positively influence trust in government institutions;
H4: Perceived positive citizen-state interactions will positively influence political engagement and, ultimately, trust in government institutions.

2.8 Sources of social trust

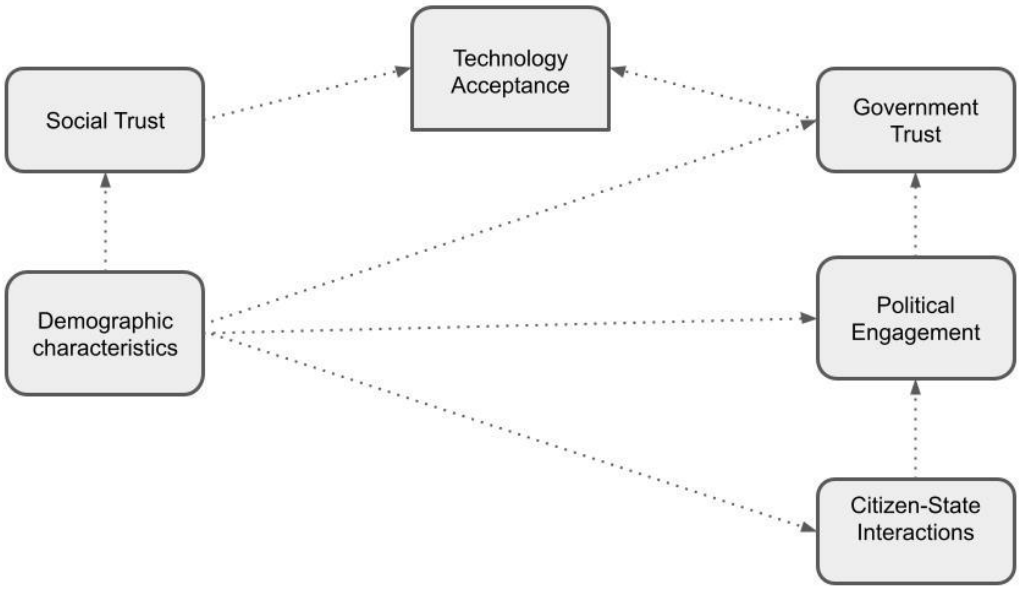
One of the most significant sources of social trust is the social aspects that shape an individual's approach to other people. In the literature, societal theory is often used to explain the influence of social aspects on an individual’s attitude towards social trust. The theory uses a top-down approach to describe the influence of social aspects such as income inequality, educational level and social class (Delhey & Newton, 2003). Therefore, the theory approaches human behavior as a reflection of the macro elements present in one’s environment and upbringing. For instance, some studies provide evidence that the smaller the urban setting, the higher the social trust of the population (House & Wolf, 1978). In smaller urban settings, the sense of community tends to be stronger and it can lead people to have the disposition to rely on other residents in the city. Similarly, a study shows that in the United States citizens of small and rural areas tend to have higher degrees of social trust compared to those living in big urban centers (Putnam, 2000). Moreover, a similar relationship is established for gender and income level. Interestingly, a study identified that in the United States women tend to have less social trust than men (Patterson, 1999). Regarding income, empirical data illustrates significant differences in social trust between wealthier nations and those facing higher income inequality (Inglehart, 1999). The same gap is empirically visible among countries with different levels of welfare benefits and discrepancies in living standards (Rothstein & Stolle 2001). Therefore, it becomes pertinent to account for demographic and socio-economic characteristics to understand the origins of social trust. Accordingly, this research includes several demographic characteristics in the analysis to provide a wider perspective on the social elements shaping social trust, and ultimately, technology acceptance. The selection of variables reflects the theoretical approach of societal theory and it reflects the survey respondent’s age, gender, income level, social class, internet usage, mobile usage and living environment.

2.9 Towards a conceptual model

In the study of technology acceptance, several theoretical models attempt to explain the drivers of the successful adoption of technological innovations. The Technology Acceptance Model (TAM) is widely used to explore individual attitudes, intentions and external observations in adopting technology. A key feature of the TAM model is the emphasis on the user's individual perception of the technology and it defines acceptance as being based on perceived usefulness and usability (Davis, 1989). Going a step further, the Theory of Reasoned Action (TRA) also focuses on individual perception but it also incorporates social factors deemed crucial in understanding citizens' attitudes towards technological innovation. The theory was formulated by Ajzen & Fishbein (1980), and it proposes three categories to explain individual behavior: behavioral intention, attitude and subjective norm. Similarly, the Unified Theory of Acceptance and Use of Technology (UTAUT) explores technology adoption through the lens of four different elements: performance expectancy, effort, social influence and other facilitating conditions (Venkatesh et al., 2003). Here, the effect of these elements is moderated by internet experience, age and gender (Venkatesh et al., 2003). In sum, these models contributed to the wider literature by developing models that identify some of the elements that are responsible for the successful public adoption of technological innovations.

In what follows, it is pertinent to reflect on the limitations of such models and the theoretical contributions of wider literature to understanding the role of social and institutional factors in this puzzle. In doing so, this paper uses the TRA and the UTAUT models to develop a broader conceptual model that considers different social and institutional factors influencing citizens' attitudes toward technology innovation. This paper proposes the Citizens' Technology Acceptance Model (Figure 01) as a framework to analyze the influence of social and institutional factors in technology acceptance. The model provides a systematic overview of the identified relevant variables used in the analysis and their respective relationship. It aims to contribute to the inclusion of, otherwise neglected elements, that are relevant in shaping citizens' attitudes toward technological innovation.

Figure 01: Citizens' Technology Acceptance Model



- *Government Trust:* Government confidence and civil service confidence;
- *Social Trust:* Confidence in other people.
- *Citizen-State Interactions:* Corruption in the civil service (self-evaluation) and democracy (self-evaluation);
- *Political Engagement:* Importance of politics (self-evaluation) and vote frequency (self-evaluation).
- *Demographic characteristics:* Age, gender, internet/mobile experience, social class (self-evaluation), income level, urban-rural environment and town size;

Apart from the moderators in the UTAUT (internet experience, age and gender), the model takes into account the societal theory approach and includes a set of variables that illustrate the social aspects responsible for shaping social trust. Similar to the literature on societal theory, studies on citizens' adoption of e-government found that certain demographics tend to have a higher degree of acceptance of the technology. Thomas & Streib (2003) found that white high-income individuals with higher educational levels better accept e-government applications. In the same way, it is argued that individuals with higher professional occupations and younger individuals tend to be more accepting of technology and are more likely to use e-government applications (Hart-Teeter, 2003; Marquie et. al 1994) In the literature on innovation adoption, the "late adopters", also known to be more likely to discontinue the use of a respective innovation, tend to be composed of individuals from lower socio-economic classes with lower educational levels (Rogers, 1962). In terms of technology in general, there is evidence that older individuals from lower socio-economic classes with lower levels of

internet usage have lower technology adoption rates in comparison to younger individuals (Mitzner et. al, 2019; Anderson & Perrin, 2017). Likewise, in the adoption of e-government applications, internet use is an important factor influencing the use of these services (Prattipati, 2003). Here, one can argue that those with more experience with the internet are also more likely to have positive attitudes toward technological applications (Jay & Willis, 1992; Marquie et. al 1994). More broadly, the inequality impacting the digitalization of the population illustrates the relevance of income and social class in explaining the acceptance and adoption of digital services. Scholars argue that these demographic factors are key determinants of internet use as much as trust and media use (Lenhart & Horrigan, 2003). Therefore, it is included in the model social factors such as demographic and socio-economic characteristics.

Furthermore, the model incorporates the theoretical assumption that citizen-state interactions and political engagement both influence government trust, and, ultimately, individual attitudes towards technology. In the literature, it is shown that the use of digital systems is preferred by ethnic minorities due to automated decision-making and the perceived lower risk of ethnic discrimination (Miller & Keiser, 2021). Additionally, there is evidence that a constant engagement with the provision of public services, such as in the reception of welfare and social benefits, increases the level of government trust (Sanders et. al, 2020). As a result, the model includes citizen-state interactions and political engagement as key elements in understanding the mechanisms affecting individual attitudes towards technology.

3. Operationalization & Methodology

In this research, I make use of data from the World Values Survey Wave 7 (2017-2022). The survey was chosen based on having a large number of observations and the suitability of the questionnaire for this research. The World Values Survey (WVS) is a project aimed at exploring the social, political, religious and cultural values of individuals across the world (WVS, 2022). Its origins stem from the European Values Study, and it started in 1981 by Professor Ronald Inglehart (WVS, 2022). The data is particularly relevant for this research because the database includes the perception of individuals related to the dissemination of technology in society as well as data on the relationship between individuals and the government, political engagement, social and government trust as well as a range of demographic factors. Therefore, the survey contributes to a wide array of elements that sustain the creation of strong and concise statistical models for the analysis. Interestingly enough, the literature presented in the theoretical framework does not use the WVS survey to test the hypotheses and this analysis is among the pioneers in using the WVS survey to further explore individual attitudes towards technological advancements. For the analysis, this

research uses an Ordinal Logistic Regression (OLR) to explore the attitudes towards technology among the survey respondents. The OLR is defined as a statistical method employed to estimate coefficients with the intent to predict the probabilities of the variable of interest. The statistics program SPSS was used to run the regression and to provide the descriptive statistics.

3.1 Descriptive statistics

The data used in the analysis is composed of all the valid observations, meaning that some observations were not used due to missing values. In total, fifteen variables are retrieved from the WVS survey in accordance with their compatibility to the hypothesis and the theoretical background of this research. Table 1 shows an overview of the descriptive statistics of the variables used in this research, The number of observations (N), mean and standard deviation are all presented in Table 1.

Table 01: Descriptive statistics

Variables	Description	N	Mean	SD	Min	Max	Source
Government confidence	Individual respondent's trust in government institutions	46459	2.67	0.946	1	4	WVS Survey
Civil service confidence	Individual respondent's trust in the public service	46459	2.60	0.859	1	4	WVS Survey
Social trust	Individual respondent's trust in other people	46459	1.76	0.424	1	2	WVS Survey
Political interest	Individual respondent's interest in politics	46459	2.60	0.955	1	4	WVS Survey
Vote frequency	Individual respondent's participation in national elections	46459	1.55	0.825	1	4	WVS Survey
Civil service corruption	Individual respondent's perception of corruption in the public service	46459	2.40	0.788	1	4	WVS Survey
Democracy perception	Individual respondent's perception of democracy in the country	46459	6.16	2.608	1	10	WVS Survey
Age	Individual respondent's age	46459	2.11	0.744	1	3	WVS Survey
Gender	Individual respondent's gender	46459	1.46	0.499	1	2	WVS Survey
Income scale	Individual respondent's income quartile	46459	1.88	0.564	1	3	WVS Survey
Social class	Individual respondent's social class identification	46459	3.17	0.958	1	5	WVS Survey
Mobile usage	Individual respondent's mobile usage frequency	46459	2.31	1.669	1	5	WVS Survey
Internet usage	Individual respondent's internet usage frequency	46459	2.33	1.677	1	5	WVS Survey
Urban - rural	Individual respondent's living environment	46459	1.29	0.453	1	2	WVS Survey
Town size	Individual respondent's town of residency size	46459	3.22	1.451	1	5	WVS Survey

3.2 Dependent Variable

To measure technology acceptance on the individual level, I employ the WVS Wave 7's question regarding the individual attitudes towards science and technology: "Science and technology are making our lives healthier, easier, and more comfortable". In this question, the survey respondents are asked to indicate on a scale of 1 (completely disagree) to 10 (completely agree) their position regarding the statement. This measure is relevant because it provides the respondents' perspective on technology and its impacts on our daily lives. Hence, the variable represents the most suited data available to explore individual attitudes towards the implementation of technological advancements in different areas of society, such as the provision of public and private services through automation.

3.3 Independent Variables

3.3.1 Government Confidence & Civil Service Confidence

To measure the effectiveness of government trust, I make use of the variables of "government confidence and "civil service confidence". In the survey, the section that measures trust in different institutions asks the respondents to tell how much confidence they have in them after naming a number of organizations. Based on that, respondents have to answer according to the scale: 1. - a great deal of confidence, 2. - quite a lot of confidence, 3. - not very much confidence and 4. - none at all. Among these institutions the survey asks about the government and the civil service in the respondent's respective country.

3.3.2 Social Trust

To measure the effect of social trust I make use of a variable that identifies the extent to which individuals are able to trust other people. In the survey, the section exploring social capital and trust asks the respondents to tell how much confidence they have in other people: " Generally speaking, would you say that most people can be trusted or that you need to be very careful when dealing with people?". Based on that question, respondents have to answer according to the scale: 1. - most people can be trusted or 2. - I need to be very careful.

3.3.3 Importance of Politics & Vote Frequency

To capture the impact of political engagement, I make use of the variable "importance of politics" and "vote frequency". The first is based on the self-evaluation on the extent to which

the individual is interested in politics. In the survey, the respondent is asked “How interested would you say you are in politics?”. Based on that, the respondents have to select one of the options: 1. - very interested, 2.- somewhat interested, 3.- not very interested and 4. - not at all interested. The latter asks about the respondent’s voting frequency during elections at the national level. Based on that, respondents are asked to answer according to the scale: 1. - always, 2. - usually, 3.-never and 4- not allowed to vote. In this research, the use of both variables are relevant to investigate the trends on government trust and technology acceptance based on the extent to which the individual participates in politics.

3.3.4 Corruption in Civil Service & Democracy Perception

In measuring citizen-state interactions, it is pertinent to explore the individual perception of their experience with the government. As such, this research makes use of the variable “corruption in the civil service” and “democracy perception” to grasp the respondents’ attitudes towards public service. Here, both variables are a result of the respondents’ self-evaluation about the degree of corruption in civil service and democracy in all levels of government. The survey asks the respondents: “Among the following group of people, how many do you believe are involved in corruption? Civil service providers (police, judiciary, civil servants, doctors and teachers). Based on the question, respondents are asked to select one of the following options: 1.- none of them, 2.- few of them, 3.- most of them and 4-. all of them. For the second variable, the respondents are asked: “How democratically is this country being governed today?”. Based on the question, respondents must answer using a scale from 1 to 10, where 1 means “not at all democratic” and 0 means “completely democratic”. In this research, understanding the individual perception of corruption in the civil service and the degree of democracy helps to understand the individual experience with government services and officials.

3.3.5 Age

Age is the first control variable selected for this research. In the survey, respondents are asked their age, and the data is recoded into 3 intervals: 1.- 16-29 years, 2.- 30-49 years and 3.- 50 years and over. The minimum age of 16 years old is suitable for this research because that is precisely the minimum age to vote and participate in political life in most countries.

3.3.6 Gender

Gender is the second control variable selected for this research. In the survey, respondents are asked to identify their gender based on two options: 1.- Male and 2- Female. In this research, it is taken into account the fact that binary gender identification may not be representative of all of the existing genders.

3.3.7 Income

To explore the effect of income differences, this research makes use of the recoded version of the question concerning the income level of respondents: “We would like to know in what group your household is. Please, specify the appropriate number, counting all wages, salaries, pensions and other incomes that come in". Based on that, respondents are asked to select a scale in which 1 indicates the lowest income group and 10 is the highest income group. This question relies on the individual’s perception of where it stands on the different income levels in their respective countries. In the recoded variable, the cluster of income levels is 1. - low (1-3 on the scale), 2.- medium (4-7 on the scale) and 3.- high (8-10 on the scale).

3.3.8 Social class

The variable “social class” is a secondary way to explore the effect of income differences among individuals. Here, the variable is subjective and it relies on the respondents’ self-evaluation of how they stand according to the different social classes in their respective countries. In the survey, the question asked is: “people sometimes describe themselves as belonging to the working class, the middle class, upper class or the lower class. Would you describe yourself as belonging to the:”. The respondents have to select one of the available options: 1.- upper class, 2.- upper middle class, 3.-lower middle class, 4.- working class and 5- lower class.

3.3.9 Mobile usage

The variable “mobile usage” is used to explore the effect of an individual’s experience and familiarity with technology and the internet. Here, the variable focuses on the use of a mobile as an information source. Hence, the survey asks the respondent the question: “People learn what is going on in this country and the world from various sources. For each of the following sources, please indicate whether you use it to obtain information daily, weekly, monthly, less than monthly or never. Internet.” Based on the statement, respondents are able to select the following options: 1.- Daily, 2.- weekly, 3.- monthly, 4.- less than monthly, 5.- never.

3.3.10 Internet usage

The variable “internet usage” is used to explore the effect of an individual’s experience and familiarity with technology and the internet. Here, the variable focuses on the use of the internet as an information source. Hence, the survey asks the respondent the question: “People learn what is going on in this country and the world from various sources. For each of the following sources, please indicate whether you use it to obtain information daily, weekly, monthly, less than monthly or never. Internet.” Based on the statement, respondents are able to select the following options: 1.- Daily, 2.- weekly, 3.- monthly, 4.- less than monthly, 5.- never.

3.3.11 Urban-Rural

To explore the effect of the living environment, this research makes use of the “Urban-rural” variable from the survey. The question requires respondents to identify their settlement type, to which the options are: 1.- urban and 2.-rural.

3.3.12 Town size

Similar to the previous variable, “town size” is used to explore the effect of the individuals’ living environment. In the survey, respondents are asked to identify their settlement size, to which the options are: 1.- under 5.000, 2.- 5.000-20.000, 3.- 20.000-100.000, 4.-100.000-500.000 and 5.- 500.000 and more.

4. Analysis

4.1 Ordinal Logistic Regression

A Ordinal Logistic Regression (OLR) is conducted to compare the respondents’ positive and negative attitudes towards technology acceptance regarding the predictor variables: government confidence, civil service confidence, social trust, political interest, vote frequency, civil service corruption, democracy perception, age, gender, income level, social class, mobile usage. internet usage, urban/rural setting and town size. In total, 46,459 individuals provided valid answers to the survey questions used in the analysis. The results are presented in tables under each of the six sub-headings accordingly. The left side of the tables presents the independent variables and the measurement levels. The coefficients (B), standard errors (SE), and significance (p-value) are presented side-to-side in the columns.

4.2 Government trust

In testing the first hypothesis (H1), ***"perceived trust in government institutions will positively impact citizens' technology acceptance"***, the expectation is that the respondents who identified to have higher levels of government trust have also selected high categories in the technology acceptance question. The analysis includes two key variables: government confidence and civil service confidence. Both variables are categorical and the logic behind the interpretation is based on the odds that one "option" in the predictor variable is associated with higher or lower values on the dependent variable's scale (technology acceptance) in comparison to the reference category. For all of the predictor variables the reference category is the last possible category.

Table 2: Government & civil service confidence

		Ordinal Logistic Regression Technology Acceptance					
						95% Confidence Level	
Predictor variables		**B**	**SE**	**df**	**p-value**	**Lower Bound**	**Upper Bound**
Government confidence	1 - A great deal	0.080	0.037	1	0.030	0.008	0.151
	2 - Quite a lot	-0.069	0.028	1	0.013	-0.123	-0.015
	3 - Not very much	-0.085	0.025	1	<0.001	-0.134	-0.036
	4 - None at all	*ref*					
Civil service confidence	1 - A great deal	0.524	0.041	1	<0.001	0.444	0.604
	2 - Quite a lot	0.365	0.029	1	<0.001	0.308	0.422
	3 - Not very much	0.182	0.027	1	<0.001	0.128	0.235
	4 - None at all	*ref*					

ref = reference category; * p < 0.05; ** p < 0.01; ***p < 0.001.

At first glance, the result suggests that government confidence holds important implications for the respondents' attitudes towards technological advancements. The coefficient confirms that "a great deal" (Option 1) of government confidence has a positive effect (B = 0.080; p < 0.05) on technology acceptance. More specifically, those who selected "a great deal" for government confidence are associated with a 0.080 increase in the relative log odds of selecting a higher score in the technology acceptance scale in comparison to those who selected "none at all" (Option 4), the reference category. In turn, "quite a lot" (Option 2) of government confidence has a negative effect (B = -0.069; p < 0.05) on technology

acceptance. Here, respondents who claimed to have “quite a lot” of government confidence are associated with a -0.069 decrease in the relative log odds of selecting a higher level in the technology acceptance scale. In other words, individuals with “quite a lot” of government confidence are less likely to select higher values for technology acceptance in comparison to those who have “none at all”. Similarly, “not very much” (Option 3) also indicates a negative effect ($B = -0.085$; $p < 0.001$) on technology acceptance. In this case, individuals with “not very much” government confidence are associated with a -0.085 decrease in the relative log odds of selecting a higher level in the technology acceptance scale in comparison to those who have “none at all”.

In terms of civil service confidence, the results also indicate that this predictor variable has a significant effect on technology acceptance. The result suggests that “a great deal” (Option 1) of civil service confidence has a positive ($B = 0.524$; $p < 0.001$) effect on technology acceptance. The respondents with “a great deal” of civil service confidence are associated with a 0.524 increase in the relative log odds of selecting a higher level in the technology acceptance scale. In regard to individuals with “quite a lot” (Option 2) civil service confidence the result also suggests a positive effect ($B = 0.365$; $p < 0.001$) on technology acceptance, meaning that individuals with “quite a lot” of civil service confidence are associated with a 0.365 increase in the relative log odds of selecting a higher level in the technology acceptance scale. Similarly, the respondents with “not very much” civil service confidence are also associated with a 0.182 ($p < 0.001$) increase in the relative log odds of selecting a higher level in the technology acceptance scale. Interestingly, the result predicts that the higher the civil service confidence, the higher the likelihood to have a high degree of technology acceptance.

Based on the results, it is possible to accept H1 and portray that government trust (government confidence and civil service confidence) positively impacts technology acceptance. In the literature, Carter & Belanger’s (2008) model places citizens’ confidence in the government as a key element in understanding the wider social acceptance of e-government applications. Similarly, it is theorized that citizen trust in government institutions has a significant impact on the adoption of technology (Gefen et. al, 2008). Based on the results, it seems to confirm the theoretical expectation of Carter & Belanger’s (2005) model despite the fact their model is solely focused on the adoption of e-government applications. However, it is possible to argue that the wider introduction of technological advancements is still dependent on government institutions. For instance, in putting in place regulations concerning data protection and the use of personal data for government surveillance. As such, government trust has not only an effect on the acceptance of e-government but it helps to understand the general public attitude towards technology in different forms and its perceived

impact on citizens' daily life. In terms of civil service confidence, the results seem to confirm the theoretical expectations of Carter & Belanger's (2005) model. One of the Carter & Belanger's (2005) arguments is that in order for citizens to adopt e-government applications, they need the confidence that the government is able to provide secure and reliable delivery of services. The implementation of e-government is often used in the automation of services previously conducted by street-level bureaucrats or public servants. Therefore, a degree of trust in the provision of these civil services may influence the individual tendency to accept and adopt the technology. It is argued that the failure to fulfill promises from public servants decreases trust and increases the opposition to the implementation of e-services and other technologies (Carter & Belanger, 2005).

4.3 Social trust

In testing the second hypothesis (H2), ***"perceived trust in society will positively impact citizens' technology acceptance",*** the expectation is that social trust has a positive effect in the respondents' attitudes toward technological developments. The analysis includes sociais trust as a predictor variable while all the other variables are held constant in the model. Similarly to the previous predictors, as a categorical variable, social trust is interpreted based on the odds that one "option" in the predictor variable is associated with higher or lower values on the dependent variable's scale.

Table 3: Social trust

		Ordinal Logistic Regression Technology Acceptance					
						95% Confidence Level	
Predictor variables		B	SE	df	p-value	Lower Bound	Upper Bound
Government confidence	1 - A great deal	0.080	0.037	1	0.030	0.008	0.151
	2 - Quite a lot	-0.069	0.028	1	0.013	-0.123	-0.015
	3 - Not very much	-0.085	0.025	1	<0.001	-0.134	-0.036
	4 - None at all	*ref*					
Civil service confidence	1 - A great deal	0.524	0.041	1	<0.001	0.444	0.604
	2 - Quite a lot	0.365	0.029	1	<0.001	0.308	0.422
	3 - Not very much	0.182	0.027	1	<0.001	0.128	0.235
	4 - None at all	*ref*					
Social trust	1 - Most people can be trusted	-0.058	0.020	1	0.003	-0.096	-0.019
	2 - Need to be very careful	*ref*					

ref = reference category; * p < 0.05; ** p < 0.01; ***p < 0.001.

The findings indicate that social trust has a statistically significant effect on technology acceptance. It shows that choosing “most people can be trusted” (Option 1) for social trust has a negative (B = -0.058; p < 0.01) effect on technology acceptance. The result implies that the respondents who claimed that “most people can be trusted” are associated with a -0.058 decrease in the relative log odds of selecting higher values relative to lower values for technology acceptance in comparison to those who selected “need to be very careful”, the reference category. Hence, the findings suggest that the respondents with a low level of social trust are more likely to have higher levels of technology acceptance. The results are obtained while keeping all the other predictor variables constant.

Given the output, H2 is rejected as the results do not support the assumption that perceived high level of social trust positively impacts citizens’ technology acceptance. The result predicts that the respondents who selected that “most people can be trusted” are, in fact, less likely to select higher categories in the technology acceptance question. In this case, the institutional theory may hint towards one of the reasons for this conclusion, such as the idea that social trust and trust in public institutions are both mutually influenced by each other (Spadaro et. al, 2020). Here, a high degree of social trust and an overall positive attitude

towards other individuals may contribute to prioritizing human interactions and have skeptical stances towards automation and other instances of technology implementation. Hence, explaining how individuals with a high degree of social trust may be inclined to question the benefits of the application of technological developments in daily life and develop less of a positive attitude towards technological advancements.

4.4 Political engagement

In testing the third hypothesis (H3), ***"political engagement will positively influence trust in government institutions"*** the expectation is that the effect of trust in technology acceptance is influenced by political engagement. The analysis includes two predictors from the survey: political interest and vote frequency. Here, the two predictor variables are analyzed in the same manner as the other categorical variables.

Table 4: Political interest & vote frequency

		Ordinal Logistic Regression Technology Acceptance					
						95% Confidence Level	
Predictor variables		B	SE	df	p-value	Lower Bound	Upper Bound
Government confidence	1 - A great deal	0.080	0.037	1	0.030	0.008	0.151
	2 - Quite a lot	-0.069	0.028	1	0.013	-0.123	-0.015
	3 - Not very much	-0.085	0.025	1	<0.001	-0.134	-0.036
	4 - None at all	*ref*					
Civil service confidence	1 - A great deal	0.524	0.041	1	<0.001	0.444	0.604
	2 - Quite a lot	0.365	0.029	1	<0.001	0.308	0.422
	3 - Not very much	0.182	0.027	1	<0.001	0.128	0.235
	4 - None at all	*ref*					
Social trust	1 - Most people can be trusted	-0.058	0.020	1	0.003	-0.096	-0.019
	2 - Need to be very careful	*ref*					
Political Interest	1 - Very interested	0.216	0.031	1	<0.001	0.155	0.276
	2 - Somewhat interested	0.149	0.024	1	<0.001	0.103	0.196
	3 - Not very interested	0.107	0.024	1	<0.001	0.060	0.153
	4 - Not at all interested	*ref*					
Vote frequency	1 - Always	0.030	0.048	1	0.532	-0.064	0.125
	2 - Usually	-0.020	0.050	1	0.691	-0.119	0.079
	3 - Never	0.110	0.053	1	0.037	0.007	0.212
	4 - Not allowed	*ref*					

ref = reference category; * p < 0.05; ** p < 0.01; ***p < 0.001.

Regarding political engagement, the results portray the variable of political interest as an important explanation for the respondents' attitudes towards technological advancements. The result suggests that "very interested" (Option 1) has a positive (B = 0.216; p < 0.001) effect on technology acceptance, meaning that the respondents who claim to be "very interested" in politics are associated with a 0.216 increase in the relative log odds of selecting higher values in the technology acceptance scale. In terms of those who are "somewhat interested" (Option 2), the result reveals that it has a positive (B = 0.149; p < 0.001) effect on technology acceptance. Here, the respondents who are "somewhat interested" in politics are

associated with a 0.149 increase in the relative log odds of selecting higher values in the technology acceptance scale. Finally, for those who are “not very interested” (Option 3) the result also indicates a positive (B = 0.107; p < 0.001) effect on technology acceptance, revealing that these respondents are associated with a 0.107 increase in the relative log odds of selecting higher scores in the technology acceptance scale in comparison to their counterparts who are “not at all interested” in politics. In terms of vote frequency, the coefficients are not statistically significant with the exception for those who “never” (Option 3) voted, showing a positive (B = 0.110 p < 0.05) effect on technology acceptance. The result suggests that the respondents who selected Option 3 are associated with a 0.110 increase in the relative log odds to select higher scores in the technology acceptance scale. Given that the other results are not statistically significant, the “vote frequency” predictor is not a relevant determinant of technology acceptance.

Based on the results, it is possible to accept the third hypothesis and confirm that political engagement will positively influence trust in government institutions, and ultimately, contribute to technology acceptance. The result suggests that the respondents that indicated having a considerable degree of political interest (“very interested” and “somewhat interested”) are more likely to select higher categories for the technology acceptance question. Nonetheless, the result also shows that there are nuances in the result, since those who indicate having a considerable degree of political interest are also more likely to select lower categories for technology acceptance. As theorized in the literature, engagement with political affairs leads to lower levels of distrust in government institutions. Dalton (2005) theorizes that public participation in the production of public services and political affairs, in general, tend to have higher degrees of trust in the government. Here, only the political interest variable provided enough statistically significant results. As a result, the ability to portray political engagement as resulting in positive attitudes towards technology is diminished. However, political interest indicates, to some extent, that individuals interested in politics tend to have a positive attitude towards technology. Therefore, the results seem to support the hypothesis that higher levels of political engagement may positively influence government trust and, ultimately, contribute to technology acceptance.

4.5 Citizen-State Interactions

In testing the fourth hypothesis (H4), ***“Perceived positive citizen-state interactions will positively influence political engagement and, ultimately, trust in government institutions”,*** the expectation is that the effect of government and social trust in technology acceptance is influenced by citizen-state interactions. The analysis includes two other

variables from the survey: civil service corruption and democracy perception. All of the previous predictors are held constant.

Table 5: Civil service corruption & democracy perception

		Ordinal Logistic Regression					
		Technology Acceptance					
						95% Confidence Level	
Predictor variables		B	SE	df	p-value	Lower Bound	Upper Bound
Government confidence	1 - A great deal	0.080	0.037	1	0.030	0.008	0.151
	2 - Quite a lot	-0.069	0.028	1	0.013	-0.123	-0.015
	3 - Not very much	-0.085	0.025	1	<0.001	-0.134	-0.036
	4 - None at all	*ref*					
Civil service confidence	1 - A great deal	0.524	0.041	1	<0.001	0.444	0.604
	2 - Quite a lot	0.365	0.029	1	<0.001	0.308	0.422
	3 - Not very much	0.182	0.027	1	<0.001	0.128	0.235
	4 - None at all	*ref*					
Social trust	1 - Most people can be trusted	-0.058	0.020	1	0.003	-0.096	-0.019
	2 - Need to be very careful	*ref*					
Political Interest	1 - Very interested	0.216	0.031	1	<0.001	0.155	0.276
	2 - Somewhat interested	0.149	0.024	1	<0.001	0.103	0.196
	3 - Not very interested	0.107	0.024	1	<0.001	0.060	0.153
	4 - Not at all interested	*ref*					
Vote frequency	1 - Always	0.030	0.048	1	0.532	-0.064	0.125
	2 - Usually	-0.020	0.050	1	0.691	-0.119	0.079
	3 - Never	0.110	0.053	1	0.037	0.007	0.212
	4 - Not allowed	*ref*					
Civil service corruption	1 - None of them	-0.003	0.039	1	0.931	-0.080	0.074
	2 - Few of them	-0.075	0.030	1	0.012	-0.134	-0.016
	3 - Most of them	-0.040	0.031	1	0.194	-0.100	0.020
	4 - All of them	*ref*					
Democracy perception	1 - Not at all democra	-0.415	0.040	1	<0.001	-0.493	-0.338
	2. - 2	-0.741	0.051	1	<0.001	-0.842	-0.640
	3. - 3	-0.890	0.045	1	<0.001	-0.978	-0.802
	4. - 4	-1.007	0.043	1	<0.001	-1.091	-0.923
	5. - 5	-0.993	0.034	1	<0.001	-1.060	-0.925
	6. - 6	-0.976	0.035	1	<0.001	-1.045	-0.907
	7. - 7	-0.894	0.034	1	<0.001	-0.915	-783
	8. - 8	-0.686	0.033	1	<0.001	-0.751	-0.620
	9. - 9	-0.538	0.039	1	<0.001	-0.615	-0.461
	10 - Completely democratic	*ref*					

ref = reference category; * p < 0.05; ** p < 0.01; ***p < 0.001.

In terms of “civil service corruption”, the results do not suggest that the coefficients are statistically significant, with the exception of “few of them” (Option 2). Here, the output indicates a negative ($B = -0.075$; $p < 0.05$) effect on technology acceptance. This implies that the respondents who selected “a few of them” are associated with a -0.075 decrease in the relative log odds to select higher scores in the technology acceptance scale in comparison to those who selected “all of them” (Option 4). In contrast, the “democracy perception” variable has shown to be an important determinant of technology acceptance. As established by the results, for “not at all democratic” (Option 1), in the lower end of the scale there is a negative and statistically significant ($B = -0.415$; $p < 0.001$) effect on technology acceptance. The result shows that those who selected “not at all democratic” are associated with a -0.415 decrease in the relative log odds of selecting a higher score in technology acceptance. Similarly, at the higher end of the democracy perception scale, Option 9 (one unit below the reference category “completely democratic”) there is also a negative and statistically significant ($B = -0.538$; $p < 0.001$) effect on technology acceptance. This implies that these respondents are associated with a -0.538 decrease in the relative log odds of selecting higher scores for technology acceptance in comparison to those who selected “completely democratic”.

Based on the results, civil service corruption does not provide enough statistically significant results to assess its effect on technology acceptance. In turn, democracy perception indicates that a negative perception of democracy in the public sector is linked to a negative attitude towards technology. Here, all of the levels of democracy perception are associated with lower values in the technology acceptance scale in comparison to those who selected the highest level for democracy perception (Option 10 - “completely democratic”). Hence, it implies that a positive perception of the public sector is linked to a positive attitude towards technology. The results suggest that the respondents who selected higher scores for democracy perception are more likely to select higher categories for technology acceptance. Based on the results, there seems to be enough evidence to accept H4 and portray that perceived positive citizen-state interactions will positively influence political engagement and, ultimately, trust in government institutions.

4.6 Demographic characteristics

For the last set of predictors, the analysis accounts for a series of variables representing demographic characteristics that provide relevant insights into citizens’ attitudes towards technology. In this aspect, the expectation is that demographic characteristics influence the respondents’ attitudes towards technological advancements. The analysis includes the

following variables while keeping all of the previous ones constant: age, gender, income scale, social class, mobile usage, internet usage, urban/rural environment, and town size.

Table 6: demographic characteristics

		Ordinal Logistic Regression Technology Acceptance					
						95% Confidence Level	
Predictor variables		B	SE	df	p-value	Lower Bound	Upper Bound
Age	1 - 16-29 years old	0.162	0.024	1	<0.001	0.115	0.209
	2 - 30-49 years old	0.089	0.020	1	<0.001	0.050	0.127
	3 - 50 years and older	*ref*					
Gender	1 - Male	0.149	0.017	1	<0.001	0.117	0.182
	2 - Female	*ref*					
Income scale	1 - low	-0.204	0.034	1	<0.001	-0.270	-0.137
	2 - medium	-0.212	0.029	1	<0.001	-0.268	-0.156
	3 - high	*ref*					
Social class	1 - Upper class	0.137	0.069	1	0.049	0.001	0.273
	2 - Upper middle class	0.135	0.036	1	<0.001	0.065	0.205
	3 - Lower middle class	0.115	0.032	1	<0.001	0.052	0.179
	4 - Working class	0.145	0.033	1	<0.001	0.082	0.209
Mobile usage	1 - Daily	0.050	0.025	1	0.050	0.989	0.100
	2 - Weekly	-0.119	0.032	1	<0.001	-0.182	-0.055
	3 - Monthly	-0.213	0.042	1	<0.001	-0.296	-0.130
	4 - Less than monthly	-0.128	0.039	1	<0.001	-0.204	-0.052
	5 - Never	*ref*					
Internet usage	1 - Daily	-0.88	0.027	1	0.001	-0.141	-0.035
	2 - Weekly	-0.182	0.033	1	<0.001	-0.245	-0.118
	3 - Monthly	-0.262	0.043	1	<0.001	-0.347	-0.177
	4 - Less than monthly	-0.164	0.042	1	<0.001	-0.247	-0.081
	5 - Never	*ref*					
Urban - rural	1 - Urban	-0.143	0.024	1	<0.001	-0.190	-0.095
	2 - Rural	*ref*					
Town size	1 - Under 5000	0.009	0.032	1	0.776	-0.054	0.072
	2 - 5000-20000	0.024	0.029	1	0.400	-0.032	0.081
	3 - 20000-100000	-0.035	0.024	1	0.150	-0.083	0.013
	4 - 500000 and more	-0.012	0.025	1	0.636	-0.061	0.037

ref = reference category; * p < 0.05; ** p < 0.01; ***p < 0.001.

In terms of the first demographic characteristics, the results show that respondents who are between 16 to 29 years old (Option 1) are associated with a 0.162 ($p < 0.001$) increase in the relative log odds to select higher scores in the technology acceptance scale in comparison to those who are 50 years old or older. Additionally, the respondents who identified themselves as having 30 to 49 years old (Option 2) are associated with a 0.089 ($p < 0.001$) increase in the relative log odds to select higher scores in the technology acceptance scale in comparison to those who are 50 years old or older. Also, the results indicate that male respondents are associated with a 0.149 ($p < 0.001$) increase in the relative log odds to select higher scores in the technology acceptance scale in comparison to female respondents.

In terms of financial status, the "income level" predictor is found to be a relevant determinant for technology acceptance. The respondents who claimed to be "low income" (Option 1) are associated with a -0.204 ($p < 0.001$) decrease in the relative log odds of selecting higher values in the technology acceptance scale in comparison to those who identified themselves as being "high income". Similarly, those who identified themselves as "middle income" (Option 2) are associated with a -0.212 ($p < 0.001$) decrease in the relative log odds to select higher values for technology acceptance in comparison to those who identified themselves as being "high income". In regard to "social class", the predictor is also found to be a determinant for technology acceptance. The respondents who identified themselves as "upper class" (Option 1) are associated with a 0.137 ($p < 0.05$) increase in the relative log odds of selecting higher values in the technology acceptance scale, while those who selected "upper middle class" (Option 2) are associated with a 0.135 ($p < 0.001$) increase, "lower middle class" (Option 3) with a 0.115 ($p < 0.001$) increase and "working class" (Option 4) with a 0.145 ($p < 0.001$) increase in the relative log odds of selecting higher values for the technology acceptance scale. All of the results are a comparison between the 4 aforementioned options and the reference category, "lower class" (Option 5).

With regard to internet familiarity, both internet and mobile were found to be relevant predictors for technology acceptance. In terms of "mobile usage", the coefficient for the "daily" use (Option 1) does not show a statistically significant result. In turn, for "weekly" use (Option 2), these respondents are associated with a -0.182 ($p < 0.001$) decrease in the relative log odds of selecting higher values in the technology acceptance scale. Respectively, those who selected "monthly" (Option 3) are associated with a -0.213 ($p < 0.001$) decrease, while those who selected "less than monthly" (Option 4) are associated with a -0.128 ($p < 0.001$) decrease in the relative log odds of selecting higher values for technology acceptance. Moreover, regarding "internet usage", the respondents who selected "daily" (Option 1) use are associated are associated with a -0.088 ($p < 0.01$) decrease, "weekly" (Option 2) with a -0.182 ($p < 0.001$)

decrease, “monthly” (Option 3) with a -0.262 ($p < 0.001$) decrease and “less than monthly” (Option 4) are associated with a -0.164 ($p < 0.001$) decrease in the relative log odds of selecting higher values in the technology acceptance scale. The results for both predictors are in comparison to the reference category, the respondents who selected “Never” (Option 5).

Finally, in terms of living environment, the coefficients for the “town size” predictor were not statistically significant, and therefore, not a relevant determinant for technology acceptance. On the other hand, “urban/rural” holds relevant implications for technology acceptance. The results confirm that the predictor has a negative ($B = -0.143$; $p < 0.001$) effect on technology acceptance, meaning that for those who reside in an urban setting are associated with a -0.143 decrease in the relative log odds of selecting higher categories in the technology acceptance scale in comparison to those who reside in a rural setting.

5. Discussion

To systematize the analysis, I have identified a series of different group behaviors and classified them into three different groups accordingly. These groups are categorized in accordance with the results retrieved from the OLR analysis with the use of predictor variables. Hence, this chapter discusses the main findings and categorizes the three different groups of respondents to obtain a better understanding of the respondents’ attitudes towards technological developments.

5.1 Interpretation of the results

In the analysis, the first group that we identify are the respondents that are most likely to have a negative attitude towards technological developments or a low level of technology acceptance. In this chapter, this group of respondents is referred to as Group 1 and it reflects the characteristics of the respondents who are less likely to select higher values in the technology acceptance scale. We find that Group 1 is likely to be composed, for the most part, by females who are 50 years old and over, to be middle to low income, who self-identify as being part of lower classes, residing in urban areas and with moderate familiarity with the internet. The demographic characteristics of Group 1 corresponds to evidence that less affluent older individuals with lower levels of internet usage have lower technology adoption rates in comparison to younger individuals (Mitzner et. al, 2019; Anderson & Perrin, 2017). In terms of trust, we find that Group 1 is more likely to trust other people but tends to have the least confidence in government institutions and civil servants. Here, the negative perception of Group 1 towards government trust corresponds to the theoretical perspective that establishes

that government trust is positively correlated with the use of technology applications (Rogers, 1962; Belanger & Carter, 2008). Interestingly, we also find that Group 1 tends to have a lower interest in politics and perceives a lower level of democracy in the government.

One of the explanations for a negative attitude might be the perceived institutionalization of the technological advancements for individuals belonging to this group. In the study of innovation, there is a distinction between early and late adopters and the late adopters are known to be more likely to discontinue the use of a given innovation (Rogers, 1962). These late adopters, belonging to lower socio-economic classes and having lower educational levels, are more likely to discontinue due to the personal incompatibility with the innovation (Rogers, 1962). Here, this incompatibility can be a result of the individual's past experiences with the setting or environment that the innovation is being implemented (Rogers, 1962). The implementation of technological developments both in the private and public sectors is based on the automation of services for the increase in productivity and reliability in the delivery of services. In this case, individuals with a high level of social trust might tend towards human interactions and reject innovations that disrupt the human element in the provision of services. However, the same group appears to have a lower degree of government and civil service trust, meaning that this relationship might have the opposite effect when talking about automation in the public sector.

The second group that we identify are the respondents that are most likely to have a positive attitude towards technological developments or a high level of technology acceptance. Here, the second group of respondents is referred to as Group 2 and it reflects the characteristics of the respondents who are most likely to select higher values in the technology acceptance scale. We identify that the profile of respondents of Group 2 is composed, for the most part, of males who are between 16 to 29 years-old, high-income and self-identifying as belonging to higher social classes, residing in rural areas and with high familiarity to the internet. Additionally, these individuals tend to trust other people less but have a higher degree of government and civil service trust as well as a higher level of political interest and higher perceived level of democracy in the government.

The characteristics of respondents belonging to Group 2 correspond to the literature that argues that young people tend to be more accepting of technology advancements in comparison to the older generations (Marquie et. al 1994). The early adopters are also known to belong to higher socio-economic classes and have greater levels of social participation and change agent behavior (Rogers, 1962). Hence, it confirms the pattern that Group 2 is more likely to have greater levels of political engagement and participation. In terms of internet

familiarity, the high familiarity to the internet corresponds to the theoretical assumption that people with more experience with technology are more likely to have positive attitudes towards technological applications (Jay & Willis, 1992; Marquie et. al 1994).

6. Conclusion

To conclude, this research was guided by the main research question of "*To what extent do institutional and social factors influence citizens' attitudes towards technological innovation?".* After conducting an ordinal logistic regression analysis of survey data relating to government trust, social trust, citizen-state interactions, political engagement and demographic factors, it is possible to confirm that these elements have a significant effect on technology acceptance. The results indicate that the Citizens' Technology Acceptance Model provides a solid and reliable mechanism to explain individual attitudes towards technological innovation. Through the quantitative analysis, it was possible to identify two groups of respondents with different stances on technology acceptance. Based on these groups, it was possible to confirm that Group 1, composed of those who hold negative attitudes towards technological innovation, are likely to be composed by females who are 50 years old and over, to be middle to low income, who self-identify as being part of lower classes, residing in urban areas and with moderate familiarity with the internet. Similarly, it was possible to identify they are more likely to trust other people but tend to have the least confidence in government institutions, low political engagement and not-so-positive interactions with the government. On the other hand, it was also possible to confirm that Group 2, composed of those who hold positive attitudes towards technological innovation, are males who are between 16 to 29 years-old, high-income and self-identifying as belonging to higher social classes, residing in rural areas and with high familiarity to the internet. It was also identified that these individuals tend to trust other people less but have a higher degree of government trust, high political engagement and more positive interactions with the government. Hence, this research was able to provide a theoretical contribution to the study of technology acceptance and the implementation of digital technologies in the public sector. In doing so, the importance of the demand-side of technology implementation in public services was illustrated through the lens of institutional theory. Reflecting on the limitations, the generalisability of the results are rather limited, given that the survey contained broad questions on the respondents' attitudes towards technology. Therefore, in order to draw further and stronger inferences of the respondents' attitude towards the implementation of technologies in the public sector, a set of more specific questions would be required. Nonetheless, the survey questionnaire provides a good foundation for an initial research on the influence of social and institutional factors on citizen's attitudes towards digital technologies.

7. References

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