Digital communication and the city. Analysis of the websites of the most visited cities in the world in the COVID-19 era

Comunicación digital y ciudad. Análisis de las páginas web de las ciudades más visitadas en el mundo en la era de la COVID-19

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ABSTRACT
Nowadays, cities are competing to become the global community's choice in investment, trade, tourism, and partnerships. In this context, the redefinition of their communication strategy, especially at the digital level, has become an urgent challenge. On the other side, COVID-19 has directly impacted all facets of life and, particularly in the world of travel and tourism, has transformed into a communication crisis for cities. On this basis, this paper, using a methodology already proven on websites of different thematic areas, presents a descriptive, explanatory, and exploratory research on the websites of the 26 most visited cities in the world. Conceiving websites as the nerve center of cities communication strategy, the study has applied an analysis tool based on six variables (usability, interactivity, information offered, content typology and updating, social networks and transmedia content, and accessibility) and

organized around 75 thematic categories. This made it possible to deepen among other topics, on how the city is shown through its digital channels, what and how it tells the story, and, very relevantly, how cities have tackled COVID-19 related information on their websites. The research highlights, among other aspects, a trend towards the mediatization of processes following routines typical of cybermedia, warning of the need to increase the role of websites as informative spaces on COVID-19.

Keywords: Most visited cities; City communication; Websites; Cybermedia; Tourism; COVID-19; Digital communication.

RESUMEN
Hoy en día, las ciudades compiten por convertirse en la elección de la comunidad mundial en materia de inversiones, comercio, turismo y asociaciones. En este contexto, la redefinición de su estrategia de comunicación, especialmente a nivel digital, se ha convertido en un reto urgente. Por otro lado, la COVID-19 ha impactado directamente en todas las facetas de la vida y, particularmente, en el mundo de los viajes y el turismo, se ha transformado en una crisis de comunicación para las ciudades. Basados en esto, el presente trabajo, utilizando una metodología ya probada en sitios web de diferentes áreas temáticas, presenta una investigación descriptiva, explicativa y exploratoria de los sitios web de las 26 ciudades más visitadas del mundo. Concibiendo los sitios web como el centro neurálgico de la estrategia de comunicación de las ciudades, el estudio ha aplicado una herramienta de análisis basada en seis variables (usabilidad, interactividad, información ofrecida, tipología y actualización de contenidos, redes sociales y contenidos transmedia, y accesibilidad) y organizada en torno a 75 categorías temáticas. Esto permitió profundizar, entre otros temas, en cómo se muestra la ciudad a través de sus canales digitales, qué cuenta y cómo lo cuenta y, de forma muy relevante, cómo las ciudades han abordado la información relacionada con la COVID-19 en sus webs. La investigación destaca, entre otros aspectos, una tendencia a la mediatización de los procesos siguiendo rutinas propias de los cibermedios, advirtiendo de la necesidad de incrementar el papel de las webs como espacios informativos sobre la COVID-19.

Palabras clave: Ciudades más visitadas; Comunicación de la ciudad; Websites; Cibermedios; Turismo; COVID-19; Comunicación digital.

1. Introduction

Nowadays, cities are competing to become the global community's choice in investment, trade, tourism, and partnerships (De San Eugenio-Vela et al., 2020), therefore they increasingly need to develop efficient communication tools, enabling them to project a positive image (Qi, 2021; Ünüvar et al., 2019) and allowing them to connect them with multiple stakeholders (Mansilla & Milano, 2019).

In particular, in a context marked by a growing mediatization of society (Pérez-Tornero, 2020; Hjarvard, 2017), the use of Internet and digital technologies has radically revolutionized communication: social media technologies have led to a change in the control of content creation processes, from a Web 1.0 mainly controlled by organizations towards the more inclusive approach of Web 2.0, which to a large extent is an expression of interaction and participation of the end user (Cervi, 2019). Cities, like any other entity, therefore, have to adapt their communication strategies to the particularities of the new scenario (Kavaratzis & Kalandides, 2015; Novy & Colomb, 2019).

According to many authors, such as Vinyals-Mirabent et al. (2019) Vilenskii & Smirnova, (2020) and Gretzel et al. (2020), although digital communication is composed of a wide range of strategies, web pages should considered the main information space and the reference point in cities' communicative strategies.

On the other side, the planetary COVID-19 pandemic that has impacted all facets of people's daily lives – from social interaction habits (Prime et al., 2020) to new mental health issues (Kola et al., 2021) – completely changing global economy (Keshky et al., 2020), not only has shown its main repercussions in the field of travel and mobility (McKibbin & Fernando, 2020) generating a global "travel fear" (Zheng et al., 2021) that has generated massive loss, especially in the tourism sector (Global Tourism Economy Research Centre, 2020; World Tourism Organization, 2020), it has also engendered what the World Health Organization has defined an "infodemic" (Eysenbach, 2020) characterized by rumors and misinformation (Kumar & Nayar, 2020) and a climate of growing uncertainty and distrust, that have forced institutions to tackle these events from a crisis communication perspective (Hantrais et al., 2020).

1.1. City branding

It is known that the concept of brand, understood as the symbolic representation of companies that reflect the core values and philosophy of organizations against competitors (Anholt, 2006) can also be applied to places (Keller & Richey, 2006).

Currently, more and more cities are striving for branding and marketing themselves to attract investors, tourists, residents and workforce (Kavaratzis, 2005; Hospers, 2010), therefore city branding represents one of the key features of contemporary global urban economy (Amore & Roy, 2020; Amore, 2019), and has become a much-researched feature in urban tourism (Pearce, 2015).

According to Pasquinelli et al. (2021), branding conceptualizations can be summarized into two macro-areas of scholarship: the first is focused on brand planning and communication, based on the design and projection of the competitive identity and aimed to raise interest and attract tourists and place users through differentiation and uniqueness (Qu et al., 2011); the second signals progressive attention to a stakeholder-based view of place brands with a focus on the analysis of open, social, and shared, multidirectional processes creating the meanings of the place brand, which is conceived as in constant change and evolution (Kavaratzis & Kalandides 2015; Anholt, 2007).

Aligning with this second understanding, we consider that cities can use branding as a way to unite relevant stakeholders around new competitive urban identities (Mansilla & Milano, 2019) and communicate their message to target audiences (Gilboa et al., 2015), acknowledging that there is mounting concern as to whether city marketing actually fulfils its purpose (Heeley, 2015).

As previously mentioned, websites are gradually establishing as the fundamental tool for communication (Gretzel et al., 2020), both towards the exterior (companies, general public) and the interior (Vinyals-Mirabent et al., 2019; Vilenskii & Smirnova, 2020) allowing the provision of a complete and homogeneous set of information concerning both the overall characteristics of the city, opportunities, description of support systems, etc.

At the same time, tourism and management literature alike (Ugur & Akbıyık, 2020) are drawing increasing attention to the pandemic impacts on cities, identifying crisis management and crisis communication as the fundamentals to steer emotional attachment with stakeholders (Hang et al., 2020): along the same line, we understand that cities website should be the embryonic core (Tejedor et al., 2022) for crisis communication, in this case for the communication of content related to COVID-19.

In this sense, agreeing with De San Eugenio-Vela et al. (2020), we understand that city branding is rather distant from corporate branding, especially when it comes to crisis communication, since, as already underlined by Anholt (2010) it should always embed a long-term strategy of local development, combining market forces with the particular interests of local human capital.

2. Objectives

Based on what we have seen, we understand that the cities are facing the double challenge to adapt their communication strategies to the new media landscape and to face this unexpected pandemic from the organizational (Rawaf et al., 2020; Sharifi & Khavarian-Garmsir, 2020) and communicative perspective (Górska et al., 2022; Caldevilla-Domínguez et al., 2021). Aligning with Ritchie and Jiang (2019) and McCartney et al. (2021) who advocate that future research should not only investigate cities capabilities to emerge from a crisis, but also the ability to create future opportunities (Sigala, 2020) and resilience (Filimonau & Coteau, 2020), this research analyzes the websites of the 26 most visited cities in the world to display their main characteristics, communicative resources, strength and weaknesses, deepening on how they deal with COVID-19 related information. In this sense our study not only contributes to the broader knowledge about cities digital communication strategies but is also timely, as it engages with the current 'intrapandemic' era debate about city resilience (McCartney et al., 2021).

3. Methodology

To determine the sample of city websites to be analyzed, three of the most influential rankings (Nathaniel & Adedoyin, 2020) have been selected - Euromonitor's International 100 City Destinations, Mástercard's Global Destination Cities Index and Statista's World Ranking of the 20 most visited cities- acknowledging that they identify the most visited cities in the world, using different criteria:

The first one includes data on international travelers visiting a city for at least 24 hours and excluding domestic visitors, day-trippers and cruise passengers. Since in 2020, due to COVID-19, no winners were published, we use data from 2019.

Mastercard's Global Destination Cities Index ranks 200 cities based on a proprietary analysis of publicly available visitor volume and spending data. As in the previous case, the latest study published by the Global Destination Cities Index dates from 2019.

The top 20 positions in this ranking exactly match, both in order and in numbers, the Global Ranking of the 20 most visited cities by international tourists in 2018, published by Statista in September 2021, which has been selected for the availability of the data.

In order to take advantage of the data from each of these rankings, we proceeded to create a list that includes all the cities that each one presents in its top 20. After merging the first 20 places of each of the rankings, the following list containing 26 cities has been obtained (Table 1). It is worth mentioning that the order followed in this list is random.

Table 1. *Worldwide most visited cities*

	City	Country	WebPage
1	Hong Kong	Hong Kong, China	https://www.gov.hk/en/residents/
2	Bangkok	Thailand	https://main.bangkok.go.th/
3	London	United Kingdom	https://www.cityoflondon.gov.uk/
4	Macau	Macau, China	https://www.gov.mo/en/
5	Singapure	Singapore	https://www.gov.sg/
6	Paris	France	https://www.paris.fr/

7	Dubai	United Arab Emirates	https://www.dm.gov.ae/
8	New York City	US	https://www1.nyc.gov/
9	Kuala Lumpur	Malaysia	https://www.dbkl.gov.my/
10	Istanbul	Turkey	http://www.istanbul.gov.tr/
11	Delhi	India	https://delhi.gov.in/
12	Antalya	Turkey	http://www.antalya.gov.tr/
13	Shenzhen	China	http://www.sz.gov.cn/en/
14	Mumbai	India	https://mumbaicity.gov.in/
15	Phuket	Thailand	https://www.phuket.go.th/webpk/default.php
16	Rome	Italy	https://www.comune.roma.it/web/it/welcome.page
17	Tokyo	Japan	https://www.metro.tokyo.lg.jp/english/index.html
18	Pattaya	Thailand	https://pattaya.go.th/
19	Taipei	Taiwan, China	https://english.gov.taipei/
20	Mecca	Saudi Arabia	https://mecca.net/
21	Seoul	South Korea	http://english.seoul.go.kr/
22	Osaka	Japan	https://www.city.osaka.lg.jp/
23	Milan	Italy	https://www.comune.milano.it/
24	Barcelona	Spain	https://www.barcelona.cat/es/
25	Palma de Mallorca	Spain	https://www.palma.cat/portal/PALMA/home.jsp?codResi=1
26	Bali	Indonesia	https://www.baliprov.go.id/web/

Source: Own elaboration.

The study, as previously stated, aims at answering the following research questions:

1. What are the defining characteristics of the websites of the most visited cities in the world in terms of content and access to information, visibility and usability?
2. What structural or content strengths and weaknesses are identified in these websites?
3. What interactive resources play a prominent role?
4. What kind of connection exists with other types of platforms, especially with social networks?
5. How do these website deal with COVID-19 related information?

In order to do so our research follows the Horus methodological approach, which has already been successfully tested in other areas (Tejedor et al., 2020), as it inscribes itself within the broader "Horus Project: Diagnosis of websites according to thematic areas", promoted by the Gabinete de Comunicación y Educación (2005SGR00520) to analyze the characteristics of different websites.

Specifically, the research, grouncded on previous methodological framework built by Codina (2000; 2003), Tejedor (2010), Calvo-Calvo (2014) Cobos & Recoder (2019) and Codina & Pedraza Jiménez (2016) identifies six main variables (see Table 2): usability, interactivity and relationship with users, information presented, content typology and updating, presence in social networks and transmedia content strategy, and accessibility. The variables are analyzed through 75 indicators (see Table 3), which has been assessed by three coders using binary scoring (0/1) noting the presence or absence of specific items, with 0 being "no" and 1 for "yes".

A first intercoder reliability test was implemented on a subset of the data (10%) to identify codes that required refinement. The final intercoder reliability test, applied to the full dataset, met the kappa >0.80

standard for all the variables (Cohen, 1960). In addition, the web analysis dedicates a special section to the analysis of the information referred to the COVID-19 pandemic on cities websites.

Table 2. *Research Variables and description*

	Research variable	Variable description
1.	Usability	Intuitive handling and easy navigation through the page.
2.	Interactivity and relationship with users	Types of virtual exchanges between the city's website and Internet users.
3.	Information offered	Presence or not of relevant information for the user (about the city and about the website). 3.1. Information on COVID-19. Focus on information about COVID-19 because of its impact on life and tourism in the cities.
4.	Content typology and updating	Types of content published and frequency of publication.
5.	Social networks and transmedia content	Presence in social networks and transmedia content strategy
6.	Accessibility	Capacity of the website to respond effectively to users with special needs.

Source: Own elaboration.

Table 3. *Research variables of study and indicators stablished for each one*

Research variable	N.	Indicators for Each Research Variable	Value
Usability	1	Website download time less than 5 s with ADSL	0/1
	2	Keeps the main navigation menu visible on every page	0/1
	3	There is a content search tool on the website	0/1
	4	They size, format and/or download time of the file are indicated	0/1
	5	There are external links to other websites	0/1
	6	There are internal links to other sections of the city's website	0/1
	7	The links describe the URL or name of the linked website	0/1
	8	There is a site map	0/1
	9	The platform allows to choose between different languages	0/1
	10	Responsive Web Design	0/1
	11	Mobile First	0/1
Interactivity and relationship with users	12	There is an e-mail address for enquiries or request for general information	0/1
	13	Telephone number, postal address and/or fax number for general information are available	0/1
	14	There is e-mail for the request/consultation with the services of the city government	0/1
	15	Telephone number, postal address and/or fax number for information about city government departments are available	0/1
	16	There is a suggestion box	0/1
	17	The is the possibility of making an appointment through the website to carry out city government formalities	0/1
	18	Option to carry out procedures online	0/1
Information offered	19	There is access information to the city government building (address and/or location map)	0/1
	20	There is a map of the city government building (buildings, floors)	0/1
	21	There is a government presentation (governor's charter, vision, mission)	0/1
	22	There is a presentation of the government organization chart	0/1
	23	Identification of staff in the different areas with job title and name	0/1

	24	Annual report(s) of the city government are presented	0/1
	25	There is a portfolio of government services by area	0/1
	26	There is a section or space dedicated to COVID-19	0/1
	27	There is a section or information that serves as advice for the citizens and/or tourists	0/1
	26	Information for the user about activities in the city is offered	0/1
	29	There is a section with government, city, or general interest news	0/1
	30	There is a press or government communication section	0/1
	31	Citizen guides are provided	0/1
	32	There is information about how to arrive to the government offices (transport means)	0/1
	33	There is information about opening hours	0/1
	34	There is information about the rights and duties of the web user	0/1
	35	There is information about the Customer Service Department	0/1
	36	There is information about cafeterias, opening hours and location	0/1
	37	There is information about how to make a complaint or suggestion	0/1
	Information on COVID-19		
	38	Information on COVID-19 is present but it does not take up significant space	0/1
	39	Information on COVID-19 takes up significant space and/or there is a full section on the subject	0/1
	40	A complete webpage on COVID-19 has been created (linked to its website)	0/1
	41	There is information on the User Support Service	0/1
	42	Information displayed is up to date	0/1
	43	Information is displayed in interactive formats	0/1
	44	Exclusive communication channels for COVID-19 enquiries are available	0/1
	45	The entry requirements for the city/country related to COVID-19 are exposed	0/1
	46	The specialized information on tourist entry distinguishes between types of trips	0/1
	47	The specialized information on tourist entry distinguishes between country of tourist origin	0/1
	48	The requirements are displayed on the same page	0/1
	49	The requirements are displayed through a link that redirects to the website of another institution	0/1
	50	The rules valid in the city/country related to COVID-19 are provided	0/1
	51	The current rules are displayed on the same page	0/1
	52	The current rules are displayed through a link that redirects to the website of another institution	0/1
Content typology and updating	53	There is an update website date	0/1
	54	Information updated less than one month from date of review	0/1
	55	Keywords are highlighted in bold	0/1
	56	The is textual content	0/1
	57	The is photographic content	0/1
	58	The is audiovisual content	0/1
	59	The is audio content (podcast)	0/1
	60	There is multimedia content	0/1
	61	There are 360º videos or photographs	0/1
	62	There is augmented reality content	0/1
	63	There is gamified content	0/1
	64	There are forums or chats	0/1
	65	The content can be promoted on social networks	0/1
	66	There is an option for comments	0/1
	67	There is the option to subscribe to a newsletter	0/1
Social networks and transmedia content	68	The city government is present in some social network and there are links to it/them form the website	0/1
	69	The city government has a Facebook account	0/1
	70	The city government has a Twitter account	0/1
	71	The city government has an Instagram account	0/1

|	72	The city government has a YouTube account	0/1
	73	The city government has a TikTok account	0/1
	74	There is a transmedia strategy	0/1
Accessibility	75	From Web Accessibility Test (TAW)	0/1

Source: Own elaboration from Codina (2000; 2003), Tejedor (2010),
Calvo-Calvo (2014) and Cobos & Recoder (2019).

4. Results

4.1. Usability

As shown in Figure 1, we can see that "Usability" is an aspect that has a high percentage of compliance by the websites that make up the sample. The nine variables analyzed are fulfilled, at least, by more than half of the websites. The aspects of presence of internal links to other sections of the city governance website and the fact that the links describe the URL or the name of the linked website stand out as being fulfilled by 100% of the websites.

Figure 1: *Web pages' usability analysis*
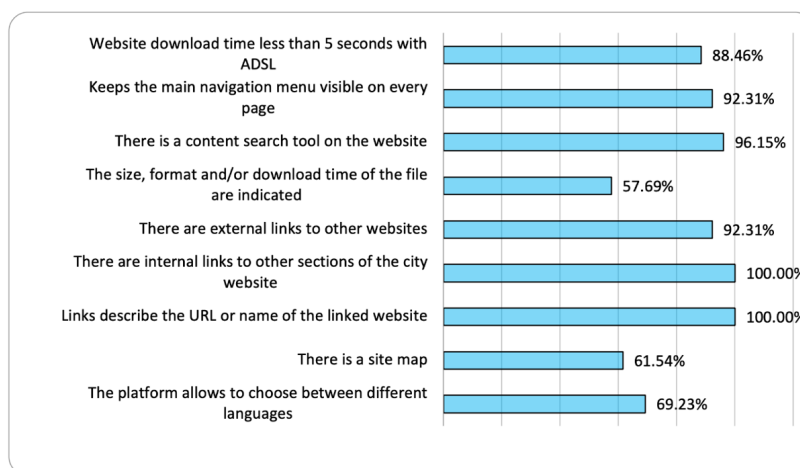
Source: Own elaboration.

Also noteworthy is the high percentage of websites that include the content search tool (96.15%), which allows users to make their navigation more useful and faster. A particular case in this regard is the website of the Dubai city government, which allows content search through audio (Figure 2).

Figure 2: *Dubai's system of voice search*
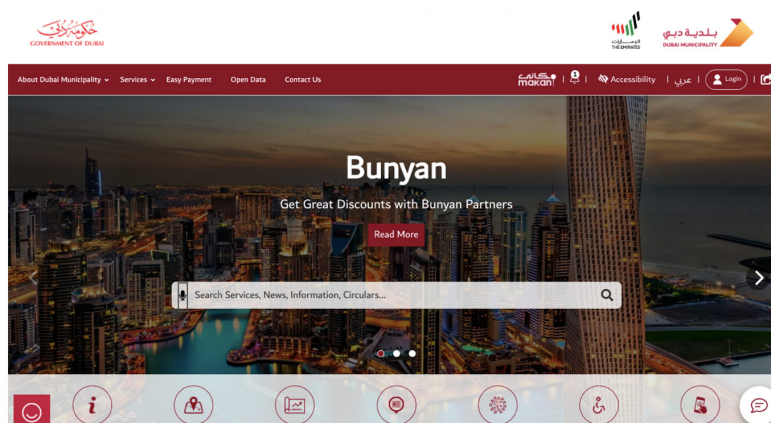
Source: https://www.dm.gov.ae/

In terms of "Usability", the use of external links to the website and that the main navigation menu is kept open on all pages also stand out with 92.31% of the websites that do so. Also with a high percentage, most of the websites (88.46%) have a download time of less than 5 seconds with DSL.

It is also important to highlight that 69.23% of the analyzed website allow to choose between different languages, a vital aspect when dealing with the websites of the cities that receive the most tourists worldwide. In a slightly lower percentage, 61.54% of the websites have a site map. This point is considered relevant for websites so that the user does not get lost among the large amount of content they can offer. Finally, 57.69% of the websites indicate the size, format and/or download time of the files they host.

Finally, we have observed that all the analyzed web pages use Responsive Web Design (RWD). RWD is an approach that considers that design and development should respond to the user's behavior and environment based on screen size, platform, and orientation (Perakakis & Ghinea, 2017).), in order to enrich the users' experience. Accordingly, all the web pages under scrutiny adapt dynamically and automatically adjust for different screen sizes, proportions, and orientations (Parlakkiliç, (2022).

In the same vein, acknowledging that today two billion people access the internet from their smartphones only. By 2025, that number is expected to jump to 72.5% (Rothe et al., 2022) Mobile-first design, a design philosophy that aims to create better user experiences by beginning the design process with mobile devices in mind first, often prioritizing the smallest of screens, is becoming crucial to all successful web design (Kim et al., 2021). In our study, all the analyzed webpages display a Mobile-first design, revealing that cities understand the importance of mobile communications.

4.2. Interactivity and relationship with users

Regarding "Interactivity and relationship with users", as shown in Figure 3, it was found that most of the analyzed websites (92.31%) provide contact data such as telephone, postal address and/or fax of general information of the city governance. However, when it comes to providing the same data, but for specific areas of city governance, the percentage is lower (69.23%). Likewise, 69.23% of the websites provide the mail for consultation or request of general information, while 57.69% provide the mails for request or consultation with the specific services of the city governance.

Figure 3: *Analysis of interactivity and relationship with users*
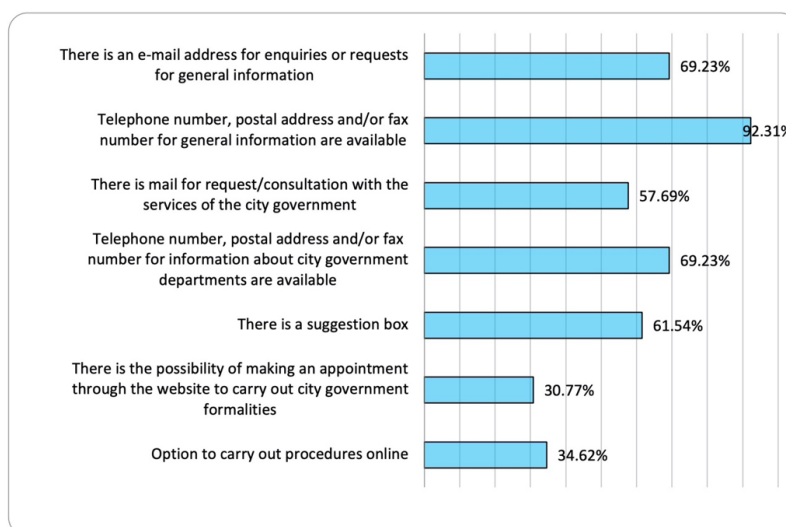
Source: Own elaboration.

It is worth noting that more than half of the websites analyzed (61.54%) offer a suggestion box. One of the websites that works very well in this aspect is the Kuala Lumpur governance website (Figure 4), which has developed a specific space where users can provide feedback on the website.

**Figure 4:** *Users' feedback space in Kuala Lumpur web*

Source: https://www.dbkl.gov.my/

Another aspect of "Interactivity and relationship with users" analyzed was the possibility of requesting an appointment through the website to carry out procedures in the city government, which showed that only 39.77% of the websites do so. Finally, it was also found that, with respect to the possibility of doing procedures online, this is only available on 34.62% of the websites. The Paris governance website is a good example of these points analyzed, as it allows some procedures to be carried out online and also some payments.

4.3. Information offered

In relation to the "Information presented" on the websites analyzed (Figure 5), it was found that 80.77% of them present access data to the city government building, such as the exact address. However, only some (11.54%) show the map of the government building, thus providing information that helps citizens to better locate themselves within the place.

Figure 5: *Analysis of the information offered*
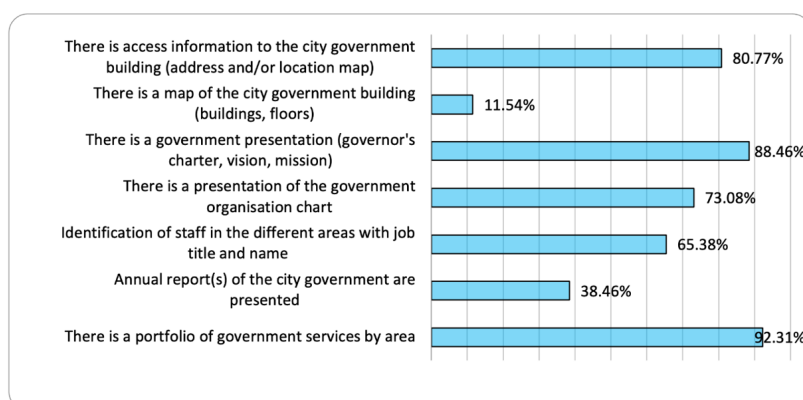
Source: Own elaboration.

Figure 5 also shows that almost all the websites analyzed (92.31%) show the portfolio of services offered by the city government by area. In addition, most of the websites (88.46%) make a presentation of the city government, either through a governor's letter, the description of the institution's mission and vision, etc. Likewise, 73.08% of the websites offer the government's organization chart, and in a lower percentage (65.38%) present the personnel of the different areas with position and name. It was also found that only 38.46% of the websites present the annual report/s or report/s of the city government, with this percentage we are facing an exercise of transparency that is lacking.

Figure 6: *Analysis of the information offered (II)*
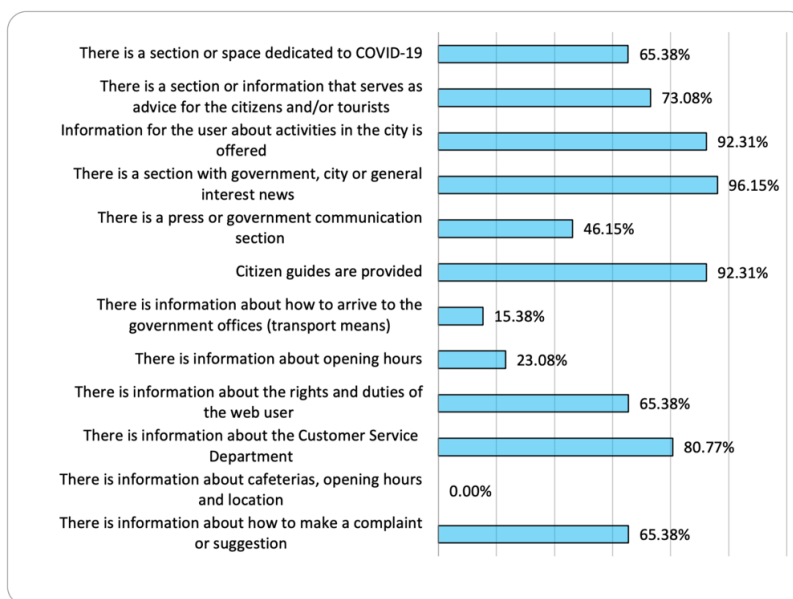
Source: Own elaboration.

Continuing with "Information presented", Figure 6 shows that almost all of the websites (96.15%) host a section on government news, city news or other topics of general interest to citizens. It is also seen that the majority (92.31%) offer information that serves as a guide for citizens. In the same percentage 92.31% of the websites provide information on the activities taking place in the city, an example of this is the website of the government of Barcelona, which uses a dynamic graphic to present this data (Figure 7).

Figure 7: *Presentation of the activities of the city of Barcelona through a dynamic graphic*

Source: https://www.barcelona.cat/es/

Figure 6 also shows that a large number of websites (80.77%) present information on user services provided by the city government. In a smaller percentage, 70.83% of the websites have a section or provide information that serves as advice for their citizens or tourists. In addition, 65.38% provide information on how to make a complaint to the city government or give it a suggestion. And in the same percentage (65.38%), there are many websites that allow the user of the website to know what their rights and duties are in such digital environment, presenting, for example, their privacy policies.

Figure 8: *Space dedicated exclusively to the publication of information related to COVID-19, developed by the Taipei City Government website*

Source: https://english.gov.taipei/covid19/

Within the information presented by the websites analyzed, it was convenient to identify if they present information related to the Coronavirus pandemic. In this regard, it was found that more than half of the websites (65.38%) dedicate a section to COVID-19 (Figure 6). An example of this is the website of the Taipei city government (Figure 9), which has developed a specific space, linked to the platform, in which it elaborates on the subject, providing numerical data on contagion, policies applied in the city, press releases, among others. We will go into more detail on this topic later on.

Figure 6 also shows that almost half of the websites (46.15%) have a press or communication section of the city government. Below this, 23.08% provide information on office hours. Likewise, only 15.38% provide information on how to get to the offices, showing, for example, the transportation lines. Lastly, none of the web sites provides information related to local cafeterias.

4.3.1 Information on COVID-19

Based on the afore mentioned 65.38% of websites that have a section or section dedicated to COVID-19, the information shown in such spaces was examined in greater depth (Figures 9 and 12). Thus, it was found that more than half of the group of websites that dedicate a space to COVID-19 (52.94%) have created a complete web page on the topic, which has been linked to the city's website. Examples of this are the Taipei website mentioned above (Figure 9), also the websites of Barcelona, Bangkok, New York, Shenzhen, among others. Of the remaining websites in the group, 47.06% devote a significant amount of space and/or a complete section to the topic, and only 5.88%, although they provide information on the topic, do not do so in a significant amount of space.

Figure 9: *Information on COVID-19 presented on the websites*
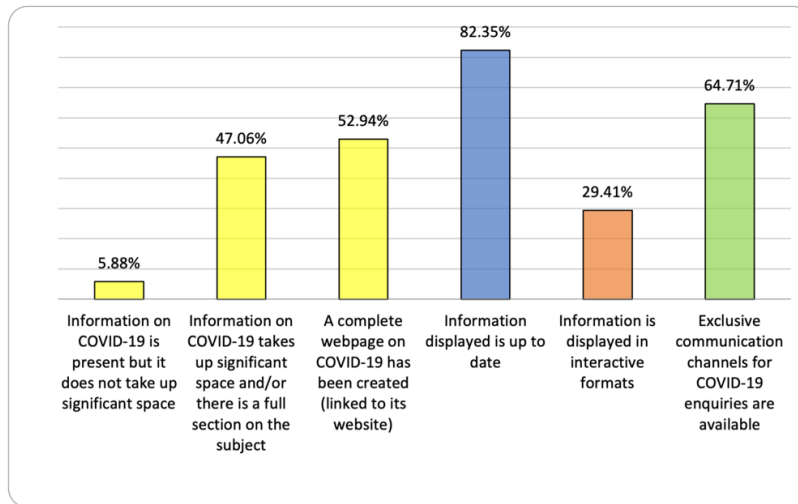
Source: Own elaboration.

Figure 9 also shows that a large part of the group of websites that dedicate space to the COVID-19 topic present updated information (82.35%). Likewise, 64.71% of these websites provide exclusive communication channels for COVID-19 related queries. In this regard, the websites of Singapore and Tokyo stand out, which have developed exclusive chatbots to engage in conversation on the subject (Figure 10).

Figure 10: *"COVID chatbots" developed in Singapore and Tokio's webpages*

Source: https://www.gov.sg/ and https://www.metro.tokyo.lg.jp/english/index.html
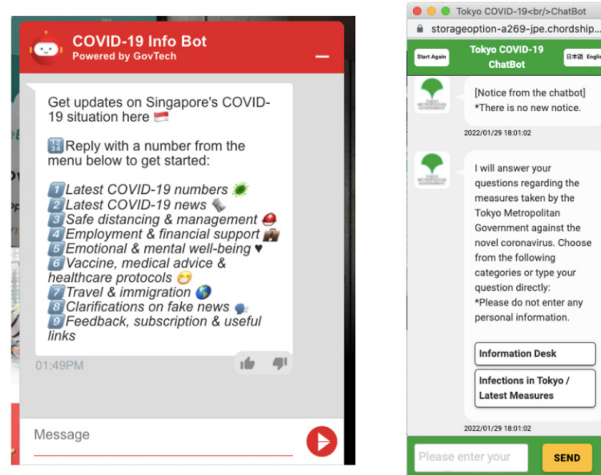
The fact of using digital resources to bring information on COVID-19 closer to citizens is also reflected in the use of interactive graphics by some of the websites (29.41%), as is the case of the website of the city of London (Figure 11).

Figure 11: *Information on COVID-19 in an interactive format on the City of London website*

Source: https://www.cityoflondon.gov.uk/

Within the group of websites that dedicate space to COVID-19, we also analyzed how information related to city/country rules and traveler entry requirements is presented. A sharp contrast was found between the two types of data, as while city/country rules on pandemic protection are displayed on 94.12% of the group's websites, COVID-19 related entry requirements are only visible on 23.53% of the group's websites (Figure 12).

Figure 12: *Information on COVID-19 related to the rules in force in the area and the entry requirements for travelers*
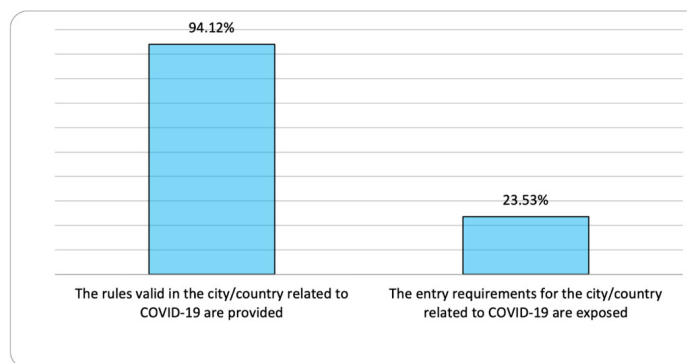

Source: Own elaboration.

We also delved into how each of these two topics are developed. Thus, it was found that of the group of websites presenting the rules in force in the city/country related to COVID-19, the majority (87.50%) developed the information on the website itself, while the remaining (12.50%) only offered links that redirected to websites of other institutions.

Finally, of the group of websites that present the requirements for travelers entering the city/country, 75% distinguish travelers according to their country of origin, as is the case of the Hong Kong website (Figure 13). It was also found that, of this group of websites, only 25% distinguish rules according to

type of travel. Lastly, half of the websites in this group provide information on entry requirements on the same website, while the other 50% only offer links that redirect to websites of other institutions.

Figure 13: *Entry requirements for travelers to Hong Kong published on the city's website*


Source: https://www.coronavirus.gov.hk/eng/index.html
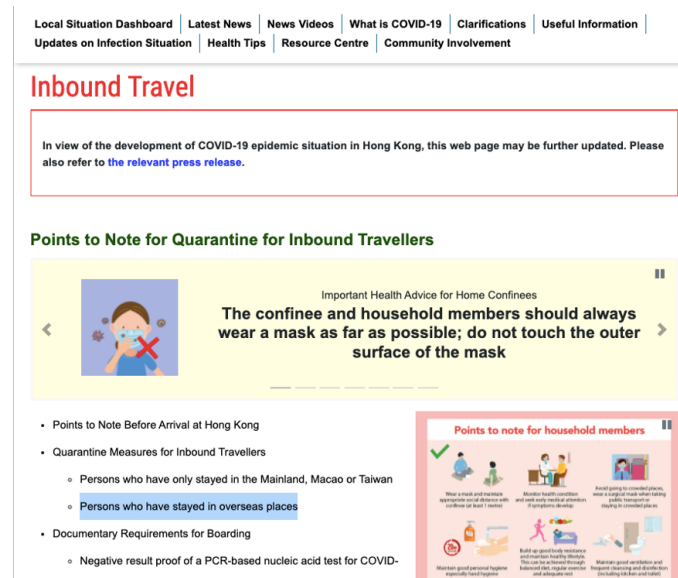
4.4. Content typology and updating

The analysis of the websites in relation to the "Typology and updating of contents" (Figure 14) shows that 92.31% of the websites have updated information that is less than one month old considering the date of revision. However, only 19.23% present the date the website was updated. It was also found that only 38.46% of the websites highlight keywords using bold type, an important resource in the digital environment for text optimization.

Figure 14: *Analysis of the typology and update of the contents of the websites of the city governments*
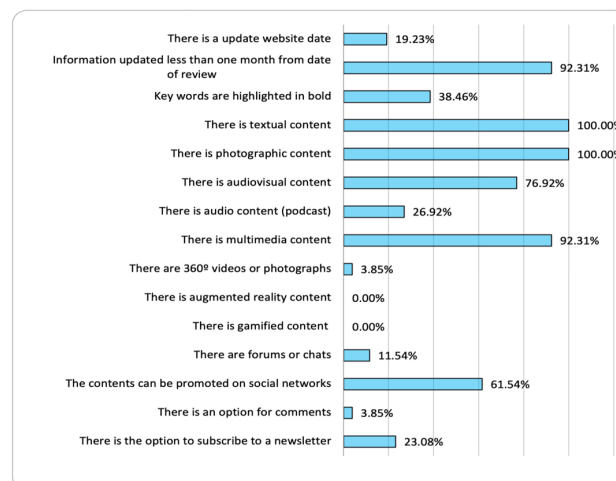
Source: Own elaboration.

In addition to the above, Figure 14 shows that in all the websites analyzed (100%) there is textual and photographic content, basic resources present in digital platforms. In addition, 92.31% host multimedia content, for example, the "Crime Map" hosted on the website of the New York City government (Figure 15).

Figure 15: *"Crime Map", multimedia map hosted on the New York City government website*

Source: https://www1.nyc.gov/
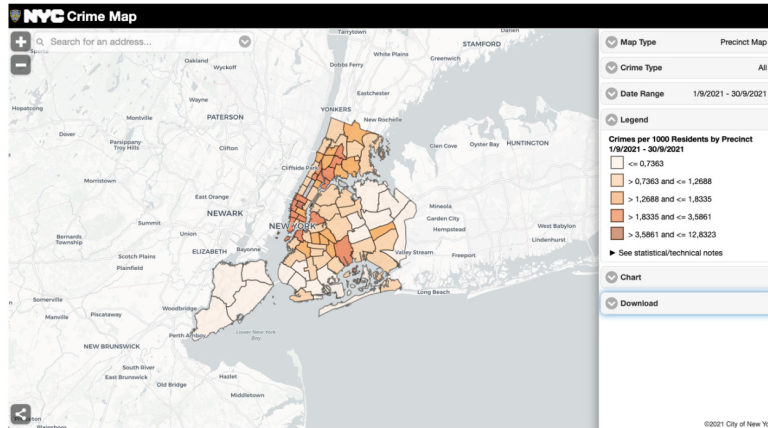
Likewise, in Figure 14 we can see that audiovisual content (videos) is present in 76.92% of the websites analyzed, for example, the website of the government of the city of Rome allows live videos of the sessions of the administration to be viewed. On the other hand, audio content (podcasts) is present in only a quarter of the websites analyzed (26.92%). Forums or chats are only available in 11.54% of the websites; an example of this is the "Bonny" chat on the website of the government of the city of Hong Kong, which provides help in searching for e-government forms and services (Figure 16).

Figure 16: *"Bonny", the Hong Kong city government website chat*

Source: https://www.gov.hk/en/residents/
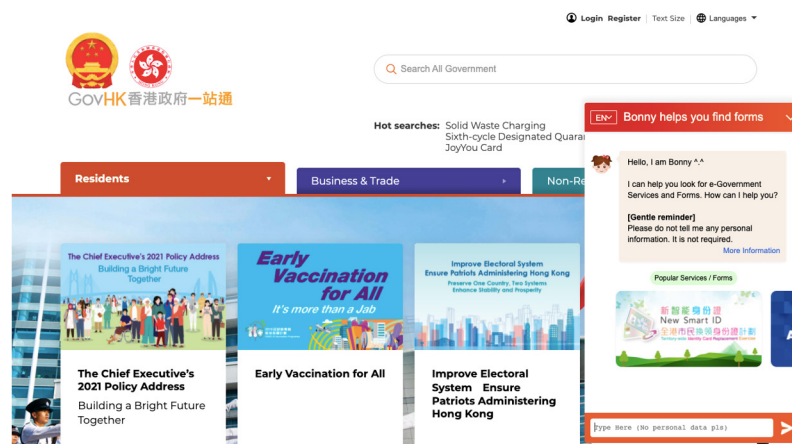
Figure 16 shows that 61.54% of the websites analyzed allow their contents to be promoted through social networks. Below this percentage, 23.08% of websites offer the option of subscribing to a newsletter, as is the case, for example, with the websites of the governments of Milan, Paris, and Rome. It was also found that only 3.85% of websites offer the option of commenting on their publications. In this line, the website of the government of the city of Bangkok (Figure 17), which in addition to allowing comments, offers the option of indicating agreement or disagreement with the content, giving "likes", and the number of views of the publication, stands out.

Figure 17: *Possibility to indicate agreement or disagreement with the published content, option available on the Bangkok City Government website*

Source: https://main.bangkok.go.th/
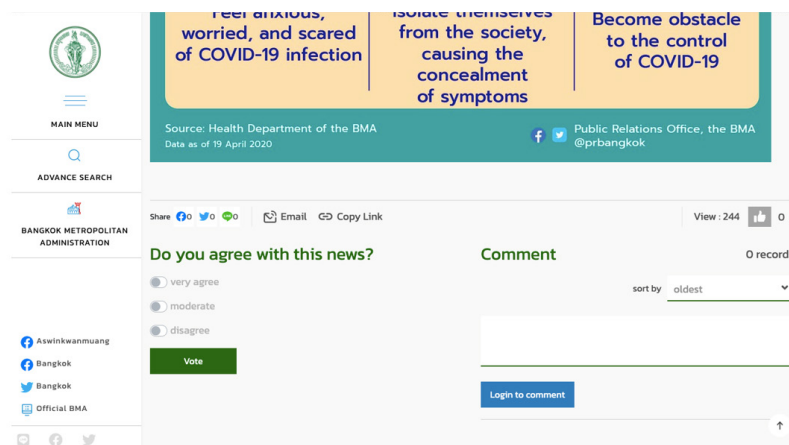
Also in a low percentage, as shown in Figure 14, 3.85% of the websites host 360 videos or photographs. This can be seen in the website of the government of the city of Seoul (Figure 18). And to finish with this section, it was found that none of the websites have gamified content or augmented reality content.

Figure 18: *Presence of 360 videos on the Seoul city government website*

Source: http://english.seoul.go.kr/
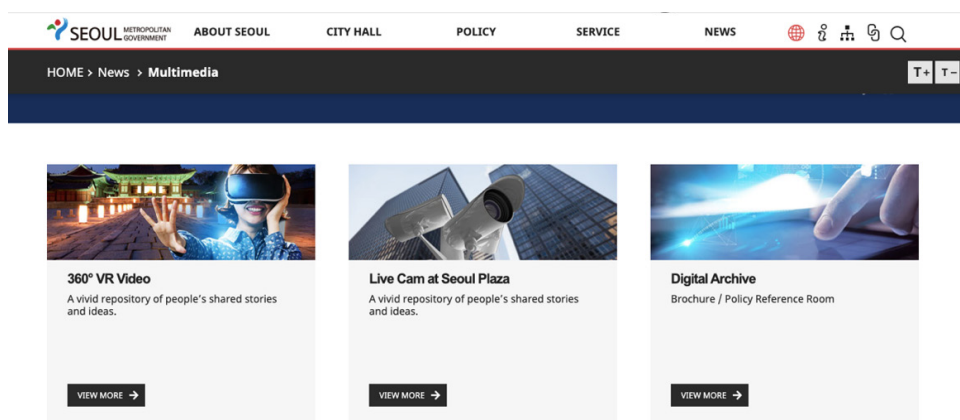
4.5. Social networks and transmedia content

As can be seen in Figure 19, in relation to "Presence in social networks and transmedia content strategy", it was found that most of the websites analyzed (69.23%) are present in some social network and provide links to these from their own platform. This percentage coincides, naturally, with the 69.23% of websites that develop a transmedia content strategy.

Figure 19: *Analysis of the presence in social networks and transmedia content strategy on the websites of city governments*
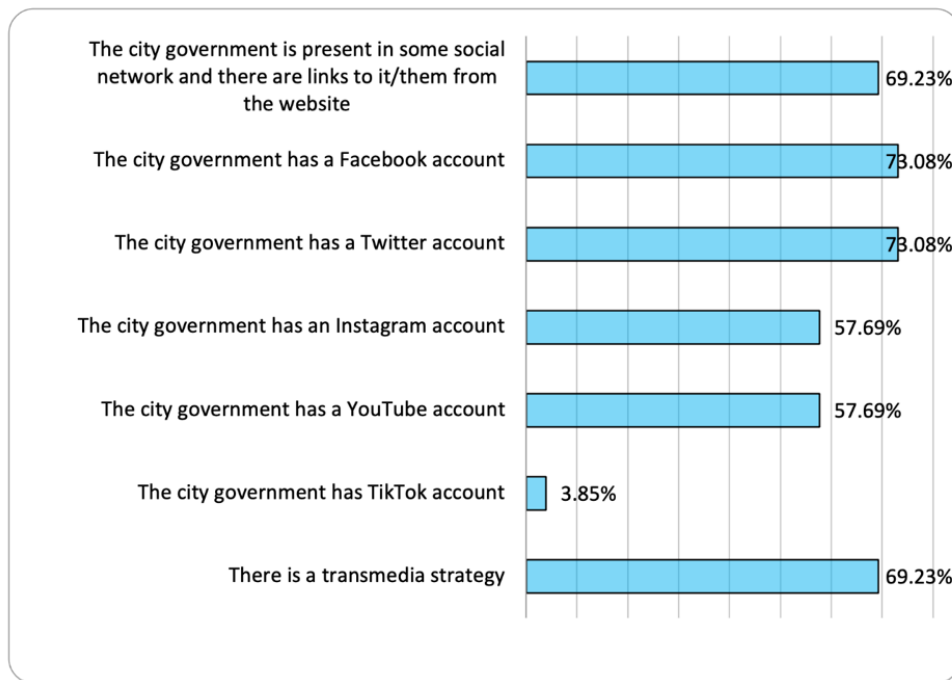
Source: Own elaboration.

Likewise, Figure 19 shows that 73.08% of the websites analyzed have a presence on Facebook and the same percentage (73.08%) on Twitter. It can also be seen that more than half of the websites analyzed (57.69%) have their own channel on YouTube, and the same percentage (57.69%) have a profile on Instagram. However, only 3.85% of the websites have a profile on TikTok, such as the Singapore city government website.

4.6. Accessibility

On the sample of websites, it was applied the automatic Web Accessibility Test (WAT), a tool developed by the Information and Communications Technology Center (http://www.tawdis.net), wich aim is to check the level of accessibility achieved in the design and development of web pages in order to access to all persons irrespective of their characteristics.

According to the results provided by WAT, all the websites analysed have a variable number of problems and warnings, at 'perceivable', 'operable', 'understandable' and 'robust' level (Figure 20). Specifically, where most problems and warnings are detected is at the 'perceivable' level, meaning that information and user interface components on websites are not presented in a way that can be perceived.

Figure 20: *Analysis of accessibility on the websites of city governments*

Perceivable	**Problems**	1982	4986
	Warnings	3004	
Operable	**Problems**	401	2753
	Warnings	2352	
Understandable	**Problems**	491	677
	Warnings	186	
Robust	**Problems**	1220	1812
	Warnings	592	

Source: Own elaboration, according to the results provided by WAT.

At the 'operable' level is where the second most problems and warnings are found, as the user interface and navigation components are not operable. These are followed by problems and warnings at the 'robust' level, meaning that web content is not robust enough to be reliably interpreted by a wide variety of user agents. Finally, although fewer in number, problems and warnings were also detected at the 'understandable' level, as the information and handling of the user interface is not presented in an understandable way.

With all these items identified, the evaluation places the entire sample analyzed in a WAI-AA register, which means that they occupy the intermediate position in the WAT evaluation. It is worth noting that the websites where the fewest problems and warnings were found are those of the city of London (43), Taipei (91) and Tokyo (99); while the websites where the most problems and warnings were detected are those of Mecca (3626), Phuket (1143) and Palma de Mallorca (639).

5. Discussion and conclusions

Our analysis of the websites of the 26 most visited cities in the world contributes to the global understanding of how cities are implementing digital communication strategies by confirming what already pointed out by Vinyals-Mirabent et al. (2019), Vilenskii and Smirnova, (2020) and Gretzel et al. (2020): websites are the core of cities digital communication.

Our study, in addition, allows us to establish a series of conclusions of great value, both for the construction of a general diagnosis of the digital strategy of these platforms and to warn of possible trends in the communicative exploitation of the websites.

As said, firstly, the study detects the great corporate, communicative and functional value that the website has in each analyzed case. The navigation proposals continue to opt for a reading of the screen from a general logic and, as pointed out by Pérez-Tornero (2020), there is a commitment to the mediatization of the processes with the aim of connecting with the target public. The commitment to a permanent main navigation menu that appears available throughout the browsing process, a generalized trend in most of the cases studied, underlines the will to take advantage of the main frame of the screens with contents and allow the user to access from any section to another section of the website. The permanent updating of contents anticipates a tendency to bring these websites closer to the logic of cybermedia (Salaverría, 2017; Tejedor et al., 2020) and underlines a dialogic will.

In this sense we can observe that ICTs are still not fully exploited and technologies such as gamification or more interactive tools are not fully implemented.

Accordingly, future research should deepen on the possibilities of this type of technological development, in a context where Internet user profiles increasingly demand greater protagonism and yearn to be able to participate and immerse themselves in browsing experiences that give them a leading role.

In this sense we noticed, in most cases a lack of interactive governance opportunities that would be particularly helpful for both interior and exterior stakeholders.

Linked to the previous point, cities presence in social networks, especially Facebook, Youtube, Instagram and Twitter, is good. However, the relevance of further study of this type of platforms and, especially, their inclusion within a general strategy that connects them with the main corporate website is once again raised.

Finally, as for the crisis communication aspect related to COVID-19, we can appreciate how cities do not seem fully prepared to create a global strategy to tackle this emergency.

In this sense, not only our results align with previous findings, for example those of Qui and colleagues (2020), but also suggest that cities shoud be place at the center of the fight against a pandemic (Sharifi, & Khavarian-Garmsir, 2020).

Acknowledging thar clearer communication and information dissemination are required to ensure campaigns and public policies are coherent, transparent and contextualized, there is therefore an important lesson to learn: as we have seen in our analysis, the case of Tokyo Singapore stand out and can be considered as best practices. Both Tokyo and Singapore applied the lessons from past pandemics and had the investigative capacities, health systems and, more importantly, used ICTS, such as chatbots, to keep a constant communication flows with citizens.

In this sense, many authors suggest to build and strengthen pandemic preparedness indexes (Kentikelenis & Seabrooke, 2022): we suggest that a pandemic preparedness index at the city level may further assist in strengthening pandemic preparedness and responses. In addition these indexes should focus on communicative tool, and specifically cities' webpages, as the main option to keep citizens informed.

Therefore, we can conclude, together with Gretzel et al. (2020) that cities should make an effort to transform this crisis into an opportunity to develop a new communicative strategy, able to strengthen their relationship with stakeholders by creating a new, more open, dialogic relationship with both visitors and residents.

Future studies, thus, should focus on looking at how applications and technologies used during the COVID pandemic are kept functioning and/or are used for other communicative purposes by cities.

On another level, as pointed out by –among others- Davidson and colleagues (2019) city networks of late have transcended beyond municipal collaborations towards more complex networked governance arrangements that provide cities with significant opportunities.

As such, these new forms of cross-national networking are potentially framing and reframing urban governance and strategy, and the way we conceive of cities, and their policies and politics, in an age of planetary urbanization (Meagher et al., 2021).

Accordingly, if both sharing best practices and connecting local decision makers with other cities to share knowledge, experience and, where possible, resources have become critically important during a crisis: therefore, it is seminal for cities to articulate themselves in networks and/or to exploit the existing networks to organize themselves and offering a more resilient response to the current and (possible) future crises.

As shown by Acuto and Rayner (2016), the potentials of improved coordination mechanisms across cities could provide platforms for urban centered strategies on responding to pandemics.

The C40 network, established in 2005 with 95 affiliated cities in 2022, to address the effective delivery in urban-focused climate initiatives' has acted as a catalyst to help cities interact with others collectively (Acuto & Rayner, 2016) make a perfect example: during COVID-19 pandemic C40 launched a dedicated COVID-19 portal that includes a knowledge hub to better support city governments through knowledge sharing, dissemination, and peer networks.

6. References

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