FACTORS ASSOCIATED WITH THE USE OF E-GOVERNMENT PRACTICES: A SURVEY APPLIED TO CIVIL SERVANTS

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This research aimed to verify the determining factors for using e-government practices from the perception of civil servants. We used a questionnaire with a five-point Likert scale to conduct the study. Data were analyzed using descriptive statistics, confirmatory factor analysis, and multiple linear regression, which evaluated five research hypotheses. The study sample included 206 federal and state civil servants from the Northeast region of Brazil. We confirmed that expectation of effort and performance, facilitating conditions, and social inclusion influence the intention to use e-government. At the same time, the hypothesis of innovative capacity was refuted, warning that servants do not need to have an entrepreneurial profile to adopt modern practices. Moreover, we found that the social influence factor is the one that has the most significant power of positive influence on the intent to use, demonstrating that the environment in which they live encourages the use of electronic practices.

Keywords: e-government; civil servant; intent to use.

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FATORES ASSOCIADOS À UTILIZAÇÃO DE PRÁTICAS DE GOVERNO ELETRÔNICO: UMA PESQUISA APLICADA A SERVIDORES PÚBLICOS

A pesquisa objetivou verificar os fatores determinantes para a utilização de práticas de governo eletrônico, perante a percepção dos servidores públicos. Para a realização do estudo, foi utilizado um questionário com escala de avaliação Likert de cinco pontos. Os dados foram analisados através da estatística descritiva, análise fatorial confirmatória e regressão linear múltipla, que avaliou 5 hipóteses de pesquisa. A amostra do estudo contou com 206 servidores federais e estaduais da região nordeste do Brasil. Foi confirmado que expectativa de esforço e desempenho, condições facilitadoras e inclusão social são aspectos que influenciam na intenção de uso do governo eletrônico, já a hipótese da capacidade inovadora foi refutada, alertando que o servidor não precisa ter um perfil empreendedor para adotar práticas modernas. Ainda, constatou-se que o fator da influência social é o que apresenta maior poder de influência positiva sobre a intenção de uso, demonstrando que o meio em que vive incentiva o uso de práticas eletrônicas.

Palavras-chave: governo eletrônico; servidor público; intenção de uso.

FACTORES ASOCIADOS AL USO DE PRÁCTICAS DE GOBIERNO ELECTRÓNICO: UNA ENCUESTA APLICADA A SERVIDORES PÚBLICOS

La investigación tuvo como objetivo verificar los factores determinantes para el uso de prácticas de gobierno electrónico, frente a la percepción de los servidores públicos. Para llevar a cabo el estudio se utilizó un cuestionario con una escala tipo Likert de cinco puntos. Los datos fueron analizados mediante estadística descriptiva, análisis factorial confirmatorio y regresión lineal múltiple, que evaluó 5 hipótesis de investigación. La muestra del estudio incluyó 206 funcionarios públicos federales y estatales de la región noreste de Brasil. Se confirmó que la expectativa de esfuerzo y desempeño, las condiciones facilitadoras y la inclusión social son aspectos que influyen en la intención de utilizar el gobierno electrónico, mientras que se refutó la hipótesis de capacidad innovadora, advirtiendo que el servidor no necesita tener un perfil emprendedor para adoptar practicas Aun así, se encontró que el factor influencia social es el que tiene mayor poder de influencia positiva sobre la intención de uso, demostrando que el entorno en el que viven incentiva el uso de prácticas electrónicas.

Palabras clave: gobierno electrónico; empleado estatal; intención de uso.

1. INTRODUCTION

With the advent of the era of knowledge and globalization, (public and private) organizations seek to adapt to the aspirations imposed by society, and for this, they have information and communication technologies (ICT) as solid allies. In this sense, Potnis (2010) shows that countries are using the tools made available by ICT to build economic and social progress since the new digital tools have become increasingly popular, affecting the conditions of society's participation in the state's decision-making processes and influencing the Leonnel democratic context (Tonelli et al., 2018, p. 2012).

In addition to economic and social progress (Baptista, 2000), the use of these tools also aims at efficiency and transparency in public administration, providing more significant interaction between government and society (Janowski et al., 2012), which is considered strategic for the provision of services to society (Budiati, 2018). Thus, this interaction between ICT and the state is named e-government, seen as a generic set of technologies and services that can be employed by a wide range of public organizations (Jun & Weare, 2010), benefiting all parties: citizens, companies, and all government units (Gaikwad, 2020). Gil-García and Pardo (2005) determine that the intensive or generalized use by the government of information technologies applied to the provision of public services enables improvements in managerial effectiveness, promotion of values and democratic mechanisms, with the empowerment of citizens as a focus of use (Al-Rababah & Abu-Shanab, 2010), expanding the options for economic and social empowerment of individuals (Poonam et al, 2020).

This way, e-government concerns how citizens, public agents, and other interested parties have digital access to governmental information and services. Therefore, the study of e-government is relevant due to its aggregating character to public administration because it is considered an exciting and valuable case for studying the diffusion of innovation in public organizations (Jun & Weare, 2010).

E-government is a form of management that is seen as an innovation for the public sector, aiming to provide services with higher quality, reducing costs and benefits, providing more significant interaction between citizens and government (increasing citizenship), participation, and improving governance capacity (Amanda, 2019; Setiawan et al., 2019). Ramírez-Alujas (2016) states that e-government goes beyond improving government services, bringing significant changes to public management practices.

However, we observed that the private sector is still seen as a reference and success in the development of innovative practices for products and services (Hartley, 2013). To Mazzucato (2013), there must be a concern on the part of the public administration regarding innovative practices, seeking to improve the provision of services and better meet the desires of society, in addition to being an economic development strategy (Morgan, 2010).

By conceptualizing and demonstrating its importance within public administration, the electronic government demonstrates to have a diversification of studies, with emphasis on Ahn (2011), who analyzed how the political environment, the structure of government, and the nature of electronic applications influence the adoption by the public; Im et al., (2012) and Janssen, et al., (2018), who evaluated the use of e-government as a tool to increase government confidence; Rana et al., (2015), who examined the success of the online public complaints system from the perspective of citizens in India; Liu and Yuan (2015), who described the evolution of ICT in the public sector, and Rey-Moreno et al., (2018), who investigated why citizens avoid adopting e-government channels, despite its apparent benefits.

Therefore, this research sought to contribute to the knowledge of the subject by approaching a different public from those generally presented in previous studies, or civil servants, as prescribed by Abu-Shanab and Shehabat (2018) research in electronic government, where civil servants are the sample, are not as common as research using citizens as a sample. The same is stated by Batara et al., (2018), who argue that there is a need for more research that focuses on other essential aspects and stakeholders of e-government beyond the citizen-user relationship, such as the adoption of e-government by part of local government officials, a less studied population. In this sense, factors were listed that help the smooth running of e-government at the domestic level. In addition, attention was paid to meeting the gap pointed out by Domínguez et al (2011), seen as the understanding of the use of electronic government concerning the internal public (civil servants). Still showing the justification of the study, Manoharan et al., (2020) emphasize that there is an extension and influence of electronic government in public organizations as a research gap, despite the growing debate. Based on the above, the following research question arises: what are the determining factors for using e-government practices from the perception of civil servants?

Thus, this research aims to analyze the determining factors for using electronic government practices, from the perception of civil servants, through five research hypotheses. In addition to this introduction, the article presents the theoretical framework and research hypotheses listing the concept of e-government and the determining factors for adopting e-government; methodology; analysis and discussion of results; and final remarks.

2. THEORETICAL FRAMEWORK AND RESEARCH HYPOTHESES

The introduction of new ICT, such as the World Wide Web and e-mail in the early 1990s, significantly changed how people communicate and exchange information (Ahn, 2011). The technology then appears to help as public sector managers face difficulties in responding to the growing demands of services (Hui & Hayllar, 2010), with the internal and external functions of the government integrated to improve service provision (Manoharan & Ingrams, 2018). Bhatia (2020) contributes to the formation of the concept by stating that e-government deals with governance issues through technology.

Therefore, e-government comprises a technological response to improve citizen participation, responsibility, and transparency, facilitating a higher level of communication and flow of public information between citizens and the government, generating an electronic democracy, as well as an economy of financial resources (Ahn, 2011; Norris & Reddick, 2013). The implementation of e-government aims to simplify and improve the relationships and transactions between public administrations and their users or customers (Domínguez et al., 2011).

E-government is a tool capable of providing services to the community. In this sense, Gil-García and Pardo (2005) show operational efficiency, cost reduction, and greater productivity, in addition to improving the provision of services to society, such as the main benefits of e-government. Lam (2005) also highlights the centralization, cohesion, and continuity in the services offered to users and other benefits of using e-government.

However, to achieve the benefits of e-government, Bertot and Choi (2014) state that building an open and transparent government and a good interaction between governments, citizens, and the business environment is necessary, bearing in mind that the citizen is the crucial aspect for the success of e-governance and realizing the empowerment of citizens (Al-Rababah & Abu-Shanab, 2010). Also, Wang and Feeney (2016) emphasize that the organizational characteristics and the technical and professional skills of civil servants are fundamental for the functioning of e-government effectively. Based on the above, we see that e-government is an efficient instrument that works to reduce corruption, promoting promote good governance, improve relationships with citizens, and monitor the behavior of employees working with public entities (Shim & Eom, 2008; Jun & Weare, 2010), contributing to the improvement and effectiveness of services provided to citizens and companies (Abu-Shanab & Shehabat, 2018).

Therefore, this research highlights the determining elements of the intent to use e-government in public institutions from the perception of civil servants. Public employees are actors in the research for acting on the supply side, being at the forefront of providing public services and involuntary users, and predisposed to adopting any change implemented in the organizational environment (Batara et al., 2018). Intent to use, on the other hand, can be defined as the satisfaction and willingness of users to continue using the services in the system previously tried (Nulhusna et al., 2017).

This way, the elements that make up the research constructs are highlighted, which theoretically influence the intent to use e-government services: Expectation of Effort, Performance Expectation, Facilitating Conditions, Social Influence, and Innovative Behavior. In this sense, some relationships between constructs and e-government are presented, which allows the theoretical support of the research hypotheses (H1 ... H5).

The expectation of effort is one of the determining factors for adopting e-government. It can be considered an impetus for people to use technology to perform their functions without much effort (Rey-Moreno et al., 2018). Wong et al., (2015) add that the system's ease of use can be considered a determinant of the intent to use it.

To Venkatesh et al., (2003), the expectation of effort shows the degree that an individual will strive to use a system or program. In the case of the present research, it seeks to understand whether civil servants have a degree of ease in using e-government services. Based on the above, we have the first research hypothesis:

H1: Expectation of effort positively relates to the user's intent to use e-government services.

Another critical factor is Performance Expectation, which, according to Rey Moreno et al. (2018), can be shown by the order in which individuals consider using technology to help achieve objectives. From the perspective of Venkatesh et al. (2003), Performance Expectation is the degree to which a specific individual believes that if he uses the system, he will benefit from his employment, improving his performance in the public institution. This fact was also noted by Abu-Shanab and Shehabat (2018), as the success of e-government is strongly associated with the provision of services to citizens and companies. To Kumar et al. (2017), adopting e-government enables the creation of value with citizens, also saving time and money in their functions.

In this sense, Curristine et al., (2007) state that e-government aims to offer improvements in the performance of public institutions, especially in resource efficiency, through the provision of systems and information that aim to improve public revenue distribution having as a guide the needs of citizens, prioritizing the provision of public services. Thus, the second hypothesis of the present investigation emerges:

H2: Performance Expectation positively relates to the user's intent to use e-government services.

Conditions are another factor that can influence the use of e-government, evidenced in the study by Rey-Moreno et al. (2018), which demonstrates the degree to which people reflect on the existence of the system's technical infrastructure, aiming to help them when necessary. To Pereira et al., (2011), the perceived ease of use refers to the degree to which a person believes that using information technology will be effortless. Still, to the authors, the term "perceived ease of use" is used by Moore and Benbasat (1991). However, it also refers to Facilitating Conditions. Ease of use also enables the intent to use e-government, as highlighted by Kumar et al. (2017), as they demonstrate in their study that there is a strong use and mobilization for e-government adherence through public institutions, especially with conventional services.

In this context, the Facilitating Conditions refer to the degree that a person believes that he will use a system, in this case, electronic governance, with ease, not requiring significant effort (Venkatesh et al., 2003). Based on this understanding, the third research hypothesis is listed:

H3: Facilitating Conditions positively relate to the user's intent to use e-government services.

The Social Influence factor is considered as the degree to which people realize that those who are important to them think they should use technology (Rey-Moreno et al., 2018), as well as the permanent and methodical process of rational approach and scientific questions that arise in the social world (Baptista, 2000). In this case, there is the Social Influence of other individuals to use a specific system, defined by Venkatesh et al. (2003) as the degree to which an individual perceives that other individuals consider essential and believe that he should use the system. Thus, we have the fourth hypothesis:

H4: Social Influence positively relates to the user's intent to use e-government services.

Innovative behavior is related to the practice of e-government in promoting innovation in public organizations (Jun & Weare, 2010). In this sense, Agarwal et al., (2012) and Yuan and Woodman (2010) describe Innovative Behavior as the intentional creation, dissemination, and application of innovative ideas within a job, group, or organization function. Corroborating, Thurlings et al., (2015) highlight Innovative Behavior as a process of generating innovative ideas promoted by employees to benefit better organizational performance.

Thus, employees' Innovative Behavior is relevant since they are the agents that start and implement innovation with organizations, seeking to improve organizational performance (Hsu et al., 2011). In this sense, Park and Jo (2017) state that in the current business environment, no organization is likely to survive without continuous innovation, and for this to occur, employees' innovative behaviors are fundamental. In this scenario, Janssen (2000) states that innovative workers seek to perform their functions by creating and applying new ideas.

Ben and Schuppan (2015) report that IT innovations affect public organizations, also changing the attitudes of civil servants towards new ways of working using electronic tools. Therefore, we observed that civil servants adopt new forms of tools in the execution of their functions, seeking improvements in the performance of their routines; among these tools, IT innovations stand out. In this sense, we have the fifth research hypothesis:

H5: Innovative Behavior positively relates to the intent to use e-government services.

3. METHOD

A quantitative and descriptive approach characterizes this research. The sample of this study is considered non-probabilistic and was obtained for convenience, which allowed the collection of data from 206 respondents. The convenience was given in the regionality and the target audience: respondents from the Northeast region of Brazil and civil servants from the state and federal spheres.

The collection act took place from September 26th to October 14th, 2019. Respondents were approached in person and remotely with the help of the Google Docs® platform and shared via e-mail and social media. For the greater reach of the respondents, the Snowball method was used, in which the electronic form was initially sent to the researchers' contacts. These respondents later forwarded it to other respondents (Freitas et al., 2000; Severo et al., 2018).

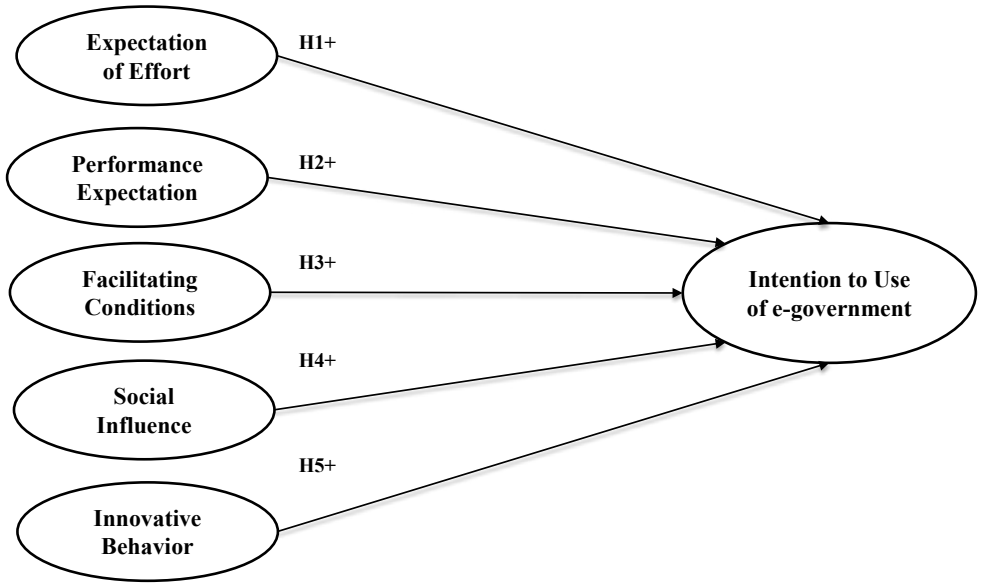
After data collection, only one outlier was ruled out, as responses were concentrated on a single alternative on the Likert scale. Three respondents were excluded from the sample because they were not from the Northeast region. So, the study's final sample comprised 202 respondents (valid cases).

As a tool for data collection, a closed questionnaire was used with questions about e-government and other constructs (Box 1). The questionnaire consists of statements the respondents should choose on a five-point Likert scale (from 1 - strongly disagree to 5 - strongly agree).

The questionnaire was validated by two specialists in the field, doctors in administration. The pre-test also was conducted with 15 respondents seeking to assess their understanding of the questions, with no difficulty identified. The Free and Informed Consent Form was also adopted, clarifying the respondent's role and the research's confidentiality.

For the analysis of the theoretical proposition of the study, research hypotheses were developed and presented in the study's theoretical framework. Such relations are show in Figure 1.

Figure 1. Expected relationship for the variables



Source: elaborated by the authors

For developing the questions that deal with the intent to use e-government, the works were developed by Park and Jo (2018) and Rey-Moreno et al. (2018) in an adapted way. Twenty-six observable variables were developed, and 7.92 respondents were obtained per variable,

demonstrating that the sample represents the study since, for each observable variable, there were five to ten respondents (Hair Jr. et al., 2010). The factors and variables that make up the study are shown in Box 1.

Box 1 - Determining factors and variables in intent to use e-government.

(EE) Expectation of Effort	(FC) Facilitating Conditions
EE1 - The use of electronic administration is clear and understandable.	FC1 - Access to electronic administration is accessible on any device.
EE2 - If you know how to use the Internet, it is easy to use electronic administration.	FC2 - You don't have to be an expert to deal with electronic administration.
EE3 - I do not believe that I will have problems using electronic administration.	FC3 - Electronic administration allows me to access the same services that I had accessed so far in person or by phone.
EE4 - E-government services make my life easier.	FC4 - Learning to use electronic administration would be easy for me.
(PE) Performance Expectation	**(SI) Social Influence**
PE1 - I think electronic administration is useful in my life.	SI1 - Public administration takes it for granted that I have to deal with matters using electronic administration.
PE2 - The use of electronic administration allows me to perform queries and operations more quickly.	SI2 - It seems that if I don't use electronic administration, I'm old-fashioned.
PE3 - Using electronic administration increases the quality of services that I receive from public administration.	SI3 - My friends and family think I should use electronic administration.
PE4 - Using public administration reduces the bureaucracy of the service provided in person.	SI4 - Using electronic administration, I help reduce public administration's financial resources.
(IB) Innovative Behavior	**(INTU) Intention to Use**
IB1 - I research new technologies, processes, techniques and/or product ideas.	INTU1 - I intend to use electronic administration.
IB2 - I generate creative ideas.	INTU2 - I intend to use some of the services.
IB3 - I promote and defend ideas for other people.	INTU3 - I intend to carry out an increasing number of operations through electronic administration.
IB4 - I research and guarantee the necessary funds to implement new ideas.	INTU 4 - The use of electronic administration is now a habit for me.
IB5 - I develop adequate plans and schedules for the implementation of new ideas.	INTU 5 - I will use electronic administration as long as this possibility exists.

Source: elaborated by the authors

The SPSS software, version 21.0, was used to develop the data analysis through Descriptive Statistics, Analysis of Variance (ANOVA), Confirmatory Factor Analysis (CFA), Pearson's correlation analysis, and Multiple Linear Regression – techniques selected to achieve the research objective.

Initially, the study used the descriptive statistics technique, evaluating, through the frequencies represented by graphs, the behavior of the respondents regarding the degree of agreement and disagreement of the observable variables of the study.

ANOVA was also used, which was selected to verify possible differences between the groups of respondents (state and federal employees), evaluating whether the perceptions about the determinants of the use of e-government are different for each group that composed the

research. The parameter used for the analysis of ANOVA is that there will be a difference between the groups if Test F is significant at the level of 0.05 (Paese et al., 2001).

Sequentially, it used multivariate data analysis through the Confirmatory Factor Analysis (CFA), which is a confirmatory method used when there is prior information about the factorial structure that needs to be confirmed (Marôco, 2010), contributing to the statistical validation of variables and observable factors. That is, verify the viability of the data set and the scale validation (De Guimarães et al., 2020), which the CFA assesses, the behavior of each factor concerning reliability, integrity, and normality of data and scale (Hair Jr. et al., 2010, De Guimarães et al., 2018, Severo et al., 2018). The parameters for assessing the performance of the CFA result were those established and used in the work of Hair Jr. et al. (2010) and Marôco (2010), and De Guimarães et al. (2020), as shown in Box 2.

Box 2 - Tests for verification of Confirmatory Factor Analysis (CFA).

Test	Parameter	Conceptualization
Cronbach's alpha	(> 0.6)	It investigates internal consistency and reports in its test to what extent all items measure the same concept and, therefore, are connected with an interrelation of items (Tavakol & Dennick, 2011).
Kaiser, Meyer and Olkin (KMO)	(=ou> 0.5)	It is a test that suggests the proportion of variance of the items that can be explained by a latent variable (Lorenzo-Seva, Timmerman, & Kiers, 2011).
Bartlett's sphericity tests	(p <0.05)	Evaluates the general significance of all correlations in a data matrix (Hair Jr. et al., 2010), a test sensitive to the normality of the data, evaluating its normality (Severo et al., 2018).
Factorial Loads	(=or> 0.5)	Evaluates the consistency of the scale items for the representation of the factor, that is, evaluating the adherence of the item in the formation of the factor (Costa, 2011).
Communality	(=or> 0.5)	It verifies the variation that an observable variable shares with all other research variables, evaluating the integration between the variables (Severo et al., 2018).

Source: elaborated by the authors

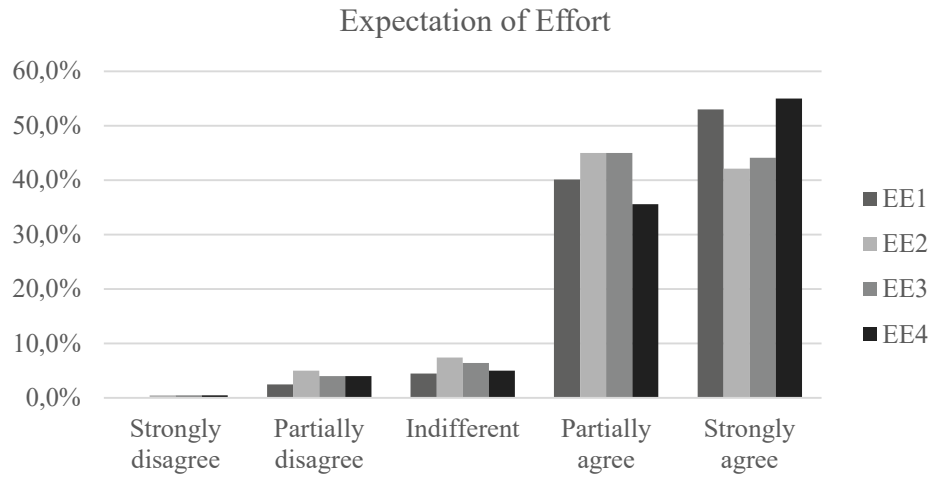
Finally, Pearson's correlation analysis evaluated the existence or not of multicollinearity, which verifies whether any independent variables are highly correlated when they are above 0.8 (Wooldridge, 2006). After evaluating the correlations, the study ended with using Multiple Linear Regression, a technique applied in situations where the dependent variable can be affected by several independent variables (Downing, 2011), seeking to verify the importance and contribution of each factor for intent to use e-government.

4. RESULTS

4.1 Descriptive statistics and anova

The first factor to be analyzed was the Expectation of Effort (EE) (Figure 2) which shows a high power of agreement in all variables, the most prominent being EE1 (The use of electronic administration is clear and understandable), which adds up to 93.1% total or partial agreement, showing that the electronic means made available by governments are clear and well understood.

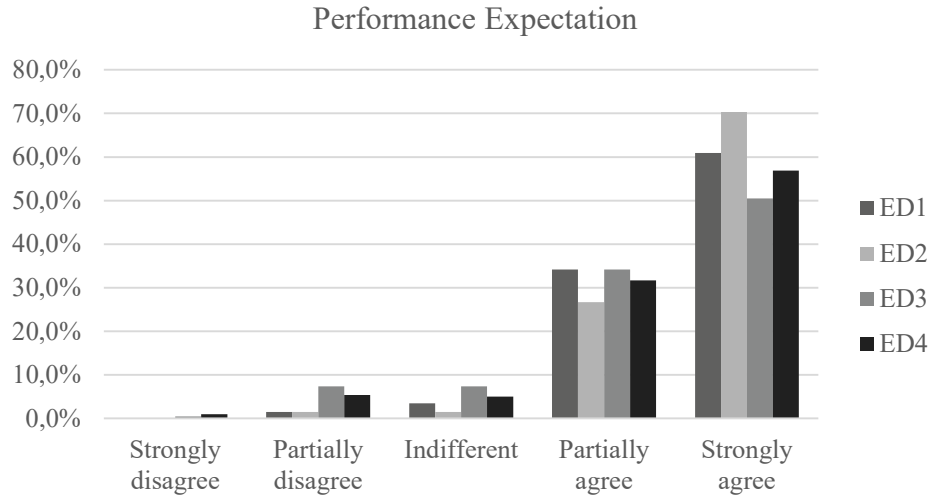
Figure 2. Frequency of the variables that make up the Expectation of Effort factor.



Source: elaborated by the authors

Concerning Performance Expectation (PE) (Figure 3), the question PE2 (The use of electronic administration allows me to perform queries and operations more quickly) has greater prominence, adding 97% of total or partial agreement, followed by the variable PE1, with 95.1% agreement, concluding that the use of e-government is beneficial in the life of the servants, mainly because it brings agility in queries and processes carried out by it, and bringing improvements with the performance of public institutions (Curristine et al., 2007).

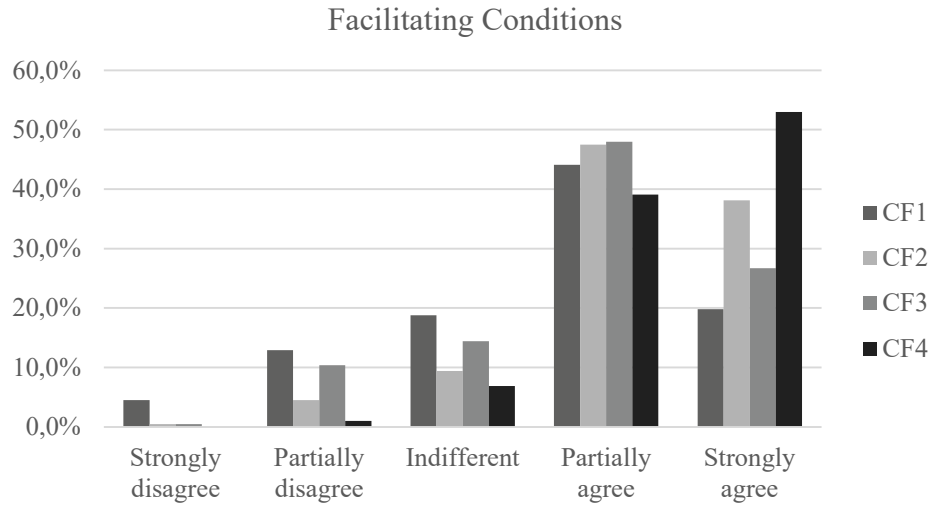
Figure 3. Frequency of the variables that make up the Performance Expectation factor.



Source: elaborated by the authors

Regarding the Facilitating Conditions (FC) (Figure 4), the highest level of agreement is concentrated on the fact that the use of electronic administration is an easily accessible mechanism, variable FC4 (Learning to use electronic administration would be easy for me) with 92.1% agreement, corroborating the study by Pereira et al. (2011), who claim that the facilitating conditions are associated with the fact that the use of information technologies is effortless in their use, since information technology, in this study, is represented by e-government.

Figure 4. Frequency of the variables that make up the Facilitating Conditions factor.

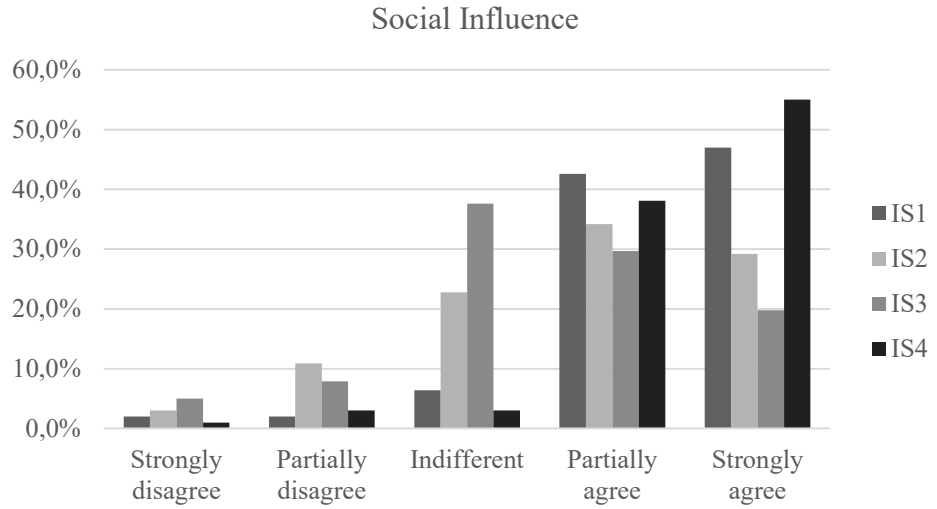


Source: elaborated by the authors

The Social Influence (SI) aspect (Figure 5) stands out in the variable SI4 (Using electronic administration, I help reduce public administration's financial resources) with 93.1% agreement, showing the awareness of civil servants regarding the reduction of financial resources when using e-government.

Regarding the reduction of resources, it is observed that the research findings converge with the understanding of Curristine et al. (2007) when the authors state that electronic government has the purpose of offering improvements in the performance of public institutions, especially in the efficiency of resources, by offering systems and information that aim to improve the distribution of public revenue, prioritizing the provision of public services in areas with the highest level of need.

Figure 5. Frequency of the variables that make up the Social Influence factor.



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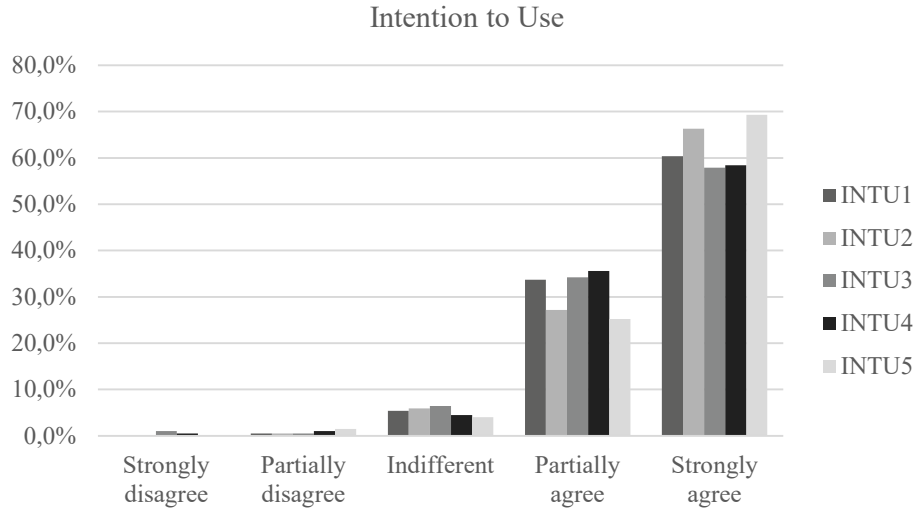
Concerning the profile of Innovative Behavior (IB) in the use of electronic tools (Figure 6), the IB3 variable (I promote and defend ideas for other people) has 81.2% agreement on the dissemination of ideas to others, demonstrating that servants are available for warnings and alerts regarding the use of electronic mechanisms within the public service. In line with Ben and Schuppan (2015), they report that IT innovations affect public organizations, also changing the attitudes of civil servants concerning new ways of working with electronic tools.

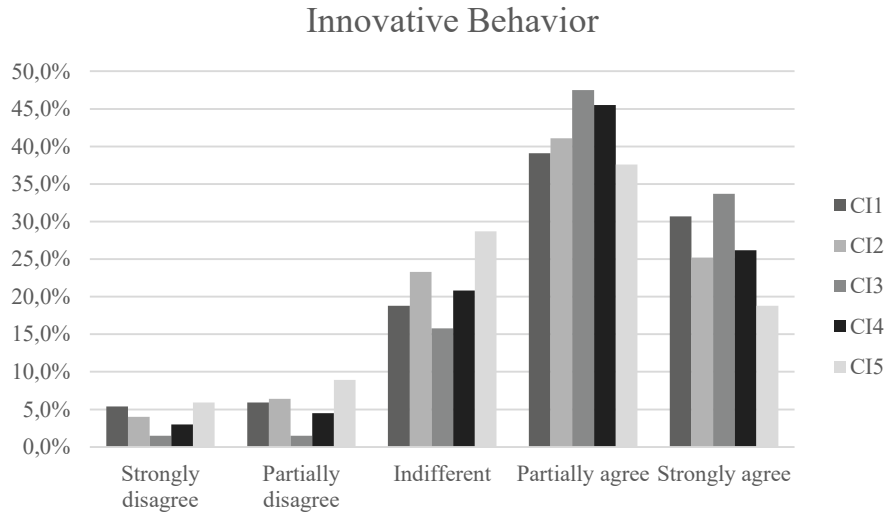
Figure 6. Frequency of the variables that make up the Innovative Behavior factor.



Source: elaborated by the authors

The Intent to Use (INTU) factor has the highest level of agreement in all observable variables (Figure 7), all of which have an agreement above 90%. This fact shows that civil servants use e-government tools as long as they exist, becoming a habit. Collaborating with previous studies, Kumar et al. (2017) show a strong mobilization for adherence to e-government through public institutions, especially with conventional services.

Figure 7. Frequency of the variables that make up the Intent to Use factor.



Source: elaborated by the authors

In addition to the descriptive analysis, this section verifies the existence or not of differences between the groups of respondents since these are federal and state employees. Therefore, the significance tests (Test F) were performed using the mean of the research variables (Table 1):

Table 1 - ANOVA test of difference of means between types of servants.

Mean of Variables	Sum of Squares	Medium Square	F Test	Sig.
MeanINTU	0.215	0.215	0.817	0.367
MeanEE	0.548	0.548	1.567	0.212
MeanPE	0.162	0.162	0.440	0.508
MeanFC	2.895	2.895	6.810	0.010
MeanSI	0.990	0.990	2.711	0.101
MeanIB	2.083	2.083	3.261	0.072

Source: elaborated by the authors

We found that, only about Facilitating Conditions (MeanFC) for the use of e-government, there is a difference between the groups of respondents with a significance of 0.010, below 0.05, as Paese et al. (2001) recommended. This fact demonstrates a difference in the perception between state and federal civil servants regarding the ease of use, access, and exchange of face-to-face services for online services.

The frequency statistics showed the difference between the groups, especially in the questions FC1 (Access to electronic administration is accessible on any device) and FC3 (Electronic administration allows me to access the same services that I had accessed so far in person or by phone). About FC1, state servants (73.3%) report having more accessible access to electronic services on any device than federal servants (56.3%). Regarding FC3, state servants also show more remarkable adaptation (82.2%) compared to federal ones (68.8), a fact that appears to be in better conditions in the state electronic service. Therefore, state employees show more Facilitating Conditions than federal employees.

4.2 Confirmatory factor analysis

Upon assuming the statistical validation of the observable variables used in the study, confirmatory factor analysis was carried out and verified whether the presented statements can measure the factors.

Table 2 specifies the factor validation tests per block. The reliability that measures the consistency of the research instrument used was measured by Cronbach's alpha, with all values greater than 0.6, as recommended in the study method. To verify whether the factor analysis technique is suitable for application in this study, the Kaiser Meyer Olkin (KMO) test was performed, all of which were above 0.5 as defined by Hair Jr. et al. (2010), that is, the sample is suitable for the application of factor analysis. Bartlett's sphericity test was performed to analyze the significant correlation between the variables at the 0.05 level, concluding that there is a correlation between the variables and that they can be reduced to a single factor.

Table 2 - Data validation for blocks.

Blocks	Cronbach's alpha	Bartlett's sphericity tests		Kaiser Meyer Olkin (KMO)	Explanation of Variability
		Chi-square	Sig.		
Expectation of Effort	0.753	184.815	0.000	0.755	57.6%
Performance Expectation	0.790	255.261	0.000	0.751	63.0%
Facilitating Conditions	0.735	171.001	0.000	0.749	56.4%
Social Influence	0.522	70.982	0.000	0.563	68.1%
Innovative Behavior	0.863	467.110	0.000	0.848	65.3%
Intention to Use	0.837	449.861	0.000	0.754	60.8%

Source: elaborated by the authors

After checking the consistency of the factors that make up the research, the analysis moves to an examination of the observable variables that make up the latent variables, investigating their factorial loads that must be above 0.5 and that deal with the representativeness of each variable for the formation of the factor, as well as Communality and Anti-image, which also need to be above 0.5 to observe the relationship between the factor variables. The data are shown in Table 3.

Table 3 - Confirmatory factor analysis by blocks.

Blocks	Observable Variable	Factorial Loads	Communality	Anti-image
Block 1 (Expectation of Effort)	EE1	0.732	0.536	0.781
	EE2	0.823	0.677	0.712
	EE3	0.784	0.615	0.744
	EE4	0.691	0.477	0.82
Block 2 (Performance Expectation)	PE1	0.777	0.603	0.754
	PE2	0.804	0.646	0.755
	PE4	0.805	0.648	0.751
	PE4	0.789	0.623	0.744
Block 3 (Facilitating Conditions)	FC1	0.803	0.645	0.718
	FC2	0.685	0.469	0.792
	FC3	0.773	0.598	0.726
	FC4	0.739	0.546	0.784
Block 4 (Social Influence)	SI1	0.669	0.58	0.599
	SI2	0.804	0.698	0.55
	SI3	0.613	0.748	0.533
	SI4	0.71	0.699	0.608
Block 5 (Innovative Behavior)	IB1	0.728	0.530	0.915
	IB2	0.878	0.772	0.826
	IB3	0.774	0.599	0.844
	IB4	0.851	0.724	0.847
	IB5	0.802	0.643	0.833
Block 6 (Intention to Use)	INTU1	0.828	0.685	0.709
	INTU2	0.812	0.659	0.699
	INTU3	0.767	0.588	0.844
	INTU4	0.772	0.596	0.756
	INTU5	0.719	0.517	0.818

Source: elaborated by the authors

All study variables had satisfactory factor loads, that is, values greater than 0.5, showing the ability to integrate and represent the factors raised in the research. The variables with the highest factor loads and Communalities in the blocks were EE2 (If you know how to use the Internet, it is easy to use electronic administration), PE4 (Using public administration reduces the bureaucracy of the service provided in person), FC1 (Access to electronic administration is accessible on any device), SI2 (It seems that if I don't use electronic administration, I'm old-fashioned), IB2 (I generate creative ideas) and INTU1 (I intend to use electronic administration). We observed that the variables EE4 (e-Government services make my life easier) and FC2 (You don't have to be an expert to deal with electronic administration) presented a low Communality, below 0.5. However, they have good anti-image o, which attests to its permanence and importance in the representativeness of its factors. Thus, these questions are representative and have correlations with each other to represent the research factors.

4.3 Multiple linear regression and framework

This research step analyzed the relationship between the independent latent variables : Expectation of Effort (EE), Performance Expectation (PE), Facilitating Conditions (FC), Social Influence (SI), and Innovative Behavior (IB) concerning the dependent variable Intent to use (INTU) that can be understood by Formula 01.

$$\text{Formula 1: } Y = \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_5 x_5 + \beta_o$$

Before the development of the regression, Pearson's correlation analysis was generated to verify the existence of multicollinearity, which finds whether any independent variables are highly correlated when the correlations between them are above 0.8 (Wooldridge, 2006). We found the most significant correlation between the IB2<->IB4 (0.680) variables, with no multicollinearity.

The first result of the regression was between EE (Expectation of Effort) and INTU (Intent to use) (Table 4), with R^2 0.258 (25.8%), showing a moderate influence on the intent to use e-government and confirming H1, that the Expectation of Effort positively relates to the user's intent to use e-government services.

Table 4 - Results of the regression of the observable variable concerning Expectation of Effort.

Variable	β coefficient	Statistics t	p-value
EE1	0.076	1.051	0.295
EE2	-0.048	-0.600	0.549
EE3	0.162	2.123	0.035
EE4	0.409	5.852	0.000
R^2 0.258		Adjusted R^2 0.243	

Source: elaborated by the authors

Only the variables EE3 (I do not believe that I will have problems using electronic administration) and EE4 (e-Government services make my life easier) are significant for the sample of surveyed civil servants. Therefore, among the representative elements of the Effort Expectation for the use of electronic government, it is clear that the non-existence of barriers in the act of use, the use of digital tools, and the ease that these instruments bring to servants are the main reasons for using of e-government by the servant, thus corroborating with Rey-Moreno et al. (2018), as they state that Expectation of Effort is seen as a driver for people to use technology to perform their function. Wong et al. (2015) complement by stating that such ease can be considered a determinant for the intent to use e-government, demonstrating that there is a low degree of effort, as mentioned by Venkatesh et al. (2003) since this tool serves as a facilitator for the servant and there are no problems in its adoption.

The influence of PE (Performance Expectation) on INTU (Intent to use) (Table 5) shows a significant and positive influence with a moderate explanatory power of R^2 0.325 (32.5%), confirming H2 that Performance Expectation positively relates to the user's intent to use e-government services.

Table 5 - Results of the regression of the observable variable concerning Performance Expectation.

Variable	β coefficient	Statistics t	p-value
PE1	0.273	3.631	0.000
PE2	0.213	2.769	0.006
PE4	-0.031	-0.400	0.690
PE4	0.237	3.101	0.002
R^2 0.325		Adjusted R^2 0.312	

Source: elaborated by the authors

Performance Expectation (PE) has three significant variables: PE1 (I think electronic administration is useful in my life), PE2 (The use of electronic administration allows me to perform queries and operations more quickly), and PE4 (Using public administration reduces bureaucracy of the service provided in person). Therefore, the capacity for utility, speed, and the reduction of the bureaucracy of the face-to-face service are the elements that must be highlighted for the better execution of e-government actions. Thus, as emphasized by Curristine et al. (2007), e-government for servants offers improvements in the performance of institutions, especially in resource efficiency, saving time and money along with their functions (Kumar et al., 2017). Regarding the degree of benefits with the use of e-government mentioned by Venkatesh et al. (2003), the Performance Expectation of the investigated servants proves to be high, showing that they perceive benefits with the use of e-government.

Regarding the relationship between FC (Facilitating Conditions) and INTU (Intent to use) (Table 6), a moderate influence of R^2 0.319 (31.9%) is presented, confirming the H3 hypothesis that Facilitating Conditions positively relates to the user's intent to use e-government services.

Table 6 - Results of the regression of the observable variable Facilitating Conditions.

Variable	β coefficient	Statistics t	p-value
FC1	0.044	0.588	0.557
FC2	0.052	0.782	0.435
FC3	0.060	0.831	0.407
FC4	0.491	7.127	0.000
R^2 0.319		Adjusted R^2 0.305	

Source: elaborated by the authors

For this group, the only facilitating condition that significantly represents the factor is the variable FC4 (Learning to use electronic administration would be easy for me) which indicates the ease of use of electronic administration and the replacement of personal services by electronic activities, which is, therefore, an element that drives the intention for its use. The confirmation of hypothesis H3 is supported by the understanding of Venkatesh et al. (2003) because, to them, the Facilitating Conditions refer to the degree that a person believes that he will use a system, in this case, electronic governance, with ease, not requiring great efforts. Thus, this technology is provided by ease of handling (Pereira et al., 2011); for this reason, institutions seek to adhere to e-government practices, especially regarding more common activities (Kumar et al., 2017).

Table 7 shows the relationship between SI (Social Influence) and INTU (Intent to use), with an influencing power of R^2 0.392 (39.2%) being of moderate to vigorous intensity, confirming hypothesis H4 of the study that raises the statement that Social Influence positively relates to the user's intent to use e-government services. In this case, there is the Social Influence of other individuals to use a specific system; when other people are considered essential and believe that an individual should use the system, he uses it (Venkatesh et al., 2003).

Table 7 - Results of the regression of the observable variable Social Influence.

Variable	β coefficient	Statistics t	p-value
SI1	0.327	5.444	0.000
SI2	0.048	0.754	0.452
SI3	0.212	3.493	0.001
SI4	0.370	6.433	0.000
R^2 0.392		Adjusted R^2 0.379	

Source: elaborated by the authors

There were three significant variables in this relationship: SI1 (Public administration takes it for granted that I have to deal with matters using electronic administration), SI3 (My friends and family think I should use electronic administration), and SI4 (Using electronic administration, I help reduce public administration's financial resources), concluding that the fact that the governments consider that the civil servant needs to use electronic services and already insert them into this context is a positive factor because it makes them adapt. We also found that the fact of being socially involved with people who indicate the use of e-government reinforces the intent to use by the servants, as defined by Rey-Moreno et al. (2018), as well as it is relevant to the awareness that there is a reduction in expenses for the public sector when services are used in a non-face-to-face manner, as conceptualized by Gil-García and Pardo (2005) and Amanda (2019).

The last analysis (Table 8), between IB (Innovative Behavior) and INTU (Intent to use), identified a low influence power R^2 0.092 (9.20%) and a non-significant relationship, refuting hypothesis H5, highlighting that Innovative Behavior does not positively relates to user's intent.

Table 8 - Results of the regression of the observable variable Innovative Behavior.

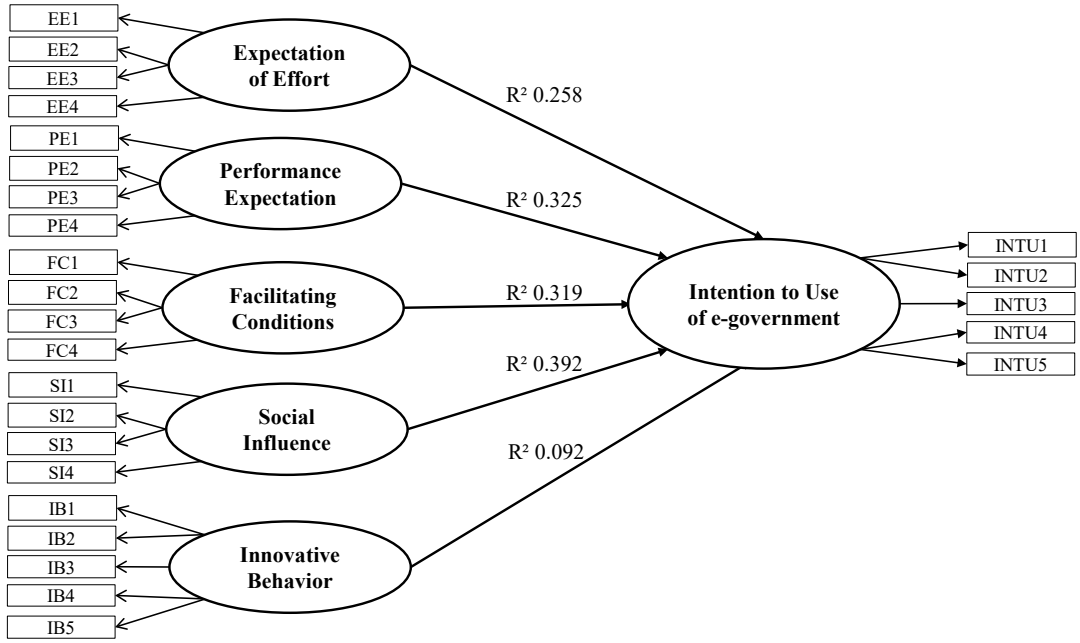
Variable	β coefficient	Statistics t	p-value
IB1	0.086	1.012	0.313
IB2	0.087	0.784	0.434
IB3	0.177	1.900	0.059
IB4	-0.037	-0.358	0.721
IB5	0.050	0.510	0.611
R^2 0.092		Adjusted R^2 0.068	

Source: elaborated by the authors

Thus, we conclude that Innovative Behavior is not a determining element in the intent to use electronic government practices. It is clear that even if the servant does not have innovative features, he can use electronic government practices and processes. Even though innovation in public organizations has gained prominence over the years (De Vries et al., 2015), the government must be concerned with using innovative practices, seeking improvements in the provision of services, and meeting society's wishes (Mazzucato, 2013).

In a synthetic way to the developed descriptive work, the framework developed in this study is expressed in Figure 8.

Figure 8. A framework of the determinants of Intent to use e-government by civil servants.



Source: elaborated by the authors

The presented framework is the result of the theoretical model that evaluated the determining elements for the intention of using e-government by civil servants. However, it is noteworthy that for state and federal civil servants in the Northeastern region of Brazil, some variables were not significant, based on the results of the multiple regression analysis, such as EE1, EE2, PE4, FC1, FC2, FC3, and SI2, as well as the factor concerning Innovative Behavior (IB).

5. CONCLUSIONS

Based on the analysis of the results, it is clear that the main finding of the research indicates that Social Influence is the most important aspect, among the constructs analyzed, of the use of e-government, which indicates the understanding of groups in the process concerning cost reduction and adaptation to technological means, even if influenced by the environment because the waste of resources often occurs due to the lack of a clear definition of objectives and a lack of precise diagnosis of the socioeconomic reality, which leads to managerial negligence in allocating resources to meet the population's demand.

Among the constructs with less explanatory power, the Expectation of Effort stands out, showing that the use of technologies is already widespread and appears naturally in users' interactions. In addition to these two aspects, the hypotheses regarding Performance Expectation and Facilitating Conditions were supported, both confirmed as elements of moderate influence in the use of e-government. It was not possible to support hypothesis H5 on the influence of Innovative Behavior, emphasizing that the innovative profile is not a requirement for servants to start using the e-government mechanism, which may be linked to the aspect of normality in the adoption of electronic practices.

As an academic contribution, the study presents its collaboration in researching civil servants since this is a group of internal respondents who are users of the IT systems of e-government practices. However, there were no broader studies yet nor a survey of observable and latent variables (constructs) to this research theme and a group of respondents, resulting in the development of a theoretical framework, as well as in the construction and validation of scales (metric), which can be used by other researchers, as well as to compare regions and different agents linked to e-government.

In the managerial scope, the study collaborates in understanding the factors that can lead to the success of e-government with civil servants, supporting the development of actions that can occur more assertively.

Among the study's limitations, the possibility of Common Method Variance (CMV), the formation of response biases, and the wrong generalization effect (Halo) is evident since the collection used a Likert scale, and there is the possibility of socially-responsible responses. It is possible to highlight also the generalization of the quantitative results obtained because the study sample is non-probabilistic, a frequent fact in research in applied social sciences. In this sense, caution is suggested in applying the results since they portray the analysis of the reality of the sample, which comprises state and federal civil servants in Northeastern Brazil. However, validation studies were conducted, and the research sample is within the acceptable range following methodological and statistical rigor. Like this, we used statistical tests to assess simple reliability and KMO to avoid these method limitations.

The results of this research contribute to the advancement of science by developing a framework for analyzing factors that influence the use of e-government. However, from this study, new research questions arose for future studies: What other factors influence the use of e-government? Do the factors related to knowledge management (organizational structure and culture) influence the adoption of e-government?

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