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Public Safety Decision-Making in the Context of Smart and Sustainable Cities

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Abstract

Prominent urbanization forces governments to rethink their management processes, incorporate new technologies and ensure quality of life through practices aligned with the concepts of smart and sustainable cities. With a qualitative approach through semi-structured interviews with commanders of two local police departments, this study investigated information orientation in the strategic decision-making process in the area of public safety in a small Brazilian city. The police departments have a limited ICT infrastructure to support the strategic decision-making process because their information systems are not connected. The results show that although the city of Pato Branco (Brazil) is considered a smart city in the area of public security, there are limited resources in several aspects of the police departments for the effective management of their ICT infrastructures. The impact of resource constraints reflects throughout the entire information use lifecycle - identification, collection, organization, processing, etc. - which fuels the strategic decision-making process. The implantation of an operations center could significantly reduce the effects of the problems identified in this research and further research may reveal the operational, technical, economic and financial viability of this proposal.

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1. Introduction

The United Nations estimates 7.5 billion people on the planet and projects a population of 9.7 billion people in 2050, with 54% of the world's current population now living in urban areas and reaching 66% in the next thirty years [1, 2]. The World Economic Forum warns about the growing urbanization process and its impacts on people, collapsing urban planning systems and national governance, increasing income and wealth inequality, and social instability [3]. In Brazil, this phenomenon is no different: between 1940 and 2010, urbanization increased from 31.24% to 81.23% [4].

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The rapid and dramatic process of urbanization puts pressure on cities for alternatives to manage challenges such as congestion, pollution, increased crime, waste treatment and energy consumption [5]. The increase of the population in urban areas generates new challenges in the field of urban management and cities need to rethink the ways in which they manage their problems in the face of legal and institutional constraints for the allocation of public resources [6, 7]. It is no exaggeration to argue that today's large urban areas are characterized as complex ecosystems that seek sustainable development while attempting to meet ever-greater demands on quality of life in areas such as health, environment, safety, and other public services [8].

Urban sustainability is strongly impacted by the need for economic adequacy and environmental preservation to guarantee and improve people's quality of life [9]. A smart city is one in which public governance is able to face challenges arising from urbanization through the creation, combination, development, and leverage of resources to make urban areas attractive, sustainable and habitable [10]. However, urban intelligence requires the use of technological resources such as networks with computerized systems composed of databases and algorithms capable of assisting the decision-making process [5].

In this context, information and communication technologies (ICTs) can help in the implementation of intelligence in urban management, for example, by integrating databases and generating decision support models, improving efficiency, equity, sustainability and quality of life in cities [11]. With ICT support, smart cities can continuously improve their capacity to innovate urban management processes [12].

Giffinger et al. [13] suggest six dimensions to characterize a smart city: economy, people, governance, mobility, environment and life. These six dimensions connect to urban development theories related to regional competitiveness, transport economics, ICT, natural resources, citizens' social involvement and quality of life [14]. Smart cities are characterized by multidimensionalities and are always permeated by ICTs [6, 15].

Public service organizations need to understand that managing their operations is a complex task [16]. Only the integration of critical infrastructures enables the preventative maintenance of a city's activities and the maximization of services to citizens, including safety [17]. A safe city is one that is able to integrate technology into the natural environment, increasing the effectiveness of the safety that permeates, among others, processes related to health, vehicle traffic, surveillance, crisis management, centralization of police operations and rescue and information processing [18]. Concern for safety in the context of smart and sustainable cities has led to the development of a decision-making ICT solution of the same name - safe city - in the web environment, which integrates information on public safety and protection services, encompassing data from surveillance by smart video, emergency communication, environmental monitoring and fire control systems, among others [19].

The requirement to improve governance processes in smart cities forces large technology companies to offer new solutions, such as Cisco's command center surveillance management service or the enhancement of Telefonica's mobile phone services to improve times of emergency response services [20]. The challenge is to integrate urban infrastructures with ICTs and contribute to new operation models, since digitized infrastructures are characterized as opportunities for public and private organizations [21].

Although public services are essentially characterized as operations, the management of public operations differs from the management of operations of private companies and there is an increasing interest in the management and operations of public services to be more efficient [22]. It is therefore pertinent to identify and understand the operations that affect a critical service such as public safety and how ICTs can provide support for those in charge of police departments to make decisions. This leads to the research question: how, in the context of smart and sustainable cities, are ICTs able to provide reliable information to guide decision-making in the area of public safety in a small Brazilian city?

With the use of an exploratory qualitative methodology supported by a literature review, this study sought to identify, within the context of smart and sustainable cities, how the strategic decision-making process in the area of public safety in a small Brazilian city is guided by information. The specific objectives of this work were: a) to identify, in the bodies responsible for local public safety, the ICT structure capable of supporting information orientation in the decision-making process; b) understand the perceptions of the commanders of these police departments on the importance of making strategic decisions based on information and; c) characterize eventual structural or operational limitations in relation to information orientation in the decision-making process in the area of public safety in the city of Pato Branco.

This article is organized, besides this section, as follows: the next section presents a review of the literature on smart and sustainable cities followed by the section that details the methodology. Then the results are presented along with the discussion. Subsequently the limitations and future directions of research are discussed. The last section presents the conclusions.

2. Literature review

2.1. Smart and sustainable cities

Urbanized areas are characterized as heterogeneous systems, with large numbers of people, often lacking the necessary skills to adapt to a competitive way of life [23]. This characteristic of urban development, usually called entropy or degree of uncertainty

perceived in a system, ends up negatively influencing the processes of the urban system as a whole [24]. Vulnerabilities can produce adverse effects within the urban system, requiring public authorities to use much more resources to mitigate this entropy [25].

Even with the growing interest in the theme of smart and sustainable cities, there is great confusion about the subject, and similar terms are used to define different aspects [7]. The ITU-T focus group of the International Telecommunication Union, the United Nations specialized agency in the field of ICT, has used more than 100 concepts drawn from a wide range of technical and scientific literature to try to establish a definition for smart and sustainable cities that could be used worldwide, but failed to achieve this goal [26]. A unique definition of a smart and sustainable city should synthesize a set of around 25,200 components associated with the concepts of smart and sustainable cities, and it is possible to presume the difficulty of achieving this definition while at the same time concluding that cities can be smart and sustainable in different ways and to different degrees [27].

Washburn and Sindhu [28] consider that a city becomes smart to the extent that those in charge of information technology management use emerging technologies together with the municipal government to optimize the connection of infrastructure services to guarantee quality of life for people. However, information technology alone is incapable of transforming or improving cities [29]. The smarter and more sustainable a city intends to be, the greater the complexity of its management and the greater the need for innovative solutions, especially those related to ICT that can foster sustainable growth and high quality of life with smart management [14, 15].

As for the dimensions that characterize a smart city, Lombardi [30] emphasizes smart governance (social participation), smart human capital (people), smart environment (natural resources), smart life (quality of life) and smart economy (competitiveness), while Chourabi et al. [31] deal with smart economy, smart people, smart governance, smart mobility, smart environment, and smart life. It is clear that these concepts align with the ideas of Giffinger et al. [13]. Bibri and Krogstie [32] propose to design and build systems and applications geared to the urban environment and to make them smart in order to support decision-making and service to multiple objectives, processing and managing various types of data and discovering knowledge for several purposes. These data and their analysis can help daily life and decision-making, contributing to construct alternative visions for the development of urban areas [33]. For this reason, municipal governments need support to build or improve the concept of smart cities and thus identify specific opportunities for improvement [34].

Therefore, ICT can help model processes to predictively analyze the growing volume of data and make predictions that will impact people's and organizations' daily lives [21]. Harrison et al. [5] suggest the optimization of public services through the exploitation of operational data, including safety data. Khan et al. [35] argue that with proper preparation and care, data can be collected from open sources and treated statistically, generating information or new knowledge for decision-making and better public governance. The dynamics of processes in the context of smart and sustainable cities brings new possibilities for transforming operation models in different sectors, especially services [21].

2.2. *ICT, decision-making and public safety*

Information technology facilities such as storage, processing and data transfer have become increasingly available and accessible [36]. To obtain information to support the decision-making process, there must be systems capable of generating qualified information [37]. As important as the technology used is the use of information by people in the collection and dissemination process [38]. Harrison et al. [5] proposes, as fundamental concepts of information technology for smart cities, real-time data sources obtained from physical and virtual sensors, the integration of this data into a corporate processing platform for the communication of information between various services to enable analysis, modeling, optimization and visualization of operational processes to make better decisions. ICT capable of supporting decision-making processes uses data capable of shifting the emphasis from long-term planning to short-term thinking [11].

ICTs permeate various concepts related to smart and sustainable cities. Even considering the undeniable advent of ICTs capable of guiding decision-making, there seems to be some doubt as to how information can be used to gain strategic advantage, probably because of the quality of information generated by information systems [38]. This strategic advantage can be achieved through the use of ICTs and must be pursued by municipal governments, aiming for budgetary discipline, sustainable development, safety and quality of life for citizens [10, 18].

Table 1: Research about the role of ICTs in the smart sustainable cities

Author	Location	Research
Caragliu et al. [14]	260 smart cities in Europe	Suggest that the correct use of ICTs associated with other factors positively affects the correlation with urban wealth.
Odendaal [39]	Brisbane (Australia) and Durban (South Africa)	Potential for improving the management and operation of cities by comparing the initiatives of the municipal governments calling attention to the literature's focus on the experiences of developed countries, emphasizing the potential for ICT exploitation in developing countries.

Partridge [40]	Brisbane (Australia)	Digital exclusion - a phenomenon of social and economic implications in the context of smart cities - to identify psychological barriers that impede people from integrating ICT into their lives.
Bakici et al. [41]	Barcelona (Spain)	How ICTs have generated opportunities and challenges in the management of urban processes.
Naphade et al. [42]	Rio de Janeiro (Brazil), Dubuque (USA), Bornholm (Denmark) and Songdo IBD (South Korea)	The role of ICTs in the governance of smart and sustainable cities in reducing costs without compromising impacts on efficiency and quality of life for citizens.
Paskaleva [43]	12 European cities	Makes propositions on how electronic governance supported by ICTs can help cities to make better decisions that can make them more competitive and at the same time promote citizen involvement in effective decision-making processes through collaborative digital environments.
Dixon [44]	Mesa (USA) and Rio de Janeiro (Brazil)	Even in the face of budget constraints, cities must invest in ICT infrastructures since they can monitor real-time situations in critical areas such as safety.

Hall [17] emphasize the need to integrate the communication infrastructure of smart cities to guarantee safety services to citizens. Bélistent [20] addresses the search for ICT solutions to provide public services effectively, including in the area of safety. Neirrotti et al. [34] analyzed smart city concept with a view of improving citizens' quality of life and the increasingly important role of ICTs in assisting municipal governance decision-making in strategic areas such as health and safety, specifically those of the police.

Rapid urbanization causes those responsible for the protection of people and property, with the support of new technologies, to rethink their processes, shifting the focus from traditional criminal investigation to preventive investigation, stimulating cooperation among the actors involved [45]. Safety is a public service, which can be provided to the citizen through a public agency or through private or third sector institutions financed with public resources [16]. Safety is a component of sustainability because a safe city attracts people and investments, while cities without sustainability are often characterized by crime, fear and physical deterioration [46].

In this way, it is opportune to rethink the traditional operations management model based on resources, processes and people [21]. In the context of smart and sustainable cities, the responsiveness of the public safety area requires ICTs capable of serving segmented and geographically distributed organizations, gathering and sharing accurate information to provide the best decision in the shortest possible time [5]. This contextualization concludes that public services no longer focus only on administrative processes or interorganizational management, but on the governance of the interorganizational relationships of the various actors involved [16].

3. Methodology

This qualitative and descriptive study obeyed a structured process with the previously determined purpose of knowing the research subject more thoroughly and obtaining evidence related to the concepts investigated [47]. Addressing the emergent theme of smart and sustainable cities and their contextualization to decision-making practices in the area of public safety, the concepts investigated were obtained through a literature review [48]. This work empirically investigates a contemporary phenomenon and its context with reality because its limits are not clear [49].

The universe of the research considered the departments of the Civil and Military Police, responsible for public safety, in the city of Pato Branco (Brazil). The city of Pato Branco is located in the southwestern region of the state of Paraná, southern Brazil, and has a population estimated at approximately 72,000 inhabitants [4]. In the year 2016, The Economist, specialized in international business analysis, mentioned the city of Pato Branco for its investment direction in technology and innovation and for being a national benchmark in quality of life [50]. In 2017, the city was recognized as the fifth smartest city in Brazil according to Exame Magazine, based on criteria such as mobility, urbanism, environment, energy, technology and innovation, economy, education, health, safety, entrepreneurship and governance [51]. According to data from Pato Branco, the city occupies, at the national level, the fifth place among the smartest cities, considering cities with up to 100 thousand inhabitants, due to initiatives involving free internet to the population, digital inclusion and safety in public areas, among others. In this way, the concept of a smart and sustainable city was included in the protocol for conducting the semi-structured interviews, since the use of the potential of ICTs can provide improvements in the management of public safety processes [5, 30, 34, 39, 54].

In Pato Branco, responsibility for public security is shared between the Military Police of Paraná (MP) and the Civil Police of Paraná (CP), departments subordinate to the Secretariat of Public Safety and Prison Administration of the State of Paraná. The MP act in crime prevention through the intelligence sector that collects and processes data on dates, places, times and characteristics of occurrences in order to identify the people involved in those occurrences. In certain situations, the MP use other data to act in crime prevention, such as telephone data and surveillance images by public and private video cameras. The CP investigate crimes and its main source of data is the record of occurrence, a document prepared by the victims. Information is the raw material for these two police departments and their actual use is dependent on people's ability to perceive, represent and communicate knowledge [38].

Considering the qualitative characteristic of this study, a non-probabilistic sample for population definition was chosen, deliberately selecting those in the command positions of the two police departments, that is, decision makers [52]. To understand the processes adopted by the two police departments to collect, evaluate and improve data quality, as well as how this data is transformed into information for strategic decision making in relation to local public safety, the development of the research tool considered as propositions the constructs of information technology practices and the management of information, behavior and information values [38]. A semi-structured questionnaire containing 08 main questions was used and, based on the theoretical foundation, improvised issues associated with the context were added since the use of semi-structured interviews allows exploring the interviewees' perceptions and opinions on more complex or delicate subjects, as well as clarifying answers [52, 53].

The main author conducted two interviews that lasted approximately one hour each. The interviewees agreed to the interviews by signing a consent form. The interviews were conducted in a single week in July 2018 at the offices of the commanders of the Civil Police and Military Police departments in the city of Pato Branco. The interviews were conducted in Portuguese, and to ensure data fidelity and minimization of memory bias, were recorded in audio and later transcribed. The main author noted and recorded nonverbal expressions of the respondents. As a precaution in preserving important characteristics of the dialogues, the transcripts in Portuguese have not been translated into English. As there was a reduced number of interviews, the main author indexed the original data to identify topics and concepts referenced in the transcripts, and the indexed excerpts were inspected and interpreted in relation to the content, meaning and context [52].

4. Results and discussions

The ICT infrastructure of the MP and CP is composed of equipment, radio and fixed and mobile telephone communication systems, internet, etc. This infrastructure gives police departments some capacity to process data and turn it into information that is then communicated to decision makers. The MP and CP have access to a specific information system of the Secretariat of Public Safety and Prison Administration of the State of Paraná, from which it is possible to extract information on occurrences and access the Infoseg system, a unique and integrated national knowledge base with data on people, vehicles and weapons. The Infoseg system is used more in the MP's operational work, which also uses the SiscopWeb system that centralizes the recording of all occurrences received and attended by the MP at the state level. The CP access and use, in addition to Infoseg, other systems such as the lethal occurrence control system, the criminal enforcement management system and the integrated system for ombudsman management, among others. Parallel to the official information systems, the PM and CP monitor social networks (e.g. Facebook, Instagram, etc.), but do not report details on how they do this monitoring. On social networks, the MP commander notes,

"We have a profile on Facebook, a profile of our intelligence sector, where we seek to find out everything that happens, especially in terms of social events where we will have a great concentration of people. This information is in a hectic flow in the network, so we need it. We also use our Facebook profile to search for information from other people."

It is a contemporary strategy necessary to guarantee public safety because it can optimize the capacity to respond in an emergency, protecting large events in order to provide surveillance in public places [20]. To prevent and investigate crimes, the MP and CP use surveillance images of "Safe Watch" video cameras: 32 cameras at 27 strategic points in the city of Pato Branco, with 24-hour monitoring. In the context of smart cities, ICT can assist in the redesign of public safety processes by allowing the capture and integration of real-world data through a variety of devices, including security cameras [5, 54]. Technically the MP and CP could connect and operate private video surveillance systems, exponentially increasing their capacity for preventive surveillance. However, in Brazil there are legal limitations due to lack of regulation, according to the MP commander,

"There is no regulation, there has to be regulation, even for a matter of responsibility of the public agent in the operationalization of this tool. It would be very interesting! And another aspect that should be noted is the legal issue, because from the moment you have that possibility ... we have to be very careful not to provide security exclusively for one particular citizen."

The two police departments receive information from the "Neighbor Solidarity" social initiative, people connected through the WhatsApp application that interact to collectively monitor their neighborhoods and bring information to police departments that is often used in the decision-making process. When effectiveness in the use of information is desired, dependence is established on the way people, in general, represent and communicate knowledge of interest [38]. The CP commander comments on the potential of using the WhatsApp application,

"If the people in the neighborhoods really interacted ... the crime would surely diminish. There is no doubt, there is no doubt that this would, in a certain way, prevent crime without the use of state forces."

The technical support for the ICT infrastructure of the CP is subordinate to the Information and Communication Technology Organization of the State of Paraná, that is, the autonomy at the local level to solve any technical problems in the ICT infrastructure is very limited. The MP have some support structure, although they often face difficulties such as, for example, different systems whose databases are outdated and disconnected. However, these databases contain information that is accessed and used by police officers on street patrol and, due to the lack of updating, may cause embarrassment to the citizen who has been wrongfully approached or, more seriously, fail to indicate to the police that the citizen addressed should be detained. The MP commander claims that the ICT

infrastructure meets information gathering needs at the operational level, imposes certain limitations from the tactical level and compromises decision making at the strategic level, an opinion shared by the CP commander. As commented by the MP commander, "We could have better decision-making (...) We would have conditions if we had a more efficient system."

In addition, there is a strong tendency to compromise the effectiveness of public safety services in the city of Pato Branco because there is no integration, or even partial connection, of the ICT infrastructure of the MP and CP. The exchange of data and information between the two police departments happens informally, only at a higher strategic level, that is, between the two commanders interviewed, in specific situations. There is no protocol or unified intelligence structure in an area considered of upmost importance for the citizen. This perspective is against the basic strategic principle of smart and sustainable cities to align technology, people and institutions [6].

This is evidence of the obsolescence that is characteristic of the information systems, especially the customized systems for very specific activities, as it is the case in the public safety sector, with increasing update costs also being due to the geographical distance from the developers that are established in large centers in most cases [36]. This requires increased attention from police department commanders, as they need to know how much ICT is effectively available for data collection and processing to empower people with the goal of generating effective and usable information in the decision-making process. As an alternative, the MP usually qualifies a police officer in a given technology, and then this officer acts internally as a multiplier of knowledge, since ICT companies are established in distant cities and the request for face-to-face technical support services becomes very expensive. This training has the intention of developing skills, behaviors and perceptions in people regarding the effectiveness of the use of information [38].

This scenario of different or duplicate systems, which are not integrated and non-integrable, is characterized as a serious problem with serious strategic consequences [10]. In the context of smart and sustainable cities, the Mesa City Police Department in Arizona (USA) integrated its system with about 50 other cities in the same state, perfecting the smarter policing approach and reducing crime by 25% [44]. The city of Rio de Janeiro (Brazil), in its preparation to host the 2014 FIFA World Cup and the 2016 Olympic Games, integrated information from more than 30 city departments into a single operations center to view, manage and analyze incidents in real time, delivering results in traffic management, public safety, and other critical areas of governance [42, 44].

Currently the only information processed by the MP available for public access concerns traffic accidents. Through the internet, citizens can report traffic accidents, as long as there are no people injured, that is, only material damages. Other information is not available for public access. In addition, the MP has a profile on the social network Facebook to disseminate general information about its activities and also maintain a channel of communication with the community. The CP that investigates crimes has no digital tool that allows citizens to expedite crime reports or other occurrences. The CP does not divulge any type of information to the community by any means, including the use of any social network.

In the context of smart and sustainable cities, integration of ICT infrastructures and services mediated by technology must be converted into social learning to strengthen governance and promote citizens' engagement [6, 11, 15, 43]. It is therefore possible to conclude that in the area of public safety in the city of Pato Branco, there is a significant limitation in the ability to mobilize and engage citizens to act proactively, since very little information is divulged.

As for his views on how local government could contribute to public safety within the framework of smart and sustainable cities, both the MP commander and the CP commander referred to the need for expanded surveillance with video cameras. The interpretation of the MP commander is that the city of Pato Branco should improve this system with facial recognition technology. In the opinion of the commander of the CP,

"Like the installation of cameras. This is fundamental in any city in the world! Any town, any village, anywhere in the world!"

These converging views of the Pato Branco police department commanders, focused solely on improving and expanding the surveillance system with video cameras, reveal a seemingly limited understanding by these authorities of the concepts of smart cities. Although in the context of smart and sustainable cities there is a strong reference to ICTs, without the human element and its capacity for learning and innovation, ICTs will not automatically transform or improve cities [29]. Systems and infrastructures must be able to connect city managers in the various public service sectors, and those in charge of governance should have a clear understanding of what a smart city is and the role of ICT as a driver of process transformation [28].

5. Conclusion

This work has achieved its goal of answering the research question about to what extent, in the context of smart and sustainable cities, ICTs are able to provide reliable information to guide decision making in the area of public safety in a small Brazilian city. Through semi-structured questions based on the metric information orientation [42], the authors sought to understand the processes adopted by the two police departments responsible for public safety in the city of Pato Branco to collect, evaluate and improve the quality of data, as well as the way these data are transformed into information for strategic decision making. The excerpts from the dialogues with the commanders of the military police and civil police departments considered as propositions the constructs of information technology practices and the management of information, behavior and information values, aside from the concept of the smart and sustainable city supported by the ICTs.

With regard to the specific objectives, this study was able to identify the ICT structure and its limited capacity to support information orientation in the decision-making process in police departments responsible for local public safety. It also made it possible to understand the perceptions of the commanders of these police departments as to the importance of making strategic decisions based on information at the same time that it was able to characterize structural and operational limitations regarding information orientation in the public safety decision-making process in the city of Pato Branco.

The results show that although the city of Pato Branco is considered a smart city in the area of public security, there are limited resources in several aspects of the police departments for the effective management of their ICT infrastructures. The impact of resource constraints reflects throughout the entire information use lifecycle - identification, collection, organization, processing, etc. - which fuels the strategic decision-making process. As a consequence, the effective use of information has its integrity compromised by the lack of formality that weakens its control and sharing [42]. One of the preponderant factors for the observed limitation concerns the lack of integration of the systems used by the police departments of Pato Branco. Bibri and Krogstie [32], through a broad literature review, emphasize that the effective integration of ICT into a city's diverse processes is a determining factor in making a city smart and sustainable. In addition, the literature provides a significant number of examples of how ICTs are affecting the way cities formulate urban growth policies [41]. In this way it is pertinent to at least think about the criteria that were used to classify the city of Pato Branco among the smartest in Brazil. The literature shows that, in many cases, certain cities adopt the concept of a smart and sustainable city as a promotional marketing strategy to attract people, companies and investments [10, 39].

Considering the problems identified in this article, the literature on smart cities is clear in pointing out that a similar problem was solved with the creation of the Operations Center of the City Hall of Rio de Janeiro (Brazil), which was the result of a partnership between the city hall and IBM, initially designed to predict floods. These operations center currently centralizes public safety actions, allowing coordination in the decision-making process in the area of safety from video surveillance and field teams [20, 33, 42, 44]. Another example is the City of the Future, an initiative by Siemens in Singapore that aids urban planning from the use of surveillance cameras for transportation and safety solutions, or the Office of Policy and Strategic Planning in New York, data analysis center that gathers information from a diverse set of public administration agents [20, 33].

The police departments of the city of Pato Branco are public structures, subordinated to the state government and, therefore, the implantation of an operations center could significantly reduce the effects of the problems identified in this research and allow, for example, the integration of other organs involved with public safety, such as the Fire Department, Mobile Emergency Care Service, Civil Defense and the Transit Department, among others, and consideration should be given to the possibility of public financing and partnerships with technology companies. This implementation could become an improvement in the management processes of public service operations and have broader benefits for the entire population [43]. Further research may reveal the operational, technical, economic and financial viability of this proposal.

As a theoretical implication, this work contributes to qualitative research on decision making, narrowing its focus to the context of smart and sustainable cities, a subject that is increasingly evident. Cities around the planet want to be recognized as smart and sustainable and there is a wealth of studies on this subject, however, little importance has been given to the safety of smart and sustainable cities [18], so this work is relevant for exploring this particularity within the context of smart and sustainable cities. As a practical implication, this work highlighted the negative impacts caused in the decision-making process in the area of public safety due to the lack of integration between the systems of the police departments of a city considered to be smart.

Among the limitations of this study, it is possible to consider the number of interviewees, which is quite small and may prevent generalization to other cities with the same characteristics. Future studies could further explore the role of ICTs in information orientation in the decision-making process in areas that belong to the other dimensions that characterize a city as smart and sustainable.

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