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Unveiling the Smart City Concept: Perspectives from an Emerging Market via the Social Representation Theory

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Abstract: This study aims to investigate the perception of citizens about the smart city construct since, so far, there is no consensus on what a "smart city" really is. As a result of this, the term has been used in different circumstances and with different names and is associated with several conceptual variants. Thus, the novelty of this work is based on capturing this perception and comparing it with the definition of the smart city found in the scientific literature in order to identify similarities and cognitive gaps and refine the smart city concept—a still open knowledge gap. For this purpose, the Social Representation Theory was used, operationalized by the evocation of words technique. The study was carried out in Brazil, herein considered as a proxy for other emerging markets with regard to smart cities. The results indicated a highly technocentric view on the part of citizens about the smart city concept. In addition, citizens did not realize some dimensions of smart cities that are often addressed in the scientific literature, such as People, Citizen Participation and Culture. Finally, it was noticed that most of the existing scientific literature on the definition of the smart city comes from developed countries rather than the Global South—curiously, where the largest urban agglomerations with the biggest problems to be faced are located. Thus, research on the concept of smart cities in developing countries is necessary, which is one of the motivations for the development of this work.

Keywords: smart city; information and communication technology; mobility; sustainability; social representation theory

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1. Introduction

Since the emergence of the first cities centuries ago, the urban population has substantially increased, and cities have become more intricate and significant [1,2]. The United Nations [3] expects that 60% of the world's population will live in cities by 2030, and this high-speed growth tends to overload the urbanization process [4]. Moreover, the management of cities must become increasingly tricky, with increasing challenges associated with sustainable development issues. Thus, cities around the world need smarter ways of development to overcome these new hurdles [5–7]. In addition, the smart city concept encompasses several areas, such as technology, society, public policies and politics, inasmuch as there is an effort to achieve the Sustainable Development Goals and reconcile them with the rapid growth of cities [8]. However, so far, there is no consensus about the smart city construct [1], a research gap that remains open [9,10]. Indeed, despite the wide usage of the term "smart city" and various efforts to define it, there is still a significant lack of consensus regarding its meaning, encompassing qualities, characteristics, or components [11,12]. In line with this, literature reviews have revealed that scholars from different knowledge areas have proposed different definitions for this concept and even in the social sciences, there is no consensus on the subject [13]. Consequently, utilizing the concept of smart city in practice, particularly in the formation and implementation of city development strategies, may result in an ineffective allocation of limited resources and misguided actions. Such policy errors can have significant long-term consequences [9]. In sum, in addition to the

lack of a monosemic definition for a smart city, questions also arise about what makes a city be considered smart, as well as its main characteristics, as argued by scholars who have investigated the evolution of the concept of the smart city over time [14,15].

Suddaby [16] argues that the clarity of a construct is fundamental in the advancement of academic research, which is achieved by meeting four requirements: the definition of a concept through the use of language; the circumstantial conditions wherein the construct is applicable (or not); the semantic relationships of the construct with other constructs; and the consistency of the logic of the construct concerning the theoretical argumentation wherein it is inserted. As Social Representation Theory (SRT) has become an efficient approach for understanding constructs in the field of Information Systems [10], this article uses SRT to identify the social representation of smart cities according to their ordinary citizens, in order to compare it with the existing literature on this subject. The objective of this work is, therefore, to identify similarities and cognitive gaps to clarify the definition of the smart city construct [11], in order to propose a consolidated definition for the same based on the perception of ordinary citizens of emerging markets, which is the uniqueness that this study aims to achieve when compared to other works that have already investigated the concept of the smart city. Therefore, the main objective of this paper is to address the following research question: what is the social representation of a smart city according to Brazilians citizens?

The selection of Brazil is justified by the fact that its context can serve as a proxy for other emerging markets when it comes to smart cities. This assertion is backed by two pieces of evidence. Firstly, this country faces significant obstacles in implementing smart cities due to inadequate connectivity infrastructure and a notable digital divide [17]. Secondly, similar to many other emerging markets, Brazil has a limited number of smart city initiatives [18].

Apart from this introduction, this article is divided into five sections. The next section introduces the theoretical framework, followed by the methodological procedures adopted and the results found. The results are then discussed and finally the conclusions—including the theoretical and practical implications accrued from this research, as well as its limitations—are set forth.

2. Theoretical Background

2.1. The Foundations of Smart Cities

The exponential rise of urban populations has resulted in many operational challenges, including resource depletion, compromised public health, pollution, inadequate waste management and urban decay [19]. Cities across the world have attempted to address these obstacles by extensively incorporating technology to enhance the quality of life for their inhabitants. Therefore, the notion of a smart city has emerged in this context of rapid urbanization [6].

Until now, there is no agreement on the exact definition of a "smart city" [20], resulting in multiple conceptual variations of this expression due to its use in different circumstances and under different designations [1,21,22]. However, while there are several definitions of a smart city, certain commonalities exist across most of them, including (1) implementation of ICT to facilitate and manage operations; (2) incorporation of technological infrastructure; (3) provision of superior services to citizens; (4) unification of systems and infrastructure to foster economic, social, cultural and environmental progress; and (5) a forward-looking perspective towards a better future [19]. While most of the initial definitions of smart cities focus on the introduction and use of ICT [23], more recent research has included the needs of citizens, as well as the quality of life in the city [20].

2.2. Theoretical References on the Smart City Concept

For this study, through a literature review, 21 articles were found about the concept of the smart city. These papers were then analyzed thematically [24,25], whereby 16 distinct categories associated with the selected papers were identified. Table 1 indicates the relevant

categories referenced in each of these publications. Next, the categories found in the publications were totaled, as shown in the last line of the table. In Table 1, one can observe the myriad of categories associated with the concept of the smart city in the scientific literature, as well as the various combinations between them, as proposed by the referenced authors. This multiplicity of concepts about smart cities is corroborated in a scientometric review of the academic literature produced from 1990 to 2019 on smart cities [14]. One can also see the relevance of technology—for academia—for the definition and conceptualization of smart cities—a fact that has been perceived since the emergence of research on this topic. Subsequently, as seen in Table 1, sustainability, over time, begins to become an important dimension in the conceptualization of smart cities.

Table 1. Main categories of smart cities retrieved from the literature review.

		Main Categories—Smart Cities															
Theoretical References	**Year**	**Tech nology**	**Sustain ability**	**Inno vation**	**Services**	**Economy/ Business**	**Infrast ructure**	**Quality of Life**	**People**	**Mobility/ Transport**	**Plan ning**	**Society**	**Inte gration**	**Effi ciency**	**Culture**	**Conne ctivity**	**Safety**
[26]	2007	o	o	o	o	o	o	o	o	o	o				o	o	o
[27]	2008	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
[28]	2011	o	o	o	o	o	o	o	o	o		o	o	o	o	o	o
[29]	2011	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	
[1]	2011	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
[30]	2012	o	o			o	o	o	o	o	o	o	o	o	o	o	
[31]	2012	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
[32]	2013	o	o	o	o	o	o		o		o	o	o			o	o
[33]	2013	o	o	o	o	o	o	o	o	o	o	o	o		o	o	o
[4]	2014	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
[6]	2014	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
[34]	2015	o	o	o	o			o		o	o		o	o			
[35]	2015	o	o	o	o	o	o	o	o	o	o	o	o	o			o
[19]	2015	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
[36]	2015	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
[37]	2016	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
[8]	2017	o	o	o	o	o	o	o	o	o	o	o		o	o		o
[38]	2018	o	o	o	o	o	o	o	o	o	o	o	o	o	o		
[39]	2018	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
[40]	2018	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
[18]	2019	o	o	o	o	o	o	o	o			o	o	o	o		
	21	21	21	20	20	20	20	20	20	19	19	19	19	18	18	16	16

2.3. Social Representation Theory

Humans try to understand the complex environment they live in to make it more predictable and controllable. Social representations help in this, which are defined as "systems of opinions, knowledge, and beliefs specific to a culture, social category or group, concerning objects in the social environment" [41]. Indeed, social representations consider individuals' perceptions of a given social phenomenon, making it possible to understand how social identity is formed [42]. Serge Moscovici developed the Social Representation Theory (SRT) in the 1960s to comprehend the advancement of common sense within diverse human communities. Based on that, SRT became one of the leading approaches to studying social groups [43,44].

For Jodelet [45], social representations are images that assemble multiple meanings, allowing people to interpret what happens around them. The emergence of a social representation is usually concomitant with a new circumstance, with an extraordinary phenomenon [46]. Several studies have used SRT to improve the understanding of a particular concept, seeking the most precise definition of a construct, for example, [47–50]

to provide just a few. Thus, in this work, SRT is used to understand how society perceives the smart city concept.

2.4. Central Nucleus Theory

Based on Moscovici's theory and Asch's [51] work on social perception, Abric proposed the Central Nucleus Theory [52,53], which contributed to the understanding of some socio-cognitive factors mandatory for the organization of social representations [41]. A social representation is composed of two primary subsystems: the central nucleus and the peripheral system. The central nucleus is a crucial element that determines the organization and significance of the representation. At the same time, the peripheral system captures the different perceptions of the society about a concept, thereby supporting the heterogeneity of the group and accommodating possible contradictions brought by the immediate context, being liable to revision and negotiation [53–56]. Finally, the central nucleus and the peripheral system can be represented by the Vergès' quadrants, a graphical representation developed for a quick and easy visualization of the social representation [53,57].

3. Methodological Procedures

This research relies on a qualitative-quantitative methodological approach, with data collected via the evocation of words technique and analyzed by means of the four-quadrant technique (Vergès' quadrants), as well as implicative statistics and content analysis [44,49,58]. The sample of respondents was obtained through social media contacts, including participants who were aware of the term "smart city". The data collection occurred from April to June 2020. Approximately 1200 questionnaires were distributed via email and direct messages through social media platforms. Two experts specializing in social representation and the evocation of words technique also endorsed the questionnaire. The evocation of words technique—based on gathering words that individuals articulate when they are orally or in writing presented with a particularly suggestive expression or word—is one of the main techniques to define a social representation [44,59]. The method consists of requesting the participants to mention the first five words or phrases that immediately come to their minds [56] when they are exposed to a particular expression—in this case, "smart city." Once the words had been evoked, additional questions were introduced to carry out the implicative statistics and content analysis, which aim to confirm the social representation obtained, as well as to understand the reasons why the five specific words were evoked [49].

The words evoked were tabulated in Excel, where semantic analysis and word corrections were performed to create the categories which emerged from the survey. Then, the categories were analyzed manually by the authors with the help of the EVOC software 2005 [60], allocating words into categories or clusters associated with the social representation under study, and positioning them in the four quadrants scheme developed by Pierre Vergès [58]. Vergès' four-quadrant technique cross-checks the evocation frequency of the categories with the order of evocation of the same, combining both quantitative and qualitative analyses [49,61,62]. According to Vergès' four-quadrant technique, to define the central nucleus of a social representation, the following steps must be performed: (i) organization of the words evoked into categories or clusters; (ii) calculation of the frequency of evocation; (iii) calculation of the average order of evocation; (iv) deployment of the reference points (averages) such that the categories are placed correctly within Vergès' four quadrants—namely, calculation of the average frequency of evocation (AFE) and the mean figure for the average order of evocation (AOE); and (v) individual comparison of the values referring to the categories with the AFE and the mean figure for the AOE, thus obtaining Vergès' framework [48,49].

The average frequency of evocation (AFE) is calculated by the median of the total number of evocations per evoked word, while the average order of evocation (AOE) is obtained from the average order in which the words of a given category were evoked, namely first, second, third, fourth or fifth place. Then, for the categories included from

the cutoff point of the AFE, the mean value of the AOE of these categories is calculated. This calculation makes it possible to identify the cutoff point for the distribution of the categories within Vergès' quadrants [55,57]. Figure 1 describes how the distribution of the AFE and average of the AOE values are placed within Vergès' four quadrants to define the social representation of the smart city.

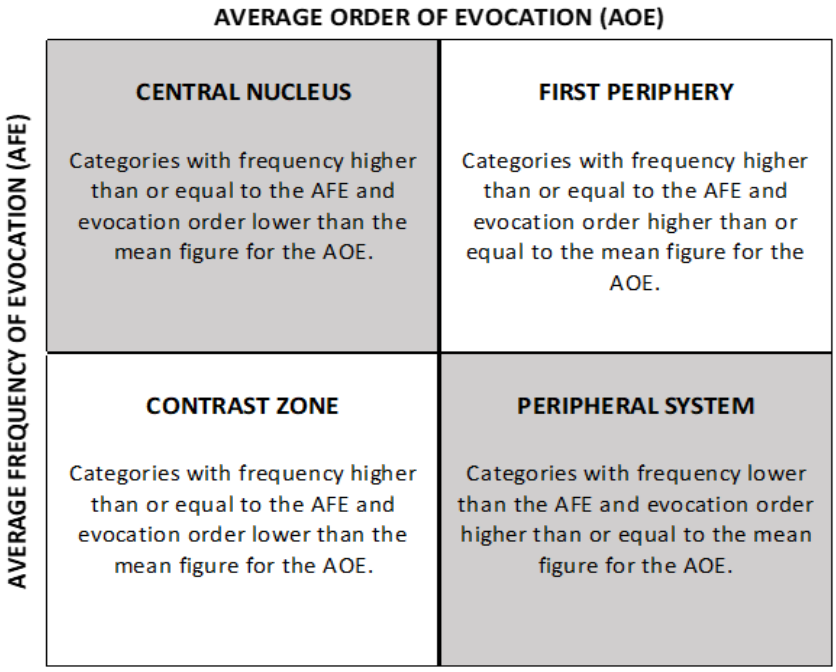

Figure 1. Vergès' four-quadrant technique. Adapted from [44,56].

According to Pereira [63], to validate the central nucleus and the peripheral system of the social representation, one must carry out a similitude analysis through implicative statistics, as well as content analysis. Therefore, after assembling the Vergès' quadrant, the similitude and content analyses were performed using the R-based software Iramuteq version 0.7 alpha 2. The content analysis included the Descending Hierarchical Classification (DHC).

4. Results

4.1. Sample

As the objective of this work is to identify the citizens' perception about the smart city concept, all people residing in urban areas who were familiar with the smart city concept were considered eligible to participate in this research. Thus, to compose the sample for this investigation, an online snowball sampling was carried out using both email and direct messages via social media, namely Whatsapp and Linkedin [64]. This process led to 1200 people dwelling in cities being contacted online of which 348 citizens accepted the invitation. From this total, 284 persons participated in the evocation of words and answered the questionnaire in full—this entire process was conducted in Portuguese, as all respondents were Brazilian. In addition, of the 284 respondents considered, 205 said they were familiar with the term "smart city" (72%). Thus, the final sample comprised those 205 respondents, and its sociodemographic characteristics are presented below (Figure 2).

As the research assumes that the interviewees live in an urban area and are familiar with the smart city concept, one can infer the suitability of the selected sample vis-à-vis the target population of the research. Besides, the results of surveys using SRT involving about 100 participants are not very different from others involving larger samples [65]. Therefore, with 205 valid respondents, we considered the sample obtained in this research sufficient to analyze the proposed social representation.

Sample Summary Profile
205 participants (who fully responded to the survey, knowers of the term Smart City)
1.025 words cited to represent the term Smart City
11 Brazilian states: 93% from Rio de Janeiro and São Paulo
Average age 45 years old
69% Men and 31% Women
87% Graduated, M.Sc. or Ph.D.
43% Private Companies' employees, 20% Business Owners, 16% Public Employees etc.

Figure 2. Sociodemographic Characteristics of the Sample.

4.2. The Central Nucleus and the Peripheral System

The following question was posed to the participants to define the social representation of the smart city: "When you think of SMART CITY, what are the first five expressions that come to your mind?" From the 205 responses from the survey, 1,025 evoked terms were obtained. Once the evoked expressions were tabulated, the authors manually conducted the respective categorization process, which resulted in 162 categories. Next, the minimum evocation frequency value was computed to determine the placement of categories within the four quadrants of Vergès' framework. It should be noted that the average frequency of evocation is widely recognized in academia as the minimum cut-off frequency to be adopted in research that uses social representation [66]. As a result, the inverse accumulation of words with evocation frequencies from 22 to 88 times totaled 518 words, encompassing 12 different categories and representing 50.5% of the total of 1025 evoked words. That is, to appear in Vergès' quadrants, the category must have been evoked at least 22 times in this research. Of the 12 categories obtained from the most cited words—namely, that were evoked 22 or more times (7.4% of the total)—Technology was the most cited category (8.6%), followed by Mobility (8.2%) and Sustainability (6.7%). Table 2 illustrates the frequencies and calculations of the AOE for each of those 12 categories.

Table 2. Frequencies and calculation of the AOE of the Vergès' quadrant's categories.

	1st Citation	2nd Citation	3rd Citation	4th Citation	5th Citation	Frequency	AOE
Citations	***f1***	***f2***	***f3***	***f4***	***f5***	$\sum f$	
Technology	36	17	12	13	10	**88**	**2.36**
Mobility	28	20	18	10	8	**84**	**2.4**
Sustainability	19	16	16	6	12	**69**	**2.65**
Connectivity	23	7	9	6	2	**47**	**2.09**
Safety	4	8	11	13	5	**41**	**3.17**
Ease of Use	4	4	8	10	6	**32**	**3.31**
Integration	4	10	5	5	7	**31**	**3.03**
Efficiency	4	7	4	6	8	**29**	**3.24**
Innovation	8	4	9	5	2	**28**	**2.61**
Planning	8	3	8	2	3	**24**	**2.54**
Quality of Life		4	6	5	8	**23**	**3.74**
Agility	2	5	4	5	6	**22**	**3.36**

The median frequency of the 22 categories (31) and the average of the AOE of the 22 categories (2.84) were the cutoff point for the allocation in the top or bottom and left or right quadrants. After the calculation of the AFE and AOE, it was possible to allocate the categories into Vergès' quadrants, composing the first design of the social representation of the smart city, as shown in Figure 3.

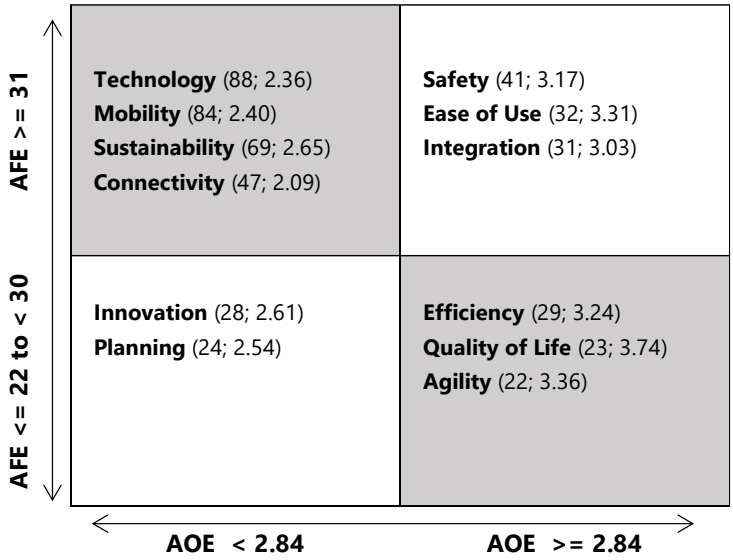

Figure 3. Vergès Quadrant for the Smart City Social Representation.

To validate that social representation, one must carry out a similitude analysis through implicative statistics, as well as content analysis, as presented below.

4.3. Similitude Analysis

The similitude analysis identifies the most relevant categories among the analyzed ones [67,68]. Thus, using Iramuteq software version 0.7 alpha 2 [50], the similitude tree was generated with the 12 listed categories that comprise the social representation of the smart city (Figure 4).

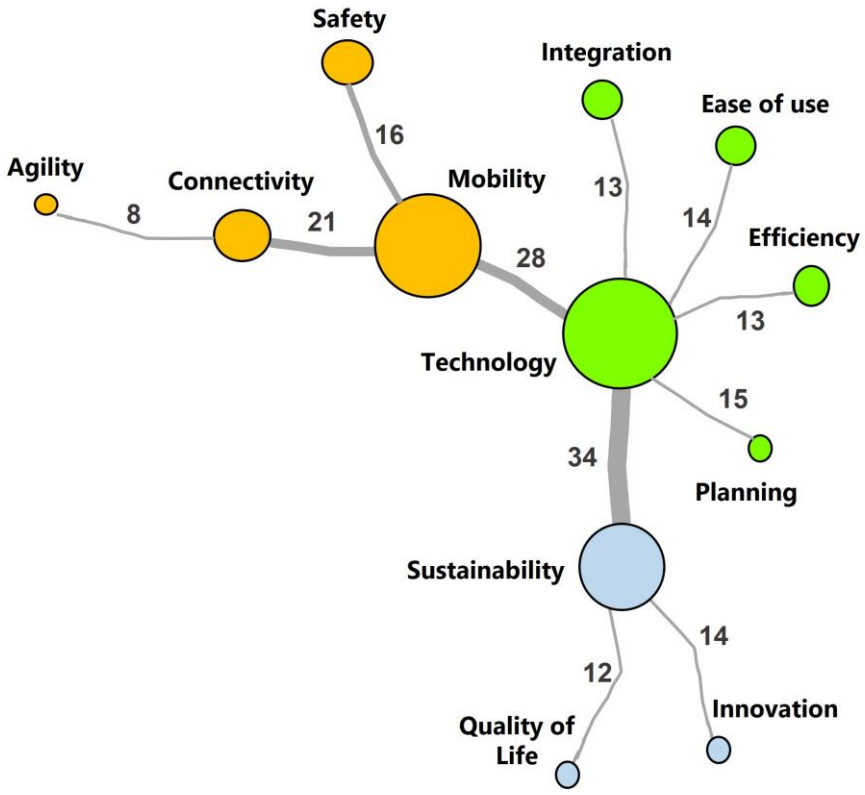

Figure 4. Smart city similitude tree.

We found three categories with greater relevance in the similitude tree—i.e., with the highest number of co-occurrences (connections), edges (lines), and frequencies (circle size)—namely, Technology, Mobility and Sustainability. Technology has the greatest connectivity, with the largest number of edges and co-occurrences with the other categories. Thus, when comparing the similitude tree with the Vergès' quadrant, Technology is confirmed as the most significant component of the central nucleus, being the strongest link among the other categories that represent smart cities. Then, Mobility and Sustainability follow, with more than 60 co-occurrences each. Connectivity appears next, although with lower co-occurrence. However, as the AOE of Connectivity is low, this category is characterized as having a priority position in the evocation order.

While Security has a high frequency of evocation, its sum of co-occurrences and edges is much lower than the first four categories, and its AOE is much higher. Thus, it does not appear in the Central Nucleus of the social representation with the others. Connectivity, for example, presents many more co-occurrences than Security. Finally, Efficiency, Quality of Life and Agility—all located in the peripheral system—present similar behavior in the similitude tree.

4.4. Content Analysis

To allow a comparative analysis with the results of the social representation obtained via EVOC, content analysis was carried out through the respondents' open responses, addressing the reasons for having chosen the first word evoked about the smart city concept. These responses consisted of phrases organized in a specific text file format so that they could be read and analyzed via Iramuteq software version 0.7 alpha 2 [56]. The content analysis included the Descending Hierarchical Classification (DHC) and Correspondence Factor Analysis (CFA), as shown in Figure 5.

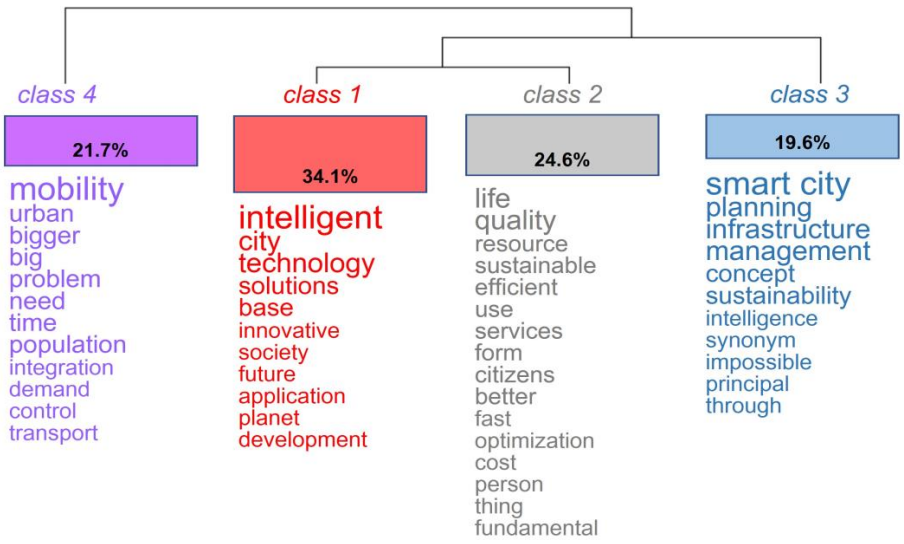

Figure 5. Smart city dendrogram (DHC).

The results generated by Iramuteq show four classes of words (Figure 5). A dendrogram was then generated to illustrate the hierarchical grouping of words (DHC), thereby allowing for the interpretation of the word classes. Of the 201 phrases, 138 (71.1%) contained appropriate explanations and were considered by the system.

The dendrogram presents classes 1 and 2 as the most significant, in terms of concentration of text segments, both in the center but derived from the trunk that joins classes 3 and 4. Class 1, with 34.1% of the text segments, indicates that smart cities have a strong connection with technology, which is the basis capable of providing solutions and innovations that bring development. Moreover, Class 2 accounted for 24.6% of the text segments and praised the improvement in the quality of life in smart cities through the efficient and optimized use of sustainable resources. Next, Class 3 accounted for 19.6% of the text segments and

praised the planning and management of cities through the efficient and optimized use of sustainable resources. Finally, Class 4, with 21.7% of the text segments, powerfully highlights Mobility as the biggest problem in cities.

Through content analysis, Quality of Life stands out very significantly in DHC as being directly linked to the leading group. Furthermore, the category stands out as the strongest in class 2, together with the central group (class 1) of DHC. Moreover, by analyzing the phrases, it is observed that this category represents people's expectations of a smart city. In addition, as seen in the theoretical framework, Quality of Life is one of the most common categories in the scientific literature on smart cities, appearing in almost all articles cited, as shown in Table 1. Thus, based on the content analysis, Quality of Life was transferred from the peripheral system to the central nucleus [50], composing the final social representation of a smart city, as shown in Figure 6.

CENTRAL NUCLEUS **Technology** **Mobility** **Sustainability** **Connectivity** **Quality of Life**	*FIRST PERIPHERY* **Safety** **Ease of Use** **Integration**
CONTRAST ZONE **Innovation** **Planning**	*PERIPHERAL SYSTEM* **Efficiency** **Agility**

Figure 6. Final social representation of the smart city.

5. Discussion of Key Findings

The ultimate social representation of a smart city enabled the identification of the categories that are most strongly linked to this notion, thus embodying the local collective thinking. Every category found in the social representation is among the most frequently cited by theoretical references, especially those situated in the central nucleus, namely Technology, Sustainability, Mobility, Connectivity and Quality of Life.

Although Innovation, Services, Economy and Infrastructure are recurrent themes in the literature on smart cities, they were not included in the central nucleus of the social representation of this concept, although Innovation was located in the contrast zone of the social representation. In addition, People, Society (also called Citizen Participation) and Culture were absent from the social representation of smart cities in Brazil, although they are some of the most referenced topics in the scientific literature on the subject. In addition, Security—despite having a less prominent role in the theoretical framework—was also outside the central nucleus of Vergès' quadrant.

Next, the categories that comprise the central nucleus of the final social representation of the smart city are analyzed.

5.1. Technology

Technology is fundamental for a smart city since ICT increases the efficiency and excellence of all urban systems: life, work, transport, entrepreneurship, green development, environmental protection, administration and security [27,35]. In the present study, Technology appears in the central nucleus, associated with the highest evocation of words frequency, and, therefore, the main category of the social representation of a smart city. This

importance was confirmed by the similitude tree, in which Technology is the central point of connection with other important categories. Regarding content analysis, Technology is also confirmed in the leading group of DHC; it is mentioned in the open responses as an essential attribute for the functioning of smart cities. It is also referred to as the attribute that connects the city to people, enhancing urban development and improving the living quality of citizens.

5.2. Mobility

The second most important category of social representation is Urban Mobility, which includes Transport. It is a category with a strong connection with Technology, a fact supported by the similitude tree. Mobility also appears strongly linked to Connectivity and Security. A transport system that allows intelligent connections, with less cost, less time spent traveling and also safety, seems to be highly valued in Brazil. Furthermore, the need for secure mobility in emerging economies is an aspect that seems to explain the strong relationship between Mobility and Security. Mobility was mentioned in the content analysis as an urgent issue, much more frequently mentioned than Security. Considering the great propaganda in Brazil about the improvement of mobility—due to global events such as the World Cup in 2014 and the Olympic Games in 2016—we realized that there were high expectations regarding the improvement of urban public transport. However, these expectations were not met for the low-income population and for those who, despite being able to pay for private transport, wish to use public transport more often [69]. In addition, reducing time spent in traffic is a highly valued issue for all citizens. The lack of Security in the central nucleus, appearing only in the first periphery, was surprising, as it is a very present issue in the daily life of large Brazilian urban centers. Indeed, even appearing as the fifth most cited category, Security was not confirmed in the central nucleus, probably because most respondents in the sample can afford to use private transport, which makes them feel more protected than the others who need to use public transport or walk through cities.

5.3. Sustainability

Caragliu et al. [29] cite socio-environmental sustainability as an important strategic component of a smart city. In fact, how the cities' operation is planned is of fundamental importance for their sustainable strategic development [37,70]. In the Vergès' quadrant, Sustainability appears as the third main category of the social representation of the smart city. Its high frequency and low AOE took it to the central nucleus. Furthermore, the similitude analysis verified the direct link between Sustainability and Technology, as well as between Sustainability, Quality of Life and Innovation. Undoubtedly, it is difficult to think about actions that involve large urban centers without the Sustainability issue being observed [70]. Although the construct Sustainability has multiple interpretations [71], the content analysis found that the term is closely associated with socio-environmental aspects, such as resource use, pollution control and quality of life.

5.4. Connectivity

Gil-Garcia et al. [19] argue that connectivity—commonly associated with technology-enabled connections to integrate data in real time—is a critical factor in the everyday life of smart cities. Connectivity is also one of the leading indicators analyzed by smart city rankings [72,73]. Connectivity is the fourth most remembered category, with the lowest AOE in the Vergès' quadrant as it occupies the first position in the evocation order. Although in the scientific literature, the term is reasonably associated with Technology, with both placed in the central nucleus, in the analysis of similitude, this dimension is directly related to Mobility and Agility. Concerning Agility, it is associated with the speed provided by digital connections. In the content analysis, people also cite Connectivity as a fundamental attribute in setting up a smart city. In the quotations, the notion of connection in cities—between systems, sensors, smartphones, people and places—is very present.

Connectivity is, therefore, seen as an intrinsic factor to the operation of a smart city, thereby generating perceptible benefits to the community.

5.5. Quality of Life

Quality of Life is one of the most desirable consequences of a smart city [8]. Although the scope of smart city initiatives varies widely, in general, they aim to improve the citizens' quality of life [4]. The scientific literature highlights Quality of Life as one of the most cited subjects in studies on smart cities, appearing in twenty out of twenty-one references on the topic. Although the category did not initially appear in the Vergès' quadrant, its prominence in other analyses led it to the central nucleus. In both the DHC and the CFA, the category received considerable prominence in the open responses. A better Quality of Life seems, therefore, to be one of the greatest aspirations of citizens for a smart city.

5.6. Culture and Citizens' Participation: Two Missing Categories

The categories of Culture and Citizens' Participation have a strong presence in the scientific literature on smart city. Conversely, we realized the almost total absence of them in the evoked expressions in this study. Of the 21 articles analyzed, 18 indicate a connection between culture and the smart city. Ramaprasad et al. [22] proposed an ontological framework for smart cities, in which Culture is a key factor for the intelligence of a city, and this category is also a relevant component in the rankings of smart cities. The IESE 2019 ranking [72], for instance, considers the level of education and access to culture as irreplaceable components for assessing the human capital of a smart city, comprising the number of theaters, art galleries, museums and the citizens' spending time on leisure, thereby reflecting the city's commitment to the theme [72]. In Brazil, Culture is absent from the words evoked, being only indirectly cited in related categories such as Arts, Entertainment and Tourism—which were also only slightly evoked. A possible explanation for this may lie in the perception of the Brazilian population that this is a matter of minor importance in view of the great basic challenges faced by the local society. Thus, while there are several categories associated with smart cities, Culture is not currently seen as a local priority, although this may change in the future in the context of emerging markets.

Citizens' Participation also figured with very low representativeness among the evocations. However, when talking about smart cities, the participation of citizens in managing urban spaces is an essential issue, being constantly present in the literature on smart cities in developed countries, and lacking in developing countries [74,75]. Some authors point to an evolution of this concept towards a "smart human city", where new forms of governance are envisaged to plan and develop citizen-oriented cities, focusing specifically on the human dimension of smart cities [76]. Brazil currently faces a significant disparity in transparency and social participation [77]. However, the emergence of Information and Communication Technology has improved citizens' access to public initiatives through websites and applications. As a result, citizens are increasingly interested in government actions, seeking a more active involvement in issues related to the society in which they are inserted [61].

6. Conclusions

Based on the findings presented and the consequent discussion developed, some implications for both theory and practice are presented below. Then, the limitations of this research are addressed as well as further research to be conducted in this realm. Finally, we present some final conclusions accrued from this research.

6.1. Implications for Theory and Practice

According to the scientific literature, a smart city is a polysemic concept without a consolidated definition [19,20,31], as it is a recent issue that has emerged from demands raised by companies and governments [33,61]. In addition, the smart city is an interdisciplinary knowledge field encompassing and linking many ideas and domains [19,35]. Therefore, to comprehend the potential effects of smart cities on societies, it is necessary for academia to

deeply comprehend the demographic, economic, institutional and environmental context in which smart cities are implemented and operationalized [78].

However, it was noticed, through this study, that most of the scientific literature on smart cities has come from developed countries rather than the Global South; interestingly, where the largest urban agglomerations with major problems to be faced are located. Thus, an adequate body of knowledge on smart cities in developing countries is still lacking. In this vein, the concept of Smart City for Development (SC4D), created and exploited by Joia and Kuhl [18], contemplates the idea of implementing smart city solutions that aim to positively impact the development of emerging markets, reinforcing the importance of taking into consideration seriously the difference contexts of cities located in developed and developing countries [79]. In the case of Brazil, although at the national level there are basic problems in areas such as security, health and education, on the other hand there are cities that have the potential to establish themselves as smart cities in other dimensions, such as mobility, sustainability and renewable energy [80]. However, for this potential to be fulfilled in Brazil and other similar emerging economies, it is necessary to have an adequate local comprehension of the concept of a smart city and coherent governmental planning of smart city initiatives [73,79].

Additionally, although notable successful smart city initiatives exist in other countries, attempting to replicate them verbatim in emerging economies may result in a significant failure [81]. Therefore, to effectively design and plan smart cities, it is crucial to have a deep understanding of society's general views and attitudes towards this subject. In this sense, the use of social representation is highly relevant to obtain more detailed insights into the perceptions of decision makers and society in general about the smart city concept. In fact, the smart city is still a poorly studied field from the perspective of emerging countries. Thus, by debating and facing the main challenges for the development of cities, it is possible to promote the sustainable alleviation of poverty and inequality, thus allowing the materialization of sustainable city development [82]. Therefore, the objective of this study is to provide assistance to scholars, public policymakers and companies to deepen the understanding of local needs, aiming to prioritize smart city initiatives that can successfully promote the sustainable development of cities located in emerging markets.

Moreover, considering the interdisciplinarity of the theme, research on smart cities must encompass different theoretical and methodological approaches. However, regardless of the approach chosen, it is essential to have defined, unequivocally, the construct to be studied, namely the smart city. In this sense, a definition of smart city can be proposed based on the categories located in the central nucleus of the social representation of this concept, namely: "a smart city is a sustainable technology-based community that, through connectivity, aims to improve the mobility and quality of life of its citizens".

In addition, with regard to practice, this study shows ordinary citizens' limited perception about the concept of a smart city. This fact can make it difficult to take advantage of the potential of smart city initiatives, highlighting the need for municipalities to develop capacity-building initiatives that can sensitize their civil servants and citizens to what a smart city actually is and its due impacts on society in general.

Furthermore, both Brazilian citizens and academia [83] have perceived smart cities as fundamentally technocentric initiatives. Thus, there is a need for a research agenda on the interdisciplinary perspective of smart city initiatives, as well as on the critical success factors for such ventures and the fundamental role of context in them [78], especially for emerging markets, as most smart city research has been based on the context of developed countries.

6.2. Research Limitations

This research, as usual, is not free of limitations, as presented below.

First, the sample used does not fully represent the population of the cities where data were collected, as the respondents needed to be aware of the smart city concept. Thus, the poorest population—who supposedly have no idea what a smart city is and could benefit most from a smart city initiative—was not covered by this work.

Second, once the evoked expressions were tabulated, the authors manually performed the respective categorization process with the help of the EVOC software 2005, which resulted in 162 categories. This categorization, however, may have some bias, and, therefore, is a limitation of the research.

Third, data collection took place online due to the social isolation imposed by the COVID-19 pandemic in Brazil. This fact may have influenced the citizens' evocations, since theoretically they had time to think about what should be said.

Fourth, this work was conducted in Brazil, herein considered a proxy for other emerging markets regarding smart city initiatives. Although there are many similarities between the contexts of these countries, one cannot guarantee that the social representation of a smart city in Brazil according to ordinary citizens fully corresponds to the same found in other emerging economies.

All the abovementioned limitations, however, can be overcome through further research on the concept of smart cities.

Finally, given that research on smart cities is still in its infancy in Brazil and other low- and middle-income countries, it is hoped that this article has helped to improve the understanding of this complex concept. In fact, when shedding light on a comparative dialogue between the perspectives of ordinary Brazilian citizens and the academic literature on the real definition of smart cities, it was noticed that several dimensions associated with this concept have been neglected by city dwellers, who attribute a technological monopoly to the smart city concept, leaving aside important dimensions associated with it, such as its positive impact on the humanization of large communities, on citizen participation and on the cultural strengthening of a city.

All in all, it is hoped that this work has contributed to clarifying how a smart city is perceived by ordinary citizens in emerging markets such as Brazil, so that effective public policies in this realm can be developed and implemented successfully.

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