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STRATEGIC DIGITAL CITY: A Survey in the Southeastern Brazil Capital Cities

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ABSTRACT
Cities and their citizens connect through information and public services, and municipal strategies and information technology resources can strengthen urban social relations. The objective is to analyze city strategies, city information, transactional public services, information technology resources, and their relationship with strategic digital city projects. The research methodology included a survey with citizens of the four Southeastern Brazil capital cities: Belo Horizonte, Rio de Janeiro, São Paulo, and Vitória. Results revealed 718 non-formal components of a strategic digital city with variations that reflect the identities of each city. The research points out that the four cities have city strategies, city information, public services, and IT-based resources meeting the requirements to be regarded as strategic digital cities. The conclusion reiterates the relevance of city strategies and democratization of the use of city information.
Keywords: Strategic digital city; city strategies; city information; public services.

INTRODUCTION

Cities and their citizens connect through information, public services and information technology. Technological resources extend beyond borders, allowing city strategies, city information and public services to be available in the daily life of citizens, and keeping them operating accordingly is a challenge posed by a fast-paced increasing population growth in urban areas. In this context, the response to the needs of citizens should be mandatory in city management programs. In increasingly complex and digital urban structures, information technology permeates the city management, making it more dynamic, interactive and democratic, since it facilitates the access to and use of information (ULTRAMARI, 2006; SOROKINE et al., 2016; BARTH et al., 2017).

Humanity has been changing consequent to the use of new information technologies, and the application of knowledge and information to create new knowledge is the key-factor for this ongoing dynamic cycle (CASTELLS, 2002). The city, which carries the aspirations of its citizens, uses information technologies to interact and give vent to their needs. Technologies can drive the dynamics of cities beyond their physical and formal boundaries by extracting valuable information from data, which provide long-term sustainability and the creation or optimization of services for their citizens

(LONGO, 2011; SOROKINE et al., 2016). As such, the digital environment is capable of processing large volumes of data autonomous and intelligently, taking advantage of opportunities granted by an extensive network of connected devices and virtualizing the relationships among the city's public services (CASTELLS, 2002; GUERREIRO, 2006; REZENDE, 2012; JARA; BOCCHI; GENOUD, 2013; SOROKINE et al., 2016; ZHANG et al., 2017).

In the digital and strategic contexts of cities, data are drawn from multiple sources and at different levels of management, the availability of services and their capacity for integration emerge as necessary strategic resources for the city. (SOROKINE et al., 2016; BARTH et al., 2017).

The research problems are also related to public administration inefficiency, lack of incentives, problems with obtaining information about citizens' preferences (SILVA; SILVA, 2017), besides the insufficient or non-existent formalization and planning of city strategies, city information, and municipal public services using information technology resources (REZENDE, 2012; REZENDE et al., 2014; REZENDE; PROCOPIUCK; FIGUEIREDO, 2015; REZENDE, 2018).

With the approval of the law on access to information, Brazil has been consolidating its democratic system, thereby expanding citizen participation and strengthening municipal information management (BRASIL, 2011). However, legal concepts of territorial delimitations and boundaries do not limit the urban space, as the city is a concrete and material space of social relations bound by the legal designation of a common space while the urban space is an abstract dimension, the political stage where citizens perform their roles. Thus, the legal regulation on access to public information does not address the definition of urban limits and is attributed to the municipality or city. This is interpreted in different ways in managing strategies (ROLNIK, 2001; DA SILVA, 2004; GUERREIRO, 2006; MENDEL, 2009; REZENDE, 2012; REZENDE, 2018; ULTRAMARI, 2006; REZENDE; PROCOPIUCK; FIGUEIREDO, 2015).

In the city that ceases to be only physical and becomes digital, the flow of information plays an important role, going beyond the idea of merely creating an official Website to turn the physical city into a digital city. For this, the integration of city strategies, city information, and public services through information technology is required (GUERREIRO, 2006; LONGO, 2011; PAZALOS; LOUKIS; NIKOLOPOULOS, 2012; DAMERI, 2012; REZENDE; PROCOPIUCK; FIGUEIREDO, 2015; FLORES; REZENDE, 2018).

Another challenge for public managers is the effective use of information technology aligned with public strategies, government objectives, and citizens' expectations, helping to strengthen democratic governance through citizen participation in public policy making (REZENDE, 2008; CUNHA, 2010; ANGELIDOU, 2015; ORTIZ et al., 2016; KUMMITHA; CRUTZENB, 2017; WEST, 2018), and not all cities provide citizens with IT-based information and public services based on municipal strategies previously planned and managed (REZENDE, 2012; REZENDE; PROCOPIUCK; FIGUEIREDO, 2015). Moreover, there is a need to understand how scientific and technological evolution contributes or not to the well-being of society as a whole (DOS SANTOS et al., 2017).

The objective is to analyze city strategies, city information, public services and information technologies and their relation with strategic digital city projects in the capital cities of Southeastern Brazil. The following cities were surveyed: Belo Horizonte, Rio de Janeiro, São Paulo, and Vitória.

The research is justified by the scientific gap in identifying city strategies and information, and public services that use information technology in order to meet criteria that enable classifying cities as strategic digital cities able to enhance the quality of life of the citizens and to improve city management (REZENDE, 2012; REZENDE et al., 2014; REZENDE; PROCOPIUCK; FIGUEIREDO, 2015).

City governance enabled by information technology can simplify and improve the government's internal administrative operations, facilitate interaction of public services between the government and interested organs, enable citizen participation, and ensure inclusion and equal opportunities. Moreover, it may improve the quality and effectiveness of governance policies and models (PEREIRA et al., 2017). Hence e-governance strategies improve public services (CUNHA, 2010; ORTIZ et al., 2016) by extending benefits to the society (FREY, 2003; LEMOS, 2004) since a public administration model capable of meeting the municipal demands is essential to ensure efficiency, efficacy, effectiveness, productiveness, and high-quality management standards (OLIVEIRA, 2014; SILVA; SILVA, 2017). Digital inclusion is also fundamental in the information age society and solutions enabling citizens to interact with the digital city through access to information and availability of services are the basis for participatory activities (TOFFLER, 1980; CASTELLS, 2002; BAILEY; NGWENYAMA, 2011; WEST, 2018).

Cities and city managers face technical and political challenges, and innovation through the adoption of new technologies must be part of the city's strategy. Consequently, digital city projects can promote social citizenship and the implementation of computerized and electronically interconnected local public power (GUERREIRO, 2006) as the concept of the digital city is highlighted in discussions between governments and society, and includes elements of strategy and municipal objectives (ZANCHETI, 2001; REZENDE, 2012; REZENDE, 2018) as well as the technological innovation in the cities (BERETTA, 2018).

Digital city projects are public policy initiatives (SHIN, 2005), the primary means for public administrations sustainable plan and conduct social, political, and economic interests (PALUDO; PROCOPIUCK, 2014), especially when intentionally used to solidify and strengthen processes essential to urban and social development (PARYSEK, 2010; SIMMONS et al., 2018). A digital city project should be elaborated based on the dialogue between the State and the civil society (SOUZA; JAMBEIRO, 2005) with an interactive interface providing information and access to the city's urban activities aiming at improving the city's performance, activities, and services (FURTADO, 2006). These strategic projects must also be intelligent, addressing the concept of smart city (KOMNINOS, 2008; PATAŠIENĖ; PATAŠIUS, 2014; GAMA; FERNANDES, 2014; REZENDE, 2016, ANTHOPOULOS, 2017, FALCO et al., 2018; VERREST; PFEFFER, 2018, WEST, 2018).

THEORETICAL FOUNDATIONS

Strategic Digital City

Rezende (2012; 2018) coined the concept of strategic digital city referring to the application of technology resources in municipal management and the provision of information and services to residents or citizens. A strategic digital city project comprises four municipal subprojects, namely city strategies, city information, public services, and information technology resources (REZENDE, 2012; REZENDE, 2018). The concept comprehends more than merely offering Internet to citizens using conventional telecommunications resources, and the aim goes beyond digitally including citizens through the World Wide Web. The strategic digital city project is based on city strategies to meet various municipal objectives on different municipal themes. The implementation thereof requires the elaboration of the municipal strategic planning (MSP) including municipal objectives and strategies related to the city functions or themes, municipal information planning (MIP), and the information technology planning (MITP) of the City Hall and relevant municipal public entities (REZENDE, 2012; REZENDE, 2018).

Information models of municipal functions or themes are the main products of the MIP and prerequisites for the planning of information systems (IS), municipal knowledge systems (MKS), and the respective human resources, which include local managers, municipal officials, and residents or citizens. The ITP project enables planning information technology (IT) resources and its respective municipal services, offered by the municipality to residents or citizens (REZENDE, 2012; REZENDE, 2018).

Municipal themes are macro activities of the city necessary for its integrated and effective functioning. There are various municipal themes including, but not limited to agriculture, science and technology, trade, culture, dissemination or marketing, education, sports, finance, government, housing, industry, legal, recreation, materials or logistics, environment, construction, planning, human resources, rural, sanitation, health, safety, municipal services, social, traffic, transport, tourism, and urban issues, among others. Each municipal theme can be divided into modules or subsystems also known as municipal subjects (REZENDE, 2012; REZENDE, 2018).

The Strategic Digital City Subprojects or Components

Four municipal subprojects constitute the strategic digital city project: city strategies, city information, public services, and information technology resources. Strategies are the means to achieve the city goals. Information is a tool that assists the decisions of public managers and citizens. Public services are facilities granted to citizens using information technology resources such as hardware, software, telecommunications, data management, information, and knowledge (REZENDE, 2012; REZENDE, 2018).

Strategies were initially used in the military and understood as tactics centered on force. Since the 20th century, strategy is considered the selection of means and objectives that prioritize psychological factors rather than force. In the 1960s, several definitions of strategy emerged focusing on the development of plans and objectives to achieve specified goals (BEUREN, 1998; MINTZBERG; AHLSTRAND; LAPPEL, 2000).

Strategy comprises one of several sets of decision-making rules to guide municipal behavior as a tool to deal with the turbulence and changing conditions that affect municipalities (ANSOFF, 1988). It is a way of thinking about the future, and is integrated in the decision-making process, based on formalized procedures, and articulated in results. Strategy can be related to "war" and tactics to the "battle" (MINTZBERG; QUINN, 2001).

Information and the flow thereof is a strategic element facilitating decision-making in cities on different dimensions (ARVIDSSON; HOLMSTRÖM; LYYTINEN, 2014; PATAŠIENĖ; PATAŠIUS, 2014; COSTA; SANTOS, 2016; BARTH at al., 2017). Information provides a new approach to the in-depth study of the operations and development of cities, and an opportunity to renew how they are managed to focus on digital development and the citizens' needs (FOTH; CHOI; SATCHELL, 2011; KITCHIN, 2014).

City information management has become a strategic resource, and the improvement thereof requires each city employing it at the appropriate scale and quality to release the potential value of information resources and their socio-economic benefits. The use of information and the management thereof is the driving force of cities' economic transformation, democratization, collaborative integration, innovation, inclusive development, and improvement of public managers' capacity (LEPRI et al., 2015, TAYLOR; RICHTER, 2015; TEIXEIRA el al., 2016; JØRGENSEN, 2017).

A public service is any service offered by the government or its delegates under norms and controls to meet the essential needs of the community or for the secondary and simple convenience of the State. Examples of public services include public education, the police, public health, public transportation, and telecommunications. These services are provided by a public entity under state norms and controls to satisfy the essential or secondary needs of the collective or for the simple convenience of the State (MEIRELLES, 2013).

Scholars and municipal government administrators agree that public services have four essential objectives: efficiency, efficacy, equity, and responsiveness (ENGLAND; PELISSERO; MORGAN, 2012).

Information technology refers to the technological and computational resources for the storage, generation, and use of data, information, and knowledge. The concept is based on the following components: hardware and its devices and peripherals, software and its resources, telecommunications systems, and data and information management (REZENDE; ABREU, 2013).

Hardware consists of computers and their respective devices and peripherals. Software comprises different programs such as operational software, networks, applications, utilities, and automation. Telecommunications systems are resources that connect hardware and software. Data and information management comprises the activities of data storage and retrieval as well as levels, and access control to information (O'BRIEN; MARAKAS, 2011; LAUDON; LAUDON, 2011; REZENDE, 2012; PAN et al., 2016; ZHANG et al., 2017).

RESEARCH METHODOLOGY

The research adopted an applied qualitative approach to a circumstantial

theoretical reality. The descriptive method was carried out using bibliographic and documentary data (FREITAS et al., 2000; MARCONI; LAKATOS, 2010; GIL, 2010), non-participatory observation, and a survey. In addition, an information mapping technique (Infomapping) was employed (BURK; HORTON, 1988; FONTANELLA et al., 2011).

The study was conducted in three phases: (a) the research protocol and performance tests took place from February to June 2016; (b) research data was collected from July 2016 to September 2017, and (c) data were consolidated and research documented from September 2017 to December 2018.

Regarding the sample, the survey was conducted in the cities of Belo Horizonte, Rio de Janeiro, São Paulo, and Vitória (capital cities of Southeastern Brazil), which were chosen based on the criteria of convenience and accessibility (GIL, 2010), since the Southeast is the wealthiest Brazilian region in which 55.4% of the national GDP is concentrated. It is also the most populated region, with 86,356,952 inhabitants (IBGE, 2017).

The observation units were the websites of the capital cities' respective City Halls, which were analyzed through non-participative observation and by using the Infomapping technique to map city information.

The research protocol (YIN, 2015) comprises four city variables: city strategies, city information, public services, and information technology (IT) resources. These variables are equivalent to the subprojects or components of Rezende's (2012) conceptualization of the strategic digital city.

ANALYSES OF STRATEGIC DIGITAL CITY VARIABLES

The four variables proposed in the research protocol for the four cities were analyzed to determine convergent interrelationships.

Analysis of City Strategies

In Belo Horizonte, 32 strategies were identified among the municipal themes: government (5), urban (4), services (4), finance (4), social (3), education (2), legal (2), environment (2), health (2), culture (1), safety (1), mobility (1), and tourism (1). In Rio de Janeiro, 17 strategies were identified: environment (6), government (3), social (3), health (2), finance (1), education (1), and safety (1). In São Paulo, 56 strategies: administration (7), education (7), government (6), science and technology (4), culture (4), health (4), social (4), sports (3), safety (3), services (3), environment (2), planning (2), urban (2), finance (1), legal (1), leisure (1), mobility (1), and rural (1), and in Vitória, 8 strategies: health (3), government (2), environment (1), social (1), and education (1).

Table 1 compares strategies, absolute numbers and provides the respective percentages.

Table 1 - Comparison of the strategies of Southeastern Brazil capital cities

Capital Cities	City Strategies	Percentage
Belo Horizonte	32	28.3%
Rio de Janeiro	17	15.0%
São Paulo	56	49.6%
Vitória	8	7.1%
Total	113	100,00%

Source: Authors (2018)

The city of Vitória has the lowest number of strategies available (7.1%) and São Paulo the highest (49.6%). In total, 113 strategies were identified for all the capital cities surveyed (Table 2).

Table 2 - City strategies related to municipal themes

Municipal themes	Belo Horizonte	Rio de Janeiro	São Paulo	Vitória	Quantity
Government	5	3	6	2	16
Education	2	1	7	1	11
Health	2	2	4	3	11
Social	3	3	4	1	11
Environment	2	6	2	1	11
Administration	0	0	7	0	7
Services	4	0	3	0	7
Urban	4	0	2	0	6
Finance	4	1	1	0	6
Culture	1	0	4	0	5
Safety	1	1	3	0	5
Science and technology	0	0	4	0	4
Sports	0	0	3	0	3
Legal	2	0	1	0	3
Planning	0	0	2	0	2
Mobility	1	0	1	0	2
Leisure	0	0	1	0	1
Rural	0	0	1	0	1
Tourism	1	0	0	0	1
Total	32	17	56	8	113

Source: Authors (2018)

The highest number of strategies (16) was found for the municipal theme Government and the lowest (1) for Tourism, Rural and Leisure.

Analysis of City Information

In Belo Horizonte, 187 information items were identified among the different municipal themes. Information overlaps, (repeated information) on the same municipal theme were rejected, leaving 101 different and non-interactive information items. In Rio de Janeiro, 165 city information items were identified and after disregarding repeated information, 113 information items remained distributed among different municipal themes. For São Paulo, 162 city information items were identified without repetitions on the website. Finally, for Vitória, 107 city information items were identified and after crosschecking the content, 89 information items remained.

From the 621 information items identified, 465 were not repeated (Table 3).

Table 3 - Information in the Southeastern Brazil capital cities

Capital Cities	City information	Percentage
Belo Horizonte	101	21.7%
Rio de Janeiro	113	24.3%
São Paulo	162	34.8%
Vitória	89	19.2%
Total	465	100,00%

Source: Authors (2018).

Vitória has the lowest number of available information items (19.2%), and São Paulo the highest (34.8%).

Analysis of Municipal Public Services

In Belo Horizonte, 39 transactional public services were identified without repetition among the municipal themes: services (15), finance (12), urban (7), culture (2), education (1), legal (1), and social (1). The predominance of Services and Finance, indicates the existence of services for improving the process of municipal tax collection. In Rio de Janeiro, 37 digital transactional public services, i.e., services that allows citizen to interact with the municipal government. After duplicated information was removed, 19 digital public services remained: services (8), environment (2), finance (2), administration (2), urban (2), social (2), and health (1). "Services" was the predominant municipal theme. Other services were listed on different pages of the website, but were unavailable or under construction. In São Paulo, 97 transactional public services were identified and 49 remained after disregarding duplicated information: finance (15), services (11), social (8), culture (5), urban (4), safety (2), environment (1), science and technology (1), sports (1), and legal (1). The prevalence of the Finance and Services municipal themes was evident indicating a recurrent concern on the process of municipal tax collection. Likewise, in Vitória, among the 50 transactional public services identified, 16 were left after identifying duplicated information: services (6), finance (5), urban (2), health (1), education (1), and environment (1).

Public services were mapped and analyzed premised on the fact that public services should be transactional to differ from information. Thus, the number of services did not demonstrate proportionally quantitative linearity among the capital cities surveyed resulting in the lack of uniformity.

Among the 245 public services identified, 123 were not repeated (Table 4).

Table 4 - Public services in the Southeastern Brazil capital cities

Capital Cities	Public services in cities	Percentage
Belo Horizonte	39	31.7%
Rio de Janeiro	19	15.5%
São Paulo	49	39.8%
Vitória	16	13.0%
Total	123	100,00%

Source: Authors (2018)

Once more Vitória had the lowest number of available transactional public services (19.2%), while São Paulo had the highest (39.8%).

The municipal themes "Services" and "Finances" prevail among the 13 themes identified, as shown in Table 5.

Table 5 - Municipal themes of public services

Municipal themes	Belo Horizonte	Rio de Janeiro	São Paulo	Vitória	Quantity
Services	15	8	11	6	40
Finance	12	2	15	5	34
Urban	7	2	4	2	15
Social	1	2	8	0	11
Culture	2	0	5	0	7
Environment	0	2	1	1	4
Education	1	0	0	1	2
Health	0	1	0	1	2
Administration	0	2	0	0	2
Safety	0	0	2	0	2
Legal	1	0	1	0	2
Science and technology	0	0	1	0	1
Sports	0	0	1	0	1
Total	39	19	49	16	123

Source: Authors (2018)

The municipal theme Services has ranked highest in numbers of public services (15), while Sports and Science and technology have ranked lowest (1).

Analysis of IT-based Resources

The research identified four IT-based resources that enable citizens to access public services in Belo Horizonte, Rio de Janeiro, and Vitória, namely the Web, telephone, APP (smartphones), and Wi-F, while in São Paulo, five IT-based resources were identified, the same mentioned above and the self-service information kiosk.

IT-based resources show a proportional linear relationship between the capital cities surveyed (Table 6).

Table 6 - IT-based resources in the Southeastern Brazil capital cities

Capital Cities	IT-based resources	Percentage
Belo Horizonte	4	23.5%
Rio de Janeiro	4	23.5%
São Paulo	5	29.5%
Vitória	4	23.5%
Total	17	100.00%

Source: Authors (2018)

São Paulo had the highest number of IT-based resources available (29.5%).

RESULTS, DISCUSSIONS AND COMPARATIVE ANALYSIS OF THE STRATEGIC DIGITAL CITY COMPONENTS

Data collected related to the components of the strategic digital city (Table 7).

Table 7. Comparison of the components of the strategic digital city in Southeastern Brazil capital cities

Capital Cities	City strategies	City information	Public services	IT-based resources
Belo Horizonte	32	101	39	4
Rio de Janeiro	17	113	19	4
São Paulo	56	162	49	5
Vitória	8	89	16	4
Totals	113	465	123	17

Source: Authors (2018)

The quantitative evaluation of "city strategies" was based on the assumption of the existence of linearity between numbers whose ratio might express a strategic arrangement of research variables. Thus, although the variables were mapped, linearity was not confirmed, leaving isolated disparate sets for Southeastern Brazil. This likely indicates different realities in the capital cities of the same region.

The analysis of the variable "city information" revealed repetition of the same information on different pages of the website. Therefore, the distance between the capital cities with the highest number of municipal information items, namely São Paulo (162 information items), and Vitória (89 information items) also indicates different realities in the same region.

The evaluation of the "public services" variable also revealed repeated services, reducing the actual number of services available in all the capital cities surveyed. Quantitatively, the survey revealed that São Paulo and Belo Horizonte offer the highest number of transactional public services, regardless of the municipal theme. The ratio indicates a proportional linearity of 39:49. On the other hand, Rio de Janeiro and Vitória provide the lowest number of public services, 16 and 19 respectively, indicating some proportionality.

Lastly, four of the IT-based resources identified are the same for all of the four capital cities, except São Paulo, which has five IT-based resources. The additional one was the self-service information kiosk.

Data analysis revealed the distribution of cities' strategies and public services among the municipal themes. Furthermore, collected data highlight the Services and Finance municipal theme (Table 8).

Table 8 - Comparison of municipal themes with the components of the strategic digital city in Southeastern Brazil

Municipal themes	City strategies	Public Services	Total	Percentage
Services	7	40	47	19.9%
Finance	6	34	40	17%
Social	11	11	22	9.3%
Urban	6	15	21	8.9%
Government	16	0	16	6.8%
Environment	11	4	15	6.4%
Education	11	2	13	5.5%
Health	11	2	13	5.5%
Culture	5	7	12	5.1%
Administration	7	2	9	3.8%
Safety	5	2	7	3.0%
Science and technology	4	1	5	2.1%
Legal	3	2	5	2.1%
Sports	3	1	4	1.7%
Planning	2	0	2	0.85%
Mobility	2	0	2	0.85%
Leisure	1	0	1	0.4%
Rural	1	0	1	0.4%
Tourism	1	0	1	0.4%
Total	113	123	236	100,00%

Source: Authors (2018)

Comparing the municipal themes, with the variables "city strategies" and "public services," Finance, Services, Social, and Urban represent more than 55% of the total municipal themes surveyed in the Southeastern Brazil capital cities showing that city managers have a special interest in financial and tax collection. In this context, Government, as a city strategy, seems disconnected from the public services since 16 city strategies were identified in all capital cities surveyed but no services related to these municipal themes were found. In preliminary analyses, the horizontal distances stand out as services, which are present in 7 municipal strategies and 40 public services. Similarly, Finance appears in 6 municipal strategies and 34 public services.

On the other hand, Safety, Sports, Planning, Recreation, and Mobility represent 3% of the municipal themes for the Southeastern region. Lower percentages may indicate disconnections between city strategies and transactional public services.

Thus, the study indicates the misalignment between the concept, premises, and components of a strategic digital city (REZENDE, 2012; REZENDE, 2018). All capital cities surveyed have city strategies and provide city information and public services on their websites as well as IT-based resources to residents. However, the four components are not integrated.

CONCLUSION

As cities and their citizens connect through information and technology, strategic digital city projects can help city management by providing citizens with access to public services according to the city's strategies.

The development of the cities of the Brazilian Southeastern region is a continuous

task that prioritizes different programs and municipal plans. In a globalized and informational environment, the challenge is to meet citizens' needs at the same speed as IT-based resources evolve. In this context, the four components, pillars of the strategic digital city, are fundamental resources.

Public policies for structuring strategic digital cities are being implemented in the regional, national, and international levels. In Brazil, the prevailing discussions on digital cities are in the international context, although public policies aimed at establishing institutional, political, and economic support to strategic digital cities projects are beginning to be structured and strengthened at micro and macro levels. These projects are public policies aiming at formalizing city strategies to improve local administration processes and to foster citizenship through planning, structuring, storing and making information and public services available. In the conceptual and practical perspectives for structuring strategic digital cities as a public policy based on the city's strategic planning, the strategic digital city project can be an important participatory tool for citizenship and city management fostering citizenship and democratic governance. These projects should be considered vital for constructing strategic and intelligent smart cities.

Regarding the objective of the research, the variables city strategies, city information, public services, and IT-based resources were identified and analyzed based on 718 components of strategic digital city projects. Disregarding redundant data, the quantitative results show that São Paulo has higher percentages of the four variables compared to the other capital cities surveyed.

Quantitatively, the research reveals that São Paulo and Belo Horizonte provide a higher number of public services, regardless of municipal theme, and Rio de Janeiro and Vitória provide the lowest number of transactional public services. Therefore, a disconnection between the variables surveyed was observed, especially for the transactional public services, which do not converge to the same municipal themes.

Thus, the importance of city strategies, democratization of access, and use of city information and public services converge partially. Despite the fact that research variables were identified, they are disconnected and non-linear; variables for a strategic digital city project were identified, however incomplete, inconsistent, and non-integrated.

This study contributes to the research on urban management and deepens academic understanding on strategic digital cities. The research comprised mapping and classifying the variables surveyed according to municipal themes. In this context, Southeastern Brazil partially reveals aspects of a strategic digital city proposed by Rezende (2012; 2018). On the other hand, the academic contributions expand the theoretical debate and create knowledge by mapping the variables and their respective relations with a strategic digital city to corroborate research on the strategic vision thereof. It also contributes to the academia as a study on public policies related to urban management and cities.

In this sense, some management implications can be pointed out, especially those related to the future of cities, since the integration of city strategies with the respective information and public services offered is not always considered, not facilitating citizens' quality of life.

On the other hand, some future research may be suggested, such as the

increase in the number of cities, the inclusion of other research variables and the elaboration of an action research to follow up the indicators of the cities involved.

As for the research limitations, there were restrictions on the use of websites and municipal documents for data collection, and the lack of follow-up for a research-action. Moreover, as the research focused on four cities in Southeastern Brazil, the results cannot be generalized to other Brazilian regions or international cities.

Despite the non-integration of study variables, the analysis identified 113 city strategies, 465 city information items, 123 public services, and 17 IT-based resources, and consequently, these capital cities have the components of a strategic digital city according to the concept coined by Rezende (2012; 2018). Although there is no homogeneity, the research provides alternatives to public managers and citizens.

The conclusion states the relevance of city strategies, democratization of city information and use of public services. Therefore, the four capital cities meet the requirements to be regarded as strategic digital cities, namely city strategy, city information, public services, and IT-based resources, as innovative and sustainable cities based on the city's public policies.

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