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Comparative study of the digital government websites of the mayors of Peru and Colombia

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Abstract---The article presents a comparison of the government websites of the main cities of Peru and Colombia, in their maturation processes of digitization of the municipal Digital Government services. The investigation is of a documentary type through the cybergraphy technique, with the application of a checklist. Based on the perspective of the level of maturity of digitization of municipal services, it is concluded that on average the municipalities of Colombia are better managed digitally compared to the municipalities of Peru.

Keywords---digital government, ICT, public management, communication, information.

Introduction

The objective of the work is to approach both the possibilities and the challenges presented by the websites of the main cities of Peru and Colombia, in their maturation processes of digitization of municipal Digital Government services. It is important to understand, from the perspective of Backus (2001), that digital or electronic government is one of the two dimensions of electronic governance, being electronic democracy the other dimension. Electronic governance, "It is defined as the application of electronic means in the interaction between government and the citizens and government and businesses, as well as in internal government operations to simplify and improve democratic, government

and business aspects of Governance". Thus, electronic governance is built from a paradigmatic dimension such as electronic democracy (relationship between government and citizens) and an operational dimension such as electronic government.

In this work, the evolutionary vision of digital government is assumed based on the level of maturity of the websites. Gartner (2000) proposes an evolutionary perspective in which electronic governance is developed, starting from the level of information (phase of presence on the web to provide information to officials and citizens), and going through the level of interaction (use of interactive tools such as email, chat and search engines for communication between government, officials and citizens), the transaction phase (procedures are completed through government portals, such as tax returns) and reaching the transformation phase in which all processes are specified through a single window (a single web portal to achieve all the aspirations of e-governance). Taking as reference the levels of Backus (2001) and Gartner (2000), the proposal for the evaluation of municipal services of Lara (2019) was considered in which 5 levels of digital government maturity are indicated.

Theoretical referents

Electronic government or digital government has gone through several phases in the world. It was born as a need to lower costs by copying the banking model in countries like Denmark, then it came as a kind of "fashion" in regions such as Latin America, with the mandate of the State modernization processes based on the Washington consensus to then arrive in what at the beginning of the second decade of the XXI we call a dead end. We use the term dead end because in general terms, the two great promises before called electronic government (now open or digital government) were to fight corruption - thanks to transparency - and to advance in the construction of a radical democracy. We might think that the predictions of the apocalypics have come true. Páez (2007) already warned: Problematizing the subject of Electronic Government from communication is not a simple task, but perhaps very convenient in order to understand its complexity. A multi and transdisciplinary approach is required in which political science, history, cybernetics and the so-called communication and information sciences are intertwined. The greatest challenge of a work of this nature involves the confrontation between apocalyptic and integrated positions, from which the potential of ICT for society is denied or affirmed.

The theoretical route proposed by Páez (2011, p. 52) could serve to avoid the disease - or malpractice - of the excessive simplification suffered by technocratic administrations that tend to mask the failure of the political system through the massive technological facilities in hands of private companies and, as we have also seen, of States with technocratic logic. The essence of the discussion on the role of ICT in State-citizen relations (electronic government), should not be technological or exclusively oriented to efficiency and effectiveness in the provision of services (since that would correspond to the instrumental approach), but rather framed in the processes of reconstruction of democracy. We consider that the Internet, in addition to be a space for the mediated transit of market interests, can be at the same time and paradoxically a form of mediation that

today citizens are using to form “their own political and ideological constellations, avoiding political structures established and creating an adaptable political environment ”(Morales, 2004, p.76).

The approach of Páez (2011) to rethink electronic government implies to consider some of the four main approaches proposed by Reilly (2004): improvements in the management of public administration, provision of services, transparency, and facilitation of citizen participation. "The four approaches are unidirectional and imply that the transformation begins with the government, but as we have been suggesting... we should think of an electronic government by the people (participatory and direct democracy) and for the people (social or substantive democracy)" (Páez , 2011, p. 54). The challenge of repaying the debt that the world elites have regarding the necessary utopia of building more democratic societies is threatened by the problem of power. As Lozano and Páez (2015) explain, despite the fact that the Internet was conceived from the perspective of decentralized networks that are difficult to control, “the dispute for power and control... takes on new dimensions, as opposed to this architecture of freedom arises surveillance technologies that allow messages to be intercepted, to monitor the communication activities of a computer or to snoop on the information stored in it ”(p. 340). For their part, Hernández, Gandur and Najles (2014, p. 5), affirm that, in recent years, the idea of Open Government as a new concept of management and public administration has achieved great attention among politicians, officials and academics of Latin America. Lara (2019, p. 51) takes into consideration the evaluation models and the expected characteristics of a public website and elaborates an instrument that serves as the basis for evaluating the level of maturity of digitization of municipal services. The dimensions to evaluate municipal websites are:

- Findability
- General aspects
- Search
- Contact services
- Social networks
- Municipal services - municipal OIRS
- Municipal services - Procedures
- Transparency
- Security
- Loading speed
- Accessibility
- Adaptability

The following figure by Lara (2019, p. 52), contains a summary table with the dimensions to be evaluated and the scores that can be assigned as the case may be.

Table 1
Instrument for the evaluation of municipal websites

Dimension / Score	0	1	2	3	4
Findability	Website not found	The website is not easily found	-	The website is among the first results	The website is the first result
General Aspects	The website does not have a clear and easy URL to remember, nor does it have a municipal identification	-	The website has only one issue fully resolved	-	The website has a clear and easy URL to remember, and also it has a municipal identification
Search	The website does not have a search engine	-	The website has a search engine, but in the face of a simple search, it does not deliver consistent results	-	The website has a search engine and in the face of a simple search, it delivers consistent results.
Contact services	The Information is very incomplete (no contact services).	The Information is incomplete (one contact services)	The information is intermediate (two contact services).	The information is complete (all contact services)	The information is very complete (all contact services, including link to the address).
Social networks	No municipal social networks are visible	-	The municipality has social networks, but it is not possible to access them	-	The municipality has social networks, which can be

			from the website.		accessed from the following website
Municipal services – OIRS municipal	There is no OIRS section on the municipal website.	-	the municipal website has a section for the OIRS, but online communication is not possible.	-	the municipal website has a section for communicating with the OIRS online
Municipal services – procedures	There is NO section for procedures	There is a separate link within the web page for procedures	-	There is an option within a menu for procedures	There is a button or banner specially dedicated to procedures
Transparency	The municipal website does not have a space dedicated to requests according to the transparency law.	-	-	-	The municipal website has a space dedicated to requests according to the transparency law.
Security	The municipal website is not secure	-	The municipal website is secure, but does not inform its users about it	-	The municipal website is secure and also informs its users about it
Loading speed	Municipal website has a slow loading speed	-	The municipal website has a normal loading speed.	-	The municipal website has fast loading speed
Accessibility	Not accessible	Not very accessible	Intermediate	Accessible	Very accessible
Adaptability	The municipal				The

	website is not optimized for cell phones.	-	-	-	website is optimized for mobile devices
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Source: Lara (2019).

Methodology

According to the traditional parameters of the investigation, this work followed the protocol of the documentary investigation. In documentary research, it is not people but documents that are being studied.; And what is a document? These are sources such as compilations written, "audiovisual or of any kind, that serve as a sample or memory of the events that occurred and allow inquiring in search of later conclusions" (Máxima, 2020, p. 4). Thus, a documentary investigation will always focus on the revision of an archive, made up of material of a diverse nature: books, newspapers, recordings, magazines, films, photographs, etc. All this is known as documentary sources (Máxima, 2020, p. 5). In the field of communication, since the 70s, the printed media have been investigated through the technique of hemerography. "Hemero" comes from the Greek language and it is linked to "day." The compositional element -graphy, meanwhile, refers to a "treatise" or a "description". Hemerography can therefore be understood as the study of journals, newspapers and magazines" (Pérez and Porto, 2019, p. 1).

The need to study digital media motivated Cely (2004) to propose cybergraphy as a research technique derived from hemerography. Cybergraphy, as determined by the cyber prefix, which has become cybernetics, would be made up of symbolic representations of the physical world, which only exist in electronic format and not in the world of atoms, and they pass through the virtual space created by the computer networks and communication lines; the graphy suffix refers to the graphic description of cybernetic representations (Cely, 2004). So in this work, the same researchers observed the digital government websites using an observation card or comparison list that served as a "checklist" of the observed characteristics, in this case the items on the maturity of the digital services of the municipalities. The population is made up of the municipal government websites of the 10 most populated cities in Peru and Colombia, namely:

Table 2
Websites of the 10 most populated municipalities in Peru

Ranking of mayors	Municipality/Mayoralt y	URL
1	Lima: 8 574 974	https://www.munlima.gob.pe/
2	Arequipa: 1 080 635	https://www.muniarequipa.gob.pe/
3	Callao Constitucional Province: 994 494	https://www.municallao.gob.pe/
4	Trujillo: 970 016	https://www.munitrujillo.gob.pe/
5	Chiclayo: 799 675	https://www.munichiclayo.gob.pe/
6	Piura: 799 321	http://www.munipiura.gob.pe/
7	Huancayo: 545 615	http://www.munihuancayo.gob.pe/

8	Maynas: 479 866	https://www.munimaynas.gob.pe/
9	Cusco: 447 588	https://cusco.gob.pe
10	Santa: 435 807	https://www.munisanta.gob.pe/

Source: own elaboration from the National Institute of Statistics and Informatics (INEI): <https://www.inei.gob.pe/biblioteca-virtual/publicaciones-digitales/>

Table 3
Websites of the 10 most populated municipalities in Colombia

City	URL
1. Bogotá: 7.674.366.	https://bogota.gov.co/
2. Medellín: 2.417.325 (Antioquia)	http://www.medellin.gov.co/
3. Cali: 2.319.684 (Valle del Cauca)	https://www.cali.gov.co/
4. Barranquilla: 1.206.946 (Atlántico)	https://www.barranquilla.gov.co/
5. Cartagena: 978.600 (Bolívar)	https://www.cartagena.gov.co/
6. Cúcuta: 637.302 (N. de Santander)	http://cucuta-nortedesantander.gov.co/
7. Soledad: 582.774 (Atlántico)	http://www.soledad-atlantico.gov.co/
8. Ibagué: 542.876 (Tolima)	https://ibague.gov.co/portal/index.php
9. Bucaramanga: 526.827 (Santander)	https://www.bucaramanga.gov.co/
10. Soacha: 488.995 (Cundinamarca)	https://www.alcaldiasoacha.gov.co/

Source: own elaboration from <https://www.dane.gov.co>

It was decided to delimit the investigation based on the municipal digital government websites, as they are the instances that in most countries are closest to the citizen, especially with regard to the possibilities of participation, procedures, issuance of documents, among others.

Results

Then, the results of the comparison between the websites of the main cities of Peru and Colombia, in their maturation processes of digitization of the municipal Digital Government services are presented. Table 3 shows the scores used to rate the websites in terms of digital government indicators. At the absent maturity level, we find that the services have not started the digitization process on the websites yet; the initial maturity level represents that the services are just beginning the digitization process on their websites. The level of development maturity means that the services still do not meet the minimum required in digitization. The defined maturity level shows that the services meet the minimum required in digitization and, finally, the managed level represents that the services are at the highest level of digital government maturity.

Table 4
Scores and scales of maturity levels of the digitization of services

Criteria	Levels				
	Absent	Initial	Development	Definite	Managed
Score	0	1	2	3	4
Scales	0 -10	11 -19	20 -29	30 -38	39 -48

Regarding the level of maturity of the digitization of the services of the Colombian mayors, in Table 4, it is observed that 60% of the services of the mayors are in the managed level, which shows that they are at the highest level of maturity of digital government according to the criteria studied. Here the mayoralties of Cali and Cartagena stand out, with 75% of the services being at this level. In addition, it is found that 9% of the services of the mayors are in a defined level of maturity, which shows that the services of the Colombian municipalities that are at this level, meet the minimum required in terms of digitization. Here we can see the mayor of Soledad with 25% of its services at that level. Also, it is observed that 12% of services are at a level of development maturity, and mayors are working to cover citizen expectations. However, they still do not comply with the minimum required in the scanning of all its services. Here the Mayor of Cúcuta appears with 33% of its digital services at this level. In addition, it is generally presented that 2% of services are digitally in a level of initial maturity; Mayors in some services are just beginning the scanning process on their websites, which complicates the navigation of its users. Here, the Mayors of Medellín and Soacha appear here with 8% of services at this level. Finally, it is observed that 17% of the services are at the absent level on their web pages. Which means that some services in the Colombian town halls have not started the digitization process yet. The mayors of Bogotá and Barranquilla are observed with 25% of their services at that level.

Table 5
Maturity level of the digitization of Colombian mayoral services

Mayorality	Maturity Level									
	ABSENT	INITIAL	DEVELOPMENT	DEFINITE	MANAGED					
Bogotá	3	25%	0	0%	2	17%	1	8%	6	50%
Medellín	2	17%	1	8%	2	17%	0	0%	7	58%
Cali	2	17%	0	0%	1	8%	0	0%	9	75%
Barranquilla	3	25%	0	0%	1	8%	1	8%	7	58%
Cartagena	1	8%	0	0%	1	8%	1	8%	9	75%
Soledad	2	17%	0	0%	1	8%	3	25%	6	50%
Cúcuta	2	17%	0	0%	4	33%	1	8%	5	42%
Ibagué	2	17%	0	0%	1	8%	1	8%	8	67%
Soacha	2	17%	1	8%	1	8%	1	8%	7	58%
Villavicencio	1	8%	0	0%	1	8%	2	17%	8	67%
AVERAGE	2	17%	0.2	2%	1.5	12%	1.1	9%	7.2	60%

Source: own elaboration

Regarding the level of maturity of the digitization of the services of the Peruvian mayors, in Table 5, it is observed that 54% of the services of the mayors are at the managed level, which indicates that they are at the highest level of maturity of digital government according to the criteria studied. Here the mayor of Lima stands out, with 75% of the services at this level. In addition, it is found that 5% of the services of the mayors meet a defined level of maturity, which shows that

the services of the Peruvian mayors that are in this level meet the minimum required in digitization. Here we can see the municipalities of Arequipa, Trujillo, Chiclayo, Piura, Huancayo and Maynas with 8% of their services at that level.

Also, it is observed that 12% of the services are at a level of development maturity; the mayors are working to meet the expectations of citizens. However, they still do not meet the minimum required in the digitization of all their services. Here appears the mayor of Lima with 25% of its digital services at this level. In addition, it is presented that 3% of the services are digitally at an initial level of maturity; the mayors in some services are just beginning the digitization process on their websites, which complicates the navigation of their users. Here you can see the mayor of Trujillo with 17% of services at this level. Finally, it is observed that 27% of the services are at the absent level, which means that some services in the Peruvian municipalities have not started the digitization process yet. The mayors of Callao appear with 42% and the mayors of Arequipa, Huancayo, Maynas and Cusco with 33% of their services at that level.

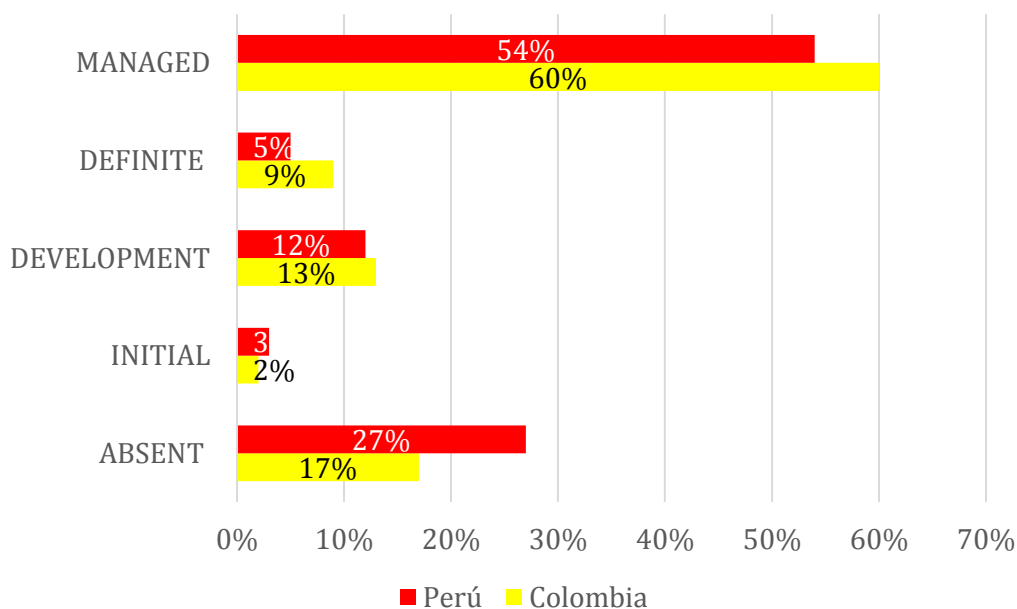
Table 6
Maturity level of the digitization of the services of the Peruvian mayoralities

MAYORALTY	MATURITY LEVEL									
	ABSENT		INITIAL		DEVELOPMENT		DEFINITE		MANAGED	
Lima	0	0%	0	0%	3	25%	0	0%	9	75%
Arequipa	4	33%	0	0%	2	17%	1	8%	5	42%
Callao	5	42%	0	0%	1	8%	0	0%	6	50%
Trujillo	2	17%	2	17%	1	8%	1	8%	6	50%
Chiclayo	3	25%	0	0%	0	0%	1	8%	8	67%
Piura	3	25%	1	8%	1	8%	1	8%	6	50%
Huancayo	4	33%	0	0%	2	17%	1	8%	5	42%
Maynas	4	33%	0	0%	2	17%	1	8%	5	42%
Cusco	4	33%	0	0%	1	8%	0	0%	7	58%
Santa	3	25%	0	0%	1	8%	0	0%	8	67%
AVERAGE	3.2	27%	0.3	3%	1.4	12%	0.6	5%	6.5	54%

Source: own elaboration

Making the comparison of the level of maturity of the digitization of the services of the Colombian and Peruvian municipalities, it is specified in Graphic 1 that the digital services of the Colombian municipalities (60%) are better managed than the digital services of the municipalities Peruvians (54%). Regarding the level of development, the mayors of both countries are at the same level, 12% the Peruvian mayors and 13% the Colombian mayors, which shows that some services are still in the process of digital maturation. On the other hand, we also find that digital services are more absent in Peruvian municipalities (27%) compared to Colombian municipalities (17%).

Graphic 1
Comparison of the maturity level of the digitization of the services of the
Colombian and Peruvian mayors



Source: own elaboration

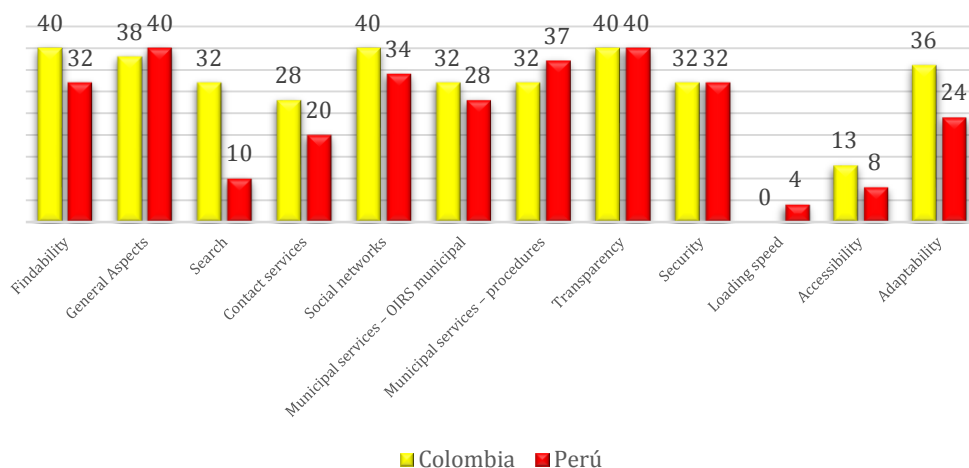
Regarding the findability indicator, we find that the majority of the Colombian mayoralties are at a managed level above the Peruvian mayoralties (Colombia 40 - Peru 32); This means that when searching the web pages of the Colombian town halls by the Google search engine, they were the search engine's first response option, which makes it easier for citizens because they do not always have the electronic address. Regarding the general aspects of the websites, such as the clear and coherent identification of the electronic address and the identification of the page with institutional elements, the mayors of both countries have been managing it in the best way (Colombia 38 - Peru 40); The URLs are clear, identifying the municipalities, which is also complemented by the institutional shields or logos found on the website, which makes them identifiable to the citizen.

On the other hand, the web pages of the Colombian town halls have search engines that provide very general information. However, in the Peruvian municipalities there are search engines, although they do not allow a real orientation and search of the content of the web, making navigation on the site less efficient. Search engines should provide information on the page and not link information from Google as observed in the analysis carried out. The websites of the mayors of both countries are integrated with the most used social networks today (Colombia 40 - Peru 34). The integration with Facebook, Twitter, Instagram, YouTube allows in many cases to expand the information and / or

coverage of the mayor's office. In some cases, such as the mayoralties of Arequipa and Maynas in Peru, there are links. However, not all of them are operational.

We also found that the transparency portals are managed in the best way in the analyzed websites of both countries (Colombia 40 - Peru 40). Although by law this space must be available, easy access to the request for information is reflected in the websites, being in a visible place for the user. Something that worries and is reflected in Graph 2, is the loading speed indicator, after having evaluated all the sites with Google's online tool PageSpeed Insight, it was found that all the other municipalities (except Lima-Peru), have a slow loading speed, which makes access to the site difficult, and this can worsen if the connectivity conditions in the area are not good (Colombia 0 - Peru 4). Another worrying indicator is the accessibility indicator; when analyzing the websites of the municipalities of both countries using the Tawdis online tool, we found non-compliance with international accessibility standards (Colombia 13 - Peru 8). Only the municipalities of Villavicencio-Colombia and Piura-Peru are those that are defined as accessible in which less than 30 problems were identified on their websites.

Graphic 2
Comparative of the level of maturity of digitization by indicators of the services of the Colombian and Peruvian mayors



Source: own elaboration

Discussion of Results and Conclusions

Responding to the objective of the research "to compare the digitalization maturation processes of municipal Digital Government services on the websites of the main cities of Peru and Colombia" it is found that according to the perspective of Backus (2001), the study has approached the dimension of e-government, considered as the operational face of e-governance. Araya (2004) explains how electronic government can be interpreted through the metaphor of the screen; there is a dimension in front of the screen, in which the citizens are, a dimension

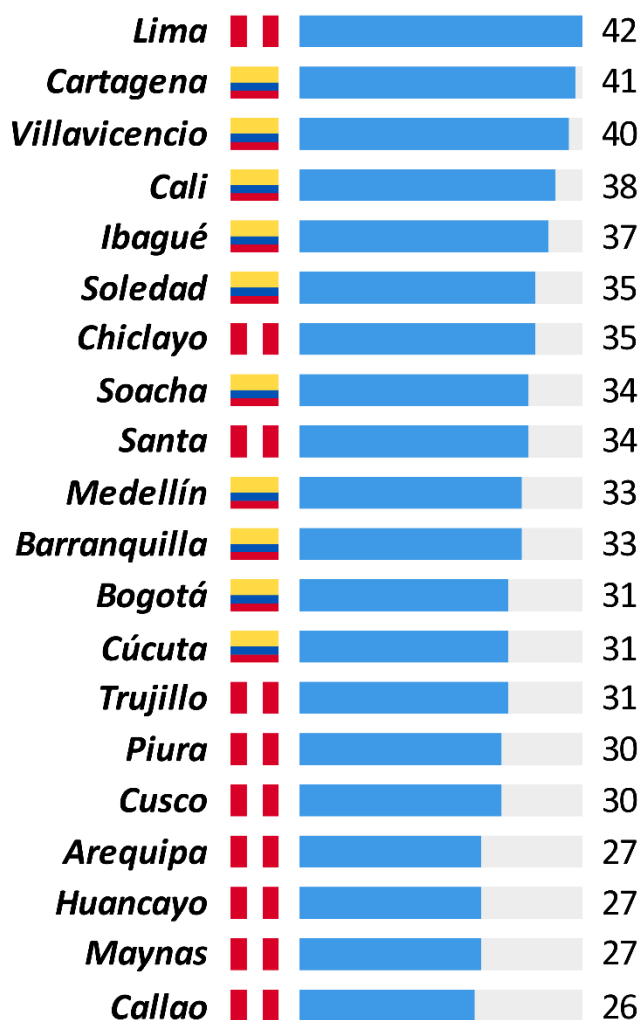
of the screen (the websites) and the dimension behind the screen, in which the human talent that makes the deployment of the offer possible is identified of digital services to the population. The proposal of Gartner (2000) has been taken as a point of reference, in which it is stated that electronic government is not a dichotomous phenomenon, but rather that it develops in an evolutionary way through different phases that can demonstrate its maturity. For operational purposes, the evaluation proposal of the municipal services of Lara (2019) was considered in which 5 levels of maturity of digital government are indicated:

- At the absent maturity level, we find that the services have not started the digitization process on the websites yet.
- The initial maturity level represents that the services are just beginning the digitization process on their websites.
- The level of development maturity means that the services still do not meet the minimum required in digitization.
- The defined maturity level shows that the services meet the minimum required in digitization.
- The managed level represents that the services are at the highest level of digital government maturity.

Taking into consideration the Reilly approach (2004), the research has focused on the provision of services, so it is recommended to approach the study of transparency and the possibilities of citizen participation in future research. It is concluded that on average the municipalities of Colombia are better managed digitally compared to the municipalities of Peru. However, in graphic 3 we can see that the one who leads the ranking in the present analysis is the mayor's office of Lima-Peru, having a total of 42 points, which shows an excellent management of digital services on the web. Next, we find the mayoralties of Colombia. The last 7 boxes in the ranking belong to the Peruvian mayors, which reflects on average a greater maturity of the digitization of services in the Colombian mayors and a high rate of digital absenteeism in the Peruvian mayors.

Graphic 3

Ranking of municipalities by level of maturity of the digitization of the services of the Colombian and Peruvian municipalities



Source: own elaboration

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