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THE ROLE OF URBAN RANKINGS IN THE CONSTRUCTION OF PERCEPTION ON INNOVATION IN SMART CITIES

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ABSTRACT

It is perceived in contemporary times the use of innumerable different rankings each with its different criteria and goals, varying according to the applied methodology, country, time, audience and other requirements, however every ranking seeks to validate something in relation to similar objects or themes. Thus, it is sought to understand the function of the rankings in what concerns to the perception about the construction of the concept of smart cities, positioning them as innovators, at the same time that they anchor them strategically in smart management. It is a qualitative study with bibliographical research on: smart cities, urban rankings, innovation and strategic urban management. It is a study of multiple cases of cities that occupy the first positions in the rankings on smart cities. The methodology uses the articulation between theory and empirical observation of three urban rankings in 2018: the CSC, the EIU and the CIMI. It is noted that the use of urban rankings are used strategically by municipal management, transforming, projecting and ambitioning that the city be perceived as an smart city.

Keywords: Innovation, Smart cities, Urban rankings, Urban management.

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O PAPEL DOS RANKINGS URBANOS NA CONSTRUÇÃO DA PERCEPÇÃO SOBRE A INOVAÇÃO NAS CIDADES INTELIGENTES

RESUMO

Percebe-se na contemporaneidade a utilização de inúmeros *rankings* diferentes cada qual com seus critérios e metas distintos, variando conforme a metodologia aplicada, país, época, audiência e demais requisitos, porém todo *ranking* busca validar algo em relação a objetos ou temáticas similares. Assim, busca-se compreender a função dos *rankings* no que tange à percepção sobre a construção do conceito de cidades inteligentes, posicionando-as como inovadoras, ao mesmo tempo em que as ancoram estrategicamente em gestão inteligente. É um estudo de natureza qualitativa com pesquisa bibliográfica sobre: cidades inteligentes, *rankings* urbanos, inovação e gestão urbana estratégica. Trata-se de um estudo de múltiplos casos de cidades que ocupam as primeiras posições nos *rankings* sobre cidades inteligentes. A metodologia utiliza a articulação entre teoria e observação empírica de três *rankings* urbanos em 2018: o CSC, o EIU e o CIMI. Nota-se que o uso dos *rankings* urbanos são utilizados de forma estratégica pela gestão municipal, transformando, projetando e ambicionando que a cidade seja percebida como uma cidade inteligente.

Palavras-Chave: Inovação, Cidades inteligentes, *Rankings* urbanos, Gestão urbana.

INTRODUCTION

It can be noticed the use of countless rankings in the contemporary world that adopt different criteria and goals vary according to the methodology applied, country, time, audience, goals and other requirements. All seek to validate or make something known in relation to similar objects or themes, also, create a list of positions that use numerical values or concepts that aim to highlight something in relation to others in the same category.

In this way, there are rankings for almost everything: games, brands, competitions, university selection, universities, courses, sports, among others. In any one there is a certain classification that follows a certain order according to the criteria adopted. Regardless of the number of positions, the former are taken as the best and the latter as the worst in which is lost only to those who do not enter the rankings.

As far as cities are concerned, there are rankings of various types: more populous cities, global cities, more developed cities, dangerous cities, safer cities, the best cities to live or work in, the largest cities in the world, more sustainable cities, among others, including rankings dedicated to smart cities. The methodology used in each ranking or set of rankings is also different from each other and exposes the use of numerous criteria to select and highlight the best cities in something. The proposed discussion seeks to understand the function of the rankings in what concerns the perception about the construction of the concept of smart cities and of the city itself as being smart.

The article is structured in three parts. It begins with the deepening of the key concepts of this study. It follows the investigation of three urban rankings investigated in the year 2018, verifying which cities have obtained the first positions. The third part deals with how the perception of cities, especially the smart ones, is constructed from the urban rankings. Following that are the final considerations are made.

Methodological Procedures

It is a qualitative study with bibliographical research to deepen the concepts of smart cities, urban rankings, innovation and strategic urban management. Three are investigated rankings on smart cities in the year 2018, observing the cities that were in the first positions, comparing the rankings with each other and characterizing the

research as a study of multiple cases. In this sense, the methodological pole adopted is anchored in the discussions of Frey (2003), Leite and Awad (2012) and Kobayashi *et al.* (2017) about smart cities. And, the references to the rankings investigated are concentrated in the EIU (2018), CSC (2018) and CIMI (2018). The article argues about the strategic use of urban rankings in building perceptions about innovation in smart cities, deepening both themes.

The criteria for choosing the investigated rankings was the number of times they were mentioned on the internet. Thus, when writing in *Google* the terms "Ranking Smart cities" or "ranking about smart cities" was repeated mentioning three rankings. They are: 1) *Economist Intelligence Unit* (EIU), 2018), 2) *Connected Smart Cities* ([CSC], 2018) and 3) *Cities in Motion Strategies* ([CIMI], 2018).

According to Yin (2015) there are steps to be followed to analyze a multiple case studies. Namely: 1) Define and plan, 2) Prepare, collect and analyze; 3) Cross-analysis and conclusion.

Following the Yin method (2015), the results of each step are the decisions that the researcher made to reach the results of his research. Thus, we use two analyzes that guide the present study: 1) individual analysis of each ranking investigated to determine its context in the literature on smart cities; and 2) a cross-analysis that seeks to compare the cases investigated between themselves and with the literature on smart cities (Figure 1).

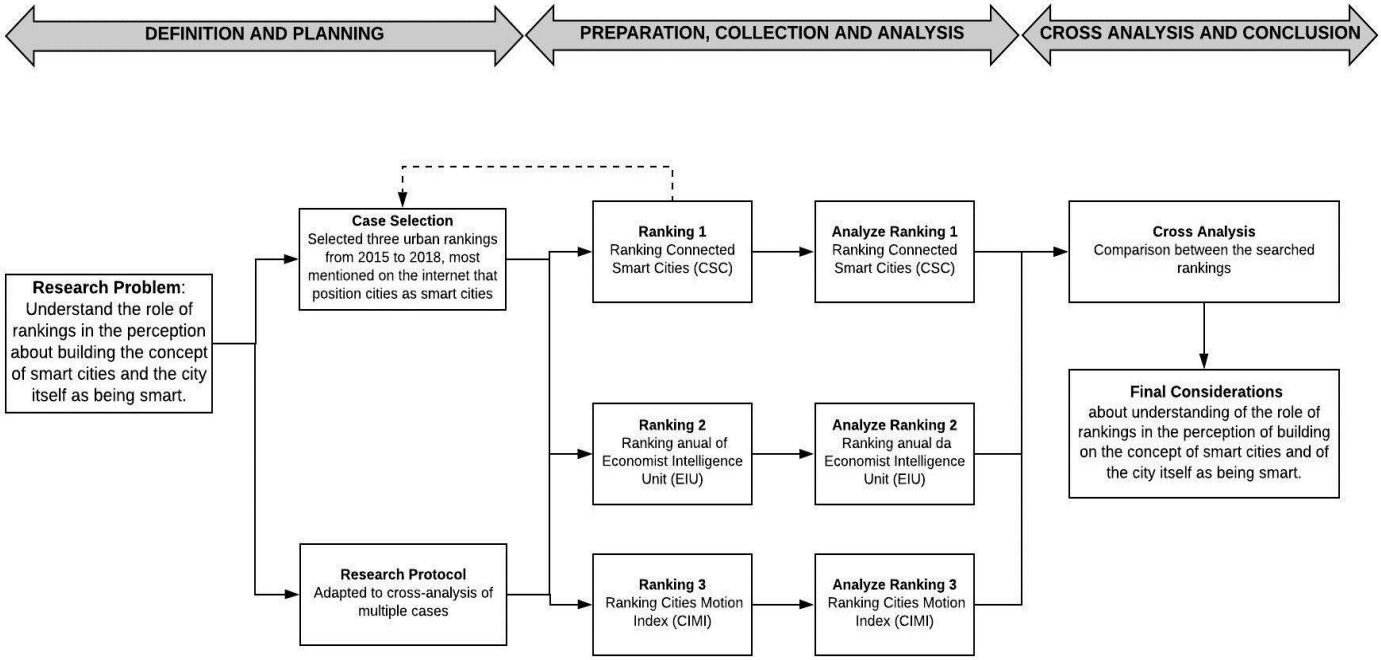

Figure 1: Methodological and analytical protocol of the research

Source: Adapted by the author of the literature of multiple case studies of Yin (2015).

In this way, the multiple case study method proposed by Yin (2015) and adapted for this research can contribute to the advancement in knowledge regarding the phenomenon of smart cities.

The methodology adopted is based on the articulation between theory and the observation of the urban rankings of 2018, found on the internet and disseminated in releases in the best scored cities. It is usual to find articles and journalistic articles in which the cities are listed among the best or worst in some urban aspect.

In this way, from the problematic proposed in the research it was investigated which urban rankings were most used to position the cities in the context of smart between the years of 2015 and 2018. The study found three rankings that were recurrently used in the highlighted period.

Then, data were collected from the ranks selected for later analysis individually and

compared with the proposed theoretical framework. Among the investigations proposed were observed the subjective social relations they establish and how they are articulated to position a city as an smart city.

SMART CITIES, INNOVATION AND MANAGEMENT: CHALLENGES

In the academic and market literature (articles of newspapers and magazines) there are several concepts found in relation to smart cities, which reveals the lack of a universal concept. For some authors, such as Droege (1997), the smart city is related to the virtuality or virtual reconstruction of the city in a digital environment. This is the case, for example, of digital collaborative maps, such as PortoAlegre.cc (Almeida & Engel, 2017). To put in another way is the digital cartographic transposition of the territory into the virtual environment of the internet in order to represent it graphically.

For the *World Foundation for Smart Communities* ([WFSC], 2001), city smartness is fundamentally based on technology to solve its problems of rapid urbanization. It combines the use of systems, software server infrastructure, network infrastructure and digital devices, called by *Forrester* technologies *Smart computing*. This technology serves to connect seven components and infrastructure services of the city: 1) city administration, 2) education, 3) health, 4) public security, 5) real estate, 6) transportation, and 7) public services ([WFSC] 2001).

Another concept attributed to smart cities is that of an smart and interactive environment that encompasses information and communication technologies (ICTs), incorporating them into real life (Steventon & Wright, 2006). The *Intelligent Community Forum* ([ICF], 2006) investigates the social and economic development of cities from a list of indicators that create a theoretical framework for understanding how communities and regions can gain competitive advantage in the so-called Broadband Economy .

From this perspective to be an smart city it is necessary to articulate: (1) broadband offer for companies, government buildings and residences; (2) effective education, training, and workforce to generate knowledge; (3) policies and programs that promote digital democracy, reducing digital divide to ensure that all sectors of society and their citizens benefit from the broadband revolution; (4) innovation in the public and private sectors and initiatives to create economic clusters and venture capital to support the development of new businesses; and (5) effective economic development marketing that leverages the digital community to attract talented employees and investors (ICF, 2006).

Komninos (2002; 2006) emphasizes that cities with a high degree of learning and innovation are inserted in the context of knowledge generation and management, people's creativity and digital infrastructure in the communication sector. All these aspects lead to innovation and, therefore, a smarter city. For Leite and Awad (2012) the smart city is one that proposes sustainable urban development, while re-inventing the city in a smart and inclusive way. Kobayashi *et.al.* (2017) points out that there is a certain convergence of concepts between smart and sustainable cities with the use of information and communication technologies (ICT).

It is common to observe the use of certain nomenclatures, such as: innovative cities, resilient cities, connected cities, compact cities and others attributed to smart cities, making their concept complex and multifaceted (Kobayashi *et al.*, 2017). It is seen that each of these terms also reveals something about the city to be taken as smart at a given time point. When the city is seen as innovative, resilient or sustainable, for example, one is talking about how the social actors (message-transmitters) want their city to be seen by others or even the world.

The message emitted and reduced to a word or adjective, in the form of an slogan advertising, exposes the society itself, locally and globally, as well as the social construction of its urban space. Lefebvre (2008) highlight that the social production of urban space is a symbolic construction and takes into account the uses, appropriations and sense of belonging with that territory.

At the same time, the city is a territory that organizes other territories (Roncayolo, 1993) and can be thought of in a fragmented format or as territories within a circumscribed territory (Coy, 2015). From this perspective, the city is complex and reflects its conflicts, inequalities and

partnerships, as well as allowing certain fluidity that is characteristic of it. The use of one or another concept linked to the city corroborates this complexity, because while one social group sees the city as innovative, another group may perceive it as vulnerable or unsustainable.

It is observed that the city in the digital context starts from the transposition of the physical space to the virtual space in the 1990s (Droege, 1997) for in 2001 to use technology to solve urban problems ([WFSC], 2001), In 2006, inserts ICT in the context of smart cities and also presents a theoretical-conceptual framework with indicators on smart cities (Steventon & Wright, 2006). Between 2002 and 2006, the smartness of the cities came from their knowledge and performance in the field of innovation, emerging the recent concept of smart social city (Planet Institute, 2017). This concept is part of a project created for the city of Laguna, in the state of Ceará, Brazil focused on the sustainability, quality of life and accessibility of its inhabitants.

In 2012 the concept of smart cities was linked to sustainable and innovative urban development in order to promote social inclusion (Leite & Awad, 2012). And in 2017, we can see that the concepts of sustainability and smart city converge through information and communication technologies (ICTs). This time line of concepts exposes some variables related to the smart city, mainly innovation, technology, knowledge and sustainability.

These variables can be separated into two groups: 1) technological innovation and 2) environmental sustainability. Thus, the bibliographic research carried out in this study allows visualizing two aspects that deal with smart cities, validating the existence of both groups. One that puts technology at the center of its existence, linking cities to a high technological degree that leads to some criticism (Droege, 1997; Steventon & Wright, 2006). Among them: a) if there is a smart city there are also smart citizens; b) smart city is one in which technology has taken over all physical and virtual space; c) in a smart city taken by high technology it is assumed that only the highest social classes would have the right to the city, leaving the poorest population on the sidelines. These are some critical insights that all bring to the surface for thought.

On the other hand, the idea that the smartness of a city comes from the intelligent use of its natural resources, whether or not to use the technology (Leite & Awad, 2012) is followed. In this case, it can be said that the center of attention is environmental sustainability and technology is only an adjunct.

However, it is observed that the timeline of both aspects identified in this research contains at its core other variables, such as: creativity, strategy and urban management. From 1950 to 2006, cities were mentioned, but in contemporary times the reference is to metropolises, megacities, megalopolis, and global cities, revealing the complexity and dimension of urban space and its challenges and opportunities in the 21st century (Coy, 2015).

The concept of innovation is often associated with smart cities. The Organization for Economic Cooperation and Development ([OECD], 2019) views innovation as being a product, an organization process or the marketing area. For Blaug (1963) and Rosenberg (1982) there are two types of innovation, product innovation and process innovation. It is also different from the technological innovation that is linked to the product and to a process. Both innovations start from research to create or reinvent something, interacting with invention and diffusion. Technological innovation comes from three points: technical, technology and innovation.

It can be seen that urban management is an important articulating and defining component of cities perceived as smart. It is the social actors who are in the position of public power who stipulate certain perceptions and spread them on multiple scales. A strategic way to disseminate them is by participating in urban rankings that list smart cities and their potential for development and innovation. It is emphasized that the degree of smartness of a city will be defined also by its set of social actors, in particular by the public power that confers a certain officiality in its actions and decisions. The choices made will also lead to the type of urban and regional development that social actors aim for with the strategies adopted.

Frey (2003) attributes to urban management a set of variables articulated by different social actors that cover social aspects and political and economic relations. Urban management or governance is understood as the process of planning, intervening, regulating and mediating the production of urban space. When you do something new or reinvent some part of this collectively articulated planning process you can say that there is some innovation. However, when technology is used as the main driver of this governance, it refers to technological innovation in the urban context, which is often attributed only to smart cities.

URBAN RANKINGS: THE PERCEPTION OF INTELLIGENCE OF THE CITIES

In general, a ranking is the listing of something that follows a certain classification according to predetermined criteria. There are rankings for just about everything: games, people, things, places, countries, etc. Cities also use rankings, but the same type of ranking used for people can be used in the urban context. We sought in the literature a concept that delimits it in a more specific way, finding nothing that meets the need of the study. Thus, in the absence of a more specific concept, the urban ranking is based on the use of a certain set of indicators that can list the cities in numerical order according to the objectives previously stipulated by urban management. In contemporary times there are innumerable types of urban rankings, with cities being one of them, but not the only one.

The present study investigates three rankings most-mentioned smart city on the Internet in 2018. These are: 1) *Economist Intelligence Unit* (EIU), 2018), 2) Connected Smart Cities ([CSC], 2018) and 3) Cities in Motion Index ([CIMI], 2018). They will then be addressed individually.

The Economist Intelligence Unit ranking: The best cities to live in

The *Economist Intelligence Unit* (EIU) is a research and analysis division of *The Economist Group* that deals with global business since 1946. Its purpose is to help companies and governments understand the transformations and take them to seize the opportunities that arise, as well as manage the risks arising from these changes ([EIU], 2018). The Group publishes several reports annually, addressing issues of macroeconomic events, national affairs and other issues that may affect specific countries, regions, cities and sectors.

Some deal with changes in the oil market, political outlook, industry sector, financial inclusion market, trade war between the United States and China, and many others. Among them is the report titled *Economist Intelligent Unit* that lists the *best cities to live in 2018*. In this ranking, we have the following positions: 1) Vienna/Austria, 2) Melbourne/Australia, 3) Osaka/Japan, 4) Calgary/Canada and 5) Sydney/Australia. In this way, the city of Vienna, capital of Austria was classified as the best city to live in the whole world. Rio de Janeiro and São Paulo, both Brazilian capitals, were in 88th and 93rd places, respectively.

The report of the *Economist Intelligent Unit* (2018) relies on thirty criteria, including global political and social stability, crime, threat of terrorism, military conflict, civil unrest, access to education, transportation networks, infrastructure and access to health. The set of these criteria listed 140 cities around the world evaluated on a scale of one hundred points. According to the EIU criteria (2018) Vienna achieved a near perfect result of 99.1 points, while Melbourne dropped to second place with 98.4 points (EIU, 2018).

The *Economist Intelligent Unit report* ([EIU], 2018) also ranks the 50 most violent cities in the world, as well as the worst cities to live in. According to the report, those with better scores tend to be medium-sized cities in richer countries. The better-off cities also have lower population densities "[...] which allows for more recreational activities without leading to high levels of crime and without overburdening infrastructure" ([EIU], 2018, sp).

Vienna, capital of Austria, was the city that obtained the best position in the mentioned ranking. It is noteworthy that during the last seven rankings EIU (2010-2017) the city of Melbourne occupied the leading position, yielding its status to another city in 2018. Vienna has a population of 1.8 million inhabitants and is considered the the most populous city in Austria.

It is also a city with a international privileged status, such as: to be considered the economic heart of Austria, to host more than 200 multinational corporations and/or to be one of the main regions of the European Union ([EC], 2019).

On the internet search was found news releases that Vienna was considered the best city to live. Below are some of the titles of the releases found:

1) Vienna is elected the best city in the world to live. The capital of Austria overcame Australian Melbourne, champion for seven consecutive years (Viagem and Turismo, 2018).

2) Vienna is voted the best city in the world to live. Austrian capital stands out in the areas of health, education, infrastructure and stability, overtaking Australia's Melbourne, which led the ranking seven years ago. Low crime also favors European city (DW, 2018).

3) Vienna is voted the best city in the world to live. Austrian capital stands out in the areas of health, education, infrastructure and stability, overtaking Australia's Melbourne, which led the ranking seven years ago. Low crime also favors European city. Vienna, the capital of Austria, was voted the best city to live in the world by consulting the Economist Intelligence Unit (EIU), ousting Melbourne, Australia, which carried the title seven years ago (UOL Viagem, 2018).

4) Ranking points to Vienna as the best city to live in; Rio is occupying the 88th place (UOL economia, 2018).

The Connected Smart Cities ranking: Brazil's development potential

In 2015 the consultancy *Urban Systems* created the *Connected Smart Cities ranking*. The *Connected Smart Cities* involves companies, organizations and governments on a platform whose mission find the DNA of innovation and improvements for more intelligent and connected each cities with each other, whether they are small or megacities (CSC Ranking, 2018). The event and the ranking aim to map Brazilian cities with potential for development from indicators created by a consulting firm, *Urban Systems* (CSC Ranking, 2018).

The ranking CSC starts with the collection and creation of indicators, as well as the segmentation of these indicators and relevance assessment (CSC, 2018). Another point that is highlighted in the website is that the indicators have the objective of mapping the Brazilian cities in order to portray indicators, such as intelligence, connection and sustainability, of eleven of the main sectors of Brazil (CSC, 2018).

The data found indicate that the indicators were chosen from among those that could classify the development potential of the Brazilian municipalities anchored in three broad areas: intelligence, connection and sustainability. It does not specify what was considered in each area to be relevant to a developmental assessment covering smart cities.

According to the magazine that bears the namesake of the event and the ranking, this is "[...] the first *ranking* of smart cities in the country" (Revista CSC, 2018, p.3). This statement indicates certain status positioning in relation to the other rankings urban. In addition, seven municipalities have been researched and mapped in different market segments: residential real estate, office and commercial real estate, commercial and retail, hotels and events, higher education, basic and complementary, health, hospitals and poles, logistics, mobilities and transportation, ancillary revenues (Revista CSC, 2018).

The exhibition of *the Connected Smart Cities ranking* in the magazine (Revista CSC, 2018, p.7) brings a persuasive speech about the immensity of Brazil's size and population, linking the need for "the giant" (Brazil) can't stop growing, but that must to grow in an orderly way and with a higher quality of life. From this observation is that the event *Connected Smart Cities*, strategically allied to the partnership *Urban Systems*, originated the *Connected Smart Cities Ranking*. Thus, a specific methodology was created that lists the Brazilian cities with the greatest potential for development. The ranking has eleven axis divided into three categories: 1) general, 2) population range and, 3) by the sectors covered in the homonymous event - mobility, urbanism, environment, energy, health, education, security, entrepreneurship,

technology, innovation, economy, quality of life and governance (Revista CSC, 2018, p.7)

The study also points out that 700 of the 5.570 Brazilian municipalities were surveyed, comparing them to point to the most smart cities. Upon doing it reveals the urban disability and serves at the same time, as a guiding for private and public investment. The publication features beyond ranking some interviews with local governments of the cities that stood out, talking about investments, challenges, inspiration and plans for the future (Revista CSC, 2018).

The maximum score of the general ranking found in the 2018 edition of Revista CSC is 63 points, but none of the Brazilian cities has reached it. It has been achieved 30 points, that is, a score lower than 50% of the ranking. The city of Rio de Janeiro/RJ led the general ranking in 2018 with 29.99 points, followed by São Paulo/SP (29.36 points), Belo Horizonte/MG (28.91 points), Brasília/DF (28, 34 points) and Curitiba/PR (28.10 points).

There are eleven indicators of the ranking CSC(2018): 1) mobility, 2) urbanism, 3) environment, 4) energy, 5) technology and innovation, 6) health 7) safety, 8) education, 9) entrepreneurship, 10) governance and, 11) economy.

The cities that stood out in the ranking are those that already propose solutions to their urban problems and are better highlighted in the set of indicators. São Paulo, for example, led this ranking in 2018 and in 2017 was the city of Rio de Janeiro, both megacities with various problems in urban mobility (Revista CSC, 2018). The editors of the magazine attribute the *gap* of 50% in ranking to the economic crisis that has plagued the country in recent years, causing cuts in investments in several areas, such as health, education, infrastructure, among others.

In CSC magazine (2018) the order of the reports follows the order of the best listed cities, with the first two articles, respectively, with Rio de Janeiro and São Paulo. The first report entitled "Rio de Janeiro the most intelligent city in Brazil", followed by the secondary title "having innovation and collaborative management as its greatest allies, the city ranked in 7 of the 11 indicators of the Ranking" (Revista CSC, 2018, p.11). In the first paragraph of the article, it is exposed that Rio de Janeiro besides the recognition of intelligence in Brazil by the ranking, also "... won heavyweights like São Paulo, Belo Horizonte and Brasília" (Revista CSC, 2018, p. 11). This practice exposes the competitiveness between cities.

On the website of the *Connected Smart Cities* (CSC Ranking, 2018) there is an interview with the executive director of the BMPI and Brasil IP group, Miguel Noronha, who was also a speaker at the event in 2018, in response to the event's own question: What is the relationship between the performance of BMPI and Brazil IP with *Connected Smart Cities* and the theme smart cities? To this question Noronha answered that Brazil IP is a holding company of participations in intelligent urban solutions, anchored in sustainability and innovation.

Noronha's speech (CSC, 2018) reveals that ranking, besides classifying cities, also serves as a strategic tool for the holding company that proposes customized solutions to the demands of cities. Thus, the choice of the indicators of said ranking was made with the main parameter not only the concept of smart city, but mainly, indicators that allow Brazil IP to offer in the market solutions that enable the company to meet the needs of city halls.

Rio de Janeiro City Hall (PMRJ, 2018) also found the press release titled "City Hall of Rio celebrates 1st place in award for smart cities".

The first paragraph of the release mentions that the City of Rio de Janeiro won two awards in the *Connected Smart Cities*. Both awards deal with innovation for cities that are more intelligent and connected to each other, be they small or megacities (PMRJ, 2018).

In the case of the city of Rio de Janeiro, first placed in *the* ranking CSC 2018, there were no other *releases* published on the internet that highlight the position conquered by the capital of Rio de Janeiro when the expression "Rio de Janeiro city smarter" is placed. city, but not specific releases, articles or journalistic articles about the city as is the case of Vienna in the ranking. EIU 2018

Cities In Motion Index: criteria for a smart city

The *Cities in Motion Strategies* (CIMI) is a research platform launched jointly by the Globalization and Strategy Center and the

Department of Strategy at IESE Business School in Spain. It has the coordination of teachers Pascual Berrone and Joan Enric Ricart (CIMI, 2018, p.8). Its goal is to be a tool for mayors, municipal managers, companies and interest groups who wish to improve the quality of life in the city. Thus, research on cities in each category ranking provides information for identifying best urban practices.

The 2018 edition of CIMI brought new indicators such as number of terrorist attacks, compliance levels of ISO 37120 known as the sustainable city standard (NBR ISO 37120, 2017), projections of GDP *per capita* and rising temperatures (due to problems climatic conditions that devastate the whole world). The CIMI, which is in its fifth edition and seeks to analyze the degree of development in 165 cities in eighty countries from indicators arranged in ten dimensions considered fundamental for a city to be intelligent and sustainable.

Among the dimensions of CIMI (2018) are: 1) human capital (development, attraction and promotion of talents), 2) social cohesion (consensus among different groups in a city), 3) economy, 4) environment, 5) governance, (6) urban planning, (7) international reach, (8) technology, (9) mobility, and (10) transportation (ease of locomotion and access to public services).

According to CIMI (2018, p.9), the ranking creates a global network of specialists in cities and private companies with local governments. The aim would be to promote change, as well as to develop innovative ideas and tools to make cities more sustainable and, consequently, smarter.

The CIMI (2018) platform proposes a model of *Cities in Motion* through a governance approach that goes beyond technology, based on four main factors: sustainable ecosystem, innovative activities, equality between citizens and connected territory. The ranking not only lists a city order, but makes recommendations and suggestions through thematic dimensions that assess cities locally and globally, such as:

1) Size is important, though not so much;
2) Finding the right balance is a complex (and permanent) process;
3) Need for an overview;
4) The need for a long-term vision;
5) The first step is a good diagnosis;
6) The benchmark as the beginning of change;
7) CIMI is not a beauty contest;
8) Collaboration as the cornerstone of success;
9) There are many good cities, but the perfect city does not exist;
10) The change is slow for most cities.

The first positions of CIMI (2018) were led by New York (1st position) followed by, 2) London, 3) Paris, 4) Tokyo and, 5) Reykjavik. In an Internet search, there are also releases about the titles found on the first sites, as follows:

1) New York, London and Paris are elected the smartest cities in the world (Glamurama, 2018).
2) 10 smartest cities in the world by 2018 (Forbes, 2018).
3) Meet the 10 smartest cities of 2018: New York, London and Paris lead the top three places in the ranking. No Brazilian city appears on the list (Época Negócios, 2018).
4) New York is the smartest city in the world, according to a study by IESE (Top Media News, 2018).

It should be noted that most of the publications found are not from tourism sites, but from varied sites such as Glamurama (2018), Forbes (2018), Época Negócios (2018) and Top Media News. It is also perceived the use and wide dissemination in the media with the position of cities ranked in CIMI 2018, that is, the same resource of the ranking CSC (2018).

THE STRATEGIC USE OF RANKINGS IN SMART CITIES

The rankings investigated when compared to each other have several similarities. These include: the use of a certain set of indicators that vary in quantity in order to define the proposed objectives and a large number of cities investigated (EIU 140 cities in 200 countries, CSC

700 Brazilian cities and CIMI 165 cities in 80 countries).

They also have different objectives: the EIU (2018) lists the best cities to live in the world, the CSC (2018) lists the cities with the greatest potential for development in Brazil, and CIMI (2018) identifies the best urban practices and their degree of development. The amount of indicators they use to reach their goals is also distinct among rankings. The EIU adopts thirty criteria on a 100-point scale, the CSC uses eleven indicators distributed in three categories and CIMI uses ten dimensions of indicators.

In all the investigated rankings the importance given to the use of technology and innovation was noted. The presence of indicators such as mobility, transportation and the environment is common in rankings. Each ranking brought at least one new indicator: CIMI (2018) brought social cohesion and human capital; The CSC (2018), entrepreneurship and, the EIU (2018), global political stability.

It was observed that none of the cities present in the rankings investigated managed to contemplate maximum score in all the indicators, which revealed that each city has its specificities and it is those specificities that make them different from the others. Several cities also managed to stay in the same positions, others went up or down in the order of the rankings and, others, stopped participating, opening space for new cities.

The rankings reveal an invisible strategic role, that of increasing the degree of perception in regards to considering a city as smart or not. In the absence of a more consensual concept about smart cities, rankings are created by organizations, consulting firms and institutes and research groups of all types and formats, as well as local, regional, national and global.

It can be used rankings in two strategic ways. One that makes cities achieve significant urban improvements. For this, indicators are a fundamental basis for city managers to anchor themselves to generate changes in urban practices and governance. In this way, the initial position obtained in the ranking *is* not so important, because its focus will be to move up in the ranking as it improves or reaches the expected in the indicators and their definitions.

However, several problems arise. One is that in the exchange of governments the interests are other. According to Nogueira (2006) there are continuities and discontinuities in the governments of several spheres: local, state and national. The discontinuity of a government leads to the interruption of initiatives, programs and works, often changing radically the future of a city. The problem in this case is the political bias that makes good projects discontinued simply because the ideas do not come from the government in office.

As a consequence, there is the waste of public resources, loss of memory and institutional knowledge, among other negative factors (Nogueira, 2006). At the same time, it can prevent efforts and resources from being dedicated to projects that undermine a given territory. In this case, good judgment and a non-skewed critical analysis are the best choice. It is noted that, in practice, the exchange of governments makes it difficult to have a certain continuity in a work aimed at changing urban practices.

At one point it may be interesting to think about environmental sustainability and, on the other, the economic or political concern is more interesting.

One example is a green area that surrounds the city, the famous green belt, which can enhance it and highlight it in several aspects, including allowing it to obtain a prominent position in a sustainable urban ranking. This same green area may under other circumstances be the target of major projects, such as urban condominiums and shopping centers and have the support of the local government for the project to be carried out. Classification in an urban ranking can also make it easier or difficult for both situations to be fulfilled, depending on the articulation between the hegemonic social actors and their degree of persuasion with the local community.

It is a question of how one can use a ranking differently from the thought of being in the first position, that is, strategically. It should be noted that reaching the first position is not always difficult, since it requires changes in short periods of time, such as, for example, meeting the criteria of indicators. However, holding on to this position continually proves to be an arduous

task because it presupposes collective and articulated efforts that will make the changes stay in the long term and, moreover, evolve over time.

Another way of using the rankings is linked to the strategies used in the media that put the cities in a kind of multiscale media showcase. This showcase allows cities to be seen from other perspectives, sometimes different from their reality. When it is said that Vienna is the best city in the world to live in or that New York is the smartest city in the world or that Rio de Janeiro is the smartest city in Brazil places these cities in a prominent national and global place, demanding benefits and challenges in their futures.

By placing on *Google* "Vienna, best city to live" the first appearances were of the sites: 1) Viagem and Turismo (2018), 2) DW (2018), 3) UOL Viagem (2018) and 4) UOL Economy (2018). It should be noted that most are tourism sites, such as Viagem and Turismo (2018), DW (2018) and UOL Viagem (2018), revealing the strategy that this global ranking provided to the city of Vienna, as well as the other cities that are in the top five positions. It is also noticeable that there was widespread dissemination in the media with the position of cities ranked in the *Economist Intelligent Unit,* noting that the *ranking is* part of a research and analysis group linked to the English magazine *The Economist*, that is, the economic aspect is strongly valued.

It is noted that the global cities, Vienna and New York, used a lot of media on the internet, being on several sites of different segments, strengthening their positions as best cities. It is noteworthy that the city of Rio de Janeiro did not take advantage of the same internet strategy in 2018, in contrast to its participation in previous years in the same ranking. Possibly one of the reasons for this decision were the negative events that occur in 2016, both in the city and in the State of Rio de Janeiro, which exposed their urban problems nationally and globally.

As an example, in 2016 the city of Rio de Janeiro faced numerous problems in several areas with the proximity of Rio 2016 Olympics, including the State of Rio de Janeiro sent a press release that it was in a state of public calamity (Almeida & Engel, 2017). However, in 2018 it received the position of being the smartest city in Brazil in the ranking CSC. The media showcase of the city of Rio de Janeiro next to the Rio 2016 Olympics event certainly projected it multistage, as well as enabling urban management at the time to create a brand for the city, Rio de Janeiro, a trademark of Brazil (Almeida & Engel, 2017) . However, in 2018, even with the status of first position in a Brazilian urban ranking with national notoriety, municipal management opted for a more media-friendly visibility.

What goes unnoticed is that the rankings use a set of indicators, with a ranking among the indicators themselves. Thus, while sustainability and mobility indicators, for example, can score higher, indicators, social and energy, can score less. On the whole, there will be an average of all the indicators, but the ones that score the most can lead to a more privileged position. Even with the problems in 2016 and with the highlight in the ranking of CSC in 2018, for example, Rio de Janeiro could have explored more its ranking position. It could have used local and national media and tapped to invest in a more positive public and global image. At the same time, withdrawing from a more intense media exposure is also a strategy of the social actors at that time.

In all rankings investigated the innovation and technological resources are mentioned and are linked to the expression of smart city. This research has not deliberately adopted a specific concept of smart city because the rankings also use different concepts. However, it is questioned the use of the adjective smart to the cities and if it would have relation only with the use of the technology, referring to a single sector, the technological one, or if by smart would be the use of the technological resources linked to the environmental sustainability (Milk & Awad, 2012). It is known that the finitude of natural resources is a reality throughout the world, as well as the serious urban problems, especially megacities (Souza, 2000; Mueller, 2007; Coy, 2015). In this sense, it is proposed that the central focus is not to consider which city is or is not smart or which is the smartest, but to reflect on which urban management practices can lead a city to the status of smart.

Many rankings of smart cities focus on indicators that expose the use of technology and / or specific measures of environmental sustainability, obtaining a good classification in indicators with greater weight, leading to different leadership positions. The way these positions are put in the media in articles or *releases* by urban managers is that it will require strategies to change the perception of a given city.

As an example, the ranking CSC, in which the city of Rio de Janeiro occupies the first position, but not in all indicators. If the analysis of CSC 2018 is by theme, other leaderships emerge, such as: a) São Paulo obtained the first place in Urbanism and Mobility and Accessibility; b) the city of Santos / SP led the axis of Environment; c) Pirassununga/SP, obtained the best score in Energy: Pirassununga (SP); d) the city of Rio de Janeiro ranked first in Entrepreneurship, Technology and Innovation; e) the Health and Education axis were led by Vitória/ES; f) the theme of Security was with Ipojuca/PE; g) Governance with Curitiba/PR; and, h) the Economics axis, led by Barueri/SP.

When getting the first overall position in a ranking it seems that the city got better score on all indicators, which is not true. The rankings, for the most part, have a general classification and another by theme, allowing several leaderships (Figure 2). It is noticed that in the set of indicators there is no cohesion in the score, because it depends on the central objective of the ranking. It can be seen that cities still have a great deal to develop in what concerns the concept of smart city, regardless of which concept it adopts.

Classificação Geral Ranking Connected Smart Cities | Histórico das 4 Edições

INDICADOR	2018	2017	2016	2015
Connected Smart Cities	Curitiba	São Paulo	São Paulo	Rio de Janeiro
Mobilidade e Acessibilidade	São Paulo	São Paulo	São Paulo	São Paulo
Urbanismo	São Paulo	Santos	Curitiba	Curitiba
Meio Ambiente	Santos	Belo Horizonte	Belo Horizonte	Belo Horizonte
Energia	Pirassununga	Tubarão	Guarapuava	Guarapuava
Tecnologia e Inovação	Rio de Janeiro	Rio de Janeiro	São Paulo	São Paulo
Saúde	Vitória	Vitória	Vitória	Vitória
Segurança	Ipojuca	Vinhedo	Ipojuca	Ipojuca
Educação	Vitória	Curitiba	Vitória	Vitória
Empreendedorismo	Rio de Janeiro	São Paulo	Rio de Janeiro	Rio de Janeiro
Governança	Curitiba	Barueri	Curitiba	Curitiba
Economia	Barueri	Barueri	Rio de Janeiro	Rio de Janeiro

Figure 2: History of *the ranking* CSC 2015-2018
Source: CSC (2018).

There are cases where cities score high but have high levels of crime, injustice and inequality, leading to serious social, urban and sustainable problems in the different strata of society. As an example, we can mention the city of São Paulo that, although it obtained first place in Urbanism, Mobility and Accessibility in the ranking CSC 2018 has serious problems in mobility, being this

a reality in practically all megacities. This situation is demonstrated in the various media articles and articles that address mobility as an urban problem in cities in the new millennium (Figure 3).

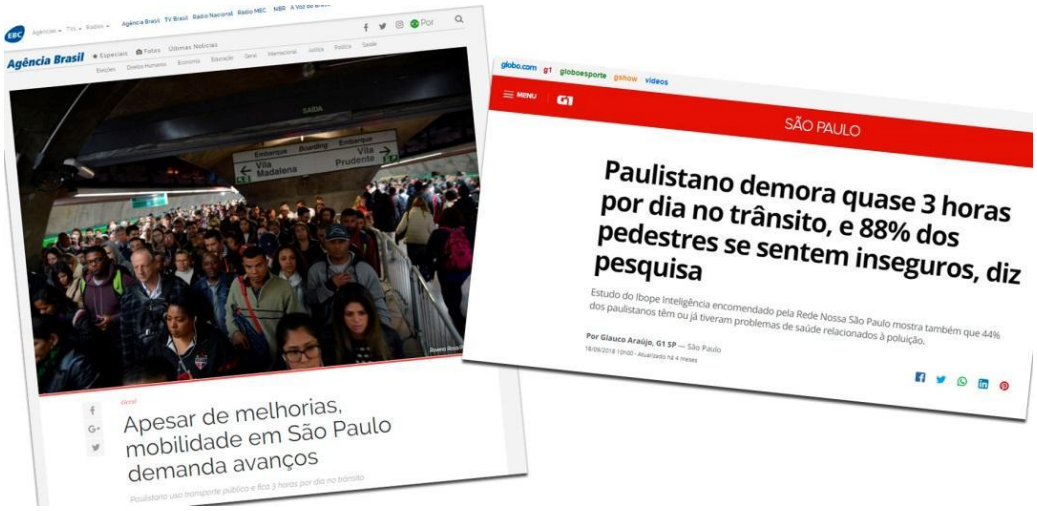

Figure 3 - Articles on mobility problems in São Paulo/SP.
Source: Agência Brasil (2018) and G1 (2018).

According to CIMI (2018, sp) "[...] one of the greatest challenges for cities is to become urban centers that are simultaneously prosperous, equitable and inclusive". The impasse makes complex the achievement of the balance of indicators in the *rankings*, as well as unlikely to unite economic issues with social, or urban mobility with natural resources, to cite two examples.

In this sense, innovation becomes a pertinent argument because it makes it possible to find new alternatives to old urban problems. Innovation seen as a propeller of new or reinvented ideas of products and processes in the environment in which smart cities have been articulated in contemporary times is relevant.

The OCDE (2019) sees innovation as a product or process of an organization and, in this sense, it can be said that urban problems make possible new entrants in the technology sector, that is, the sector expands with new companies proposing solutions technologies to cities.

For Blaug (1963) and Rosenberg (1982) innovation comes from research that suggests the solution to something, both in the sense of creation and reinvention. Because of this view, innovation is a very important element in the context of intelligent cities, since it allows urban problems to be solved both by the use of a totally new technology and by the way of reinventing a problem considered old, such as urban mobility, for example.

In view of this exhibition, one can think of urban *rankings* innovative and strategic tools for urban management practices in order to improve people's quality of life. At the same time, urban rankings enable cities to connect to one another to create a network of smart cities. The finiteness of the natural resources and the strength of the market make the cities have to explore other possibilities in their realities which leads to the reflection on the use of the intelligent adjective.

It also reveals the presence of a global smart cities market that is on the rise. This reality is perceived through the numerous *rankings* that exist and that pressure cities to adopt particularities of smart cities, such as the use of technology, for example. The existence of a specific demand is understood by the market of smart cities, whether due to technology bias or environmental sustainability, which involves cities and influences their future trajectories.

In this case, it is not enough for the city to overcome its urban problems, it is necessary that it is also seen and accepted as intelligent and, in this sense, urban *rankings* have to play a strategic role. They still fail to design two major

sectors, technology and environmental sustainability. For these reasons, it is important to reflect critically on the concept, practices, uses and dimensions of these cities as smart and innovative in the local context to the global, as well as the strategic use of urban *rankings* in the expansion and strengthening of a smart cities market.

The function of the urban *rankings* is to map the cities from a specific goal that varies from *ranking* to *ranking* even if all approach the context of smart cities.

The variation lies in the thematic axis led by the city and the way in which urban management uses this advantage to expose it in the media strategically. In making such media disclosure, city managers choose to emphasize a part of the city or a perspective only, but emphatically. If the city does not have such an orderly urban mobility, for example, the focus is on entrepreneurship and education, and when leading a national or global urban ranking in this area, it is much easier to divert attention from other urban problems.

If the look is directed to the thematic axes in which a certain city has gained leadership, it will be possible to observe the evolution of the city or even the conflicts and partnerships between its social actors. One can even elaborate a timeline of a particular city that presents its evolution as a smart city. This discussion about public management and the way in which urban rankings *are* used to understand the ramifications of this contemporary practice is important.

FINAL CONSIDERATIONS

The research sought to understand the function of the rankings in relation to the perception about the construction of the concept of smart cities, positioning them as innovative, while at the same time articulating them tactically as smart cities. It is noted that the use of urban rankings is used strategically by the media in a way that transforms, designs and ambitions that the city be perceived as an smart city. We even realized that in the use of the media, there were calls with titles that exposed some degree of competitiveness between cities.

The urban rankings, in this sense, fulfill the function of making perceptible which cities are or are not innovative, or which city is smarter than the others, positioning them and articulating the exposure in the media about the position conquered in the ranking. It is observed that the rankings investigated brought one or other thematic axis that distinguished them from each other. This "novelty" in the rankings is understood as a positioning strategy, strengthening the idea of a market of smart cities connected in a network format. It is still a way of saying that the city stands out in one or another aspect, being supported by the media.

Being in a ranking of smart cities, national or global, already highlights the city, even if it is in the last position, because not all can enter the ranking. An smart city may be the best to live, or the one with the greatest potential for development or the most sustainable, or the one with the greatest degree of innovation or technology or with a greater degree of knowledge, intellectual capital, in fact, depends on what is considered in the smart adjective.

All cities, especially megacities, have urban problems consistent with their physical dimension and appropriation of physical and symbolic space by their set of social actors. Urban mobility, for example, is a major problem that managers in a city need to solve or, at least, mitigate.

The research made it possible to keep in mind that innovation is about something new or reinvented, be it a product or a process, it is perceived that the city, seen as a product, comes from a collective work of the relation of several social actors with the urban space and its surroundings, as well as with nature itself.

In dealing with their urban problems, social actors try to find ways to solve them in the short, medium and long term. And in finding solutions, the city continually reinvent itself, which reveals its innovative side. Innovation is not necessarily linked to high technology which is one of the biggest criticisms of smart cities.

The smartness of cities comes from the creative and innovative ways in which it proposes solutions to a given urban problem or the way in which it perceives the finiteness of natural resources or how it uses its technological resources at that moment. The arduous task of city managers is to discover the balance between

the use of natural resources and the use of technology.

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