UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL
ESCOLA DE ADMINISTRAÇÃO
PROGRAMA DE PÓS-GRADUAÇÃO EM ADMINISTRAÇÃO

Anderson Cougo da Cruz

SUSTAINABLE CITIES AND COMMUNITIES: WHAT ARE THE "BEST" WAYS TO DEVELOP THEM?

Porto Alegre
2022

Anderson Cougo da Cruz

SUSTAINABLE CITIES AND COMMUNITIES: WHAT ARE THE "BEST" WAYS TO DEVELOP THEM?

Trabalho de Doutorado apresentado ao Programa de Pós-Graduação em Administração da Universidade Federal do Rio Grande do Sul, como requisito para a obtenção do título de Doutor em Administração, na área de Inovação, Tecnologia e Sustentabilidade.
Orientador: Luis Felipe Machado do Nascimento.

PhD Study presented to the School of Management Graduate Program of the Federal University of Rio Grande do Sul as a requirement to obtain the PhD in Management title, on Innovation, Technology and Sustainability area.
Advisor: Luis Felipe Machado do Nascimento

CIP - Catalogação na Publicação

Cruz, Anderson Cougo da
Sustainable Cities and Communities: what are the "best" ways to develop them? / Anderson Cougo da Cruz. -- 2022.
114 f.
Orientador: Luis Felipe Machado do Nascimento.

Tese (Doutorado) -- Universidade Federal do Rio Grande do Sul, Escola de Administração, Programa de Pós-Graduação em Administração, Porto Alegre, BR-RS, 2022.

1. Sustainable Cities. 2. Innovation Helices. 3. Sustainability. 4. Innovation Management. 5. Systematic Literature Review. I. Nascimento, Luis Felipe Machado do, orient. II. Título.

Elaborada pelo Sistema de Geração Automática de Ficha Catalográfica da UFRGS com os dados fornecidos pelo(a) autor(a).

“Cities have the capability of providing something for everybody, only because, and only when, they are created by everybody.”

Jane Jacobs

(1916-2006)

ACKNOWLEDGMENT

Ph.D. journey is not an easy period: it is about personal, intellectual, and professional development and maturation.

To understand that the process is slow and continuous; an everyday achievement for improve our own critical analysis and scientific approach about the world, in this case, the role of sustainable policies for cities and the importance of advancing life quality levels and democracy. Even in the middle of my degree, understanding the effect of Covid-19, about daily worries and uncertainty routine. Thus, bad policies die people indirectly, being it about starving, precarious health assistance, unemployment, financial crisis or any scroll of the huge complexity of urban centers: one more phenomenon about cities and how to create resilient and assertive solutions.

Therefore, I am extremely grateful for the efforts, support, love and care of my parents, Neusa and João, my sister and my brother-in-law, Franciane and Paulo, and my nephews, Pedro and Théo, always keeping together to me, asking me about the doctorate process and encouraging me to go further; and my friend Alexandre, who motivated me since from the beginning of this process.

Thanks to my academic mentor, advisor and friend, Prof. Luis Felipe, who could guide me on that important challenge and inspiring me about knowledges as education for sustainability and life quality principles for a better world for all, greener and democratic.

Thanks to my all professors, mates and staff, specially Sandra, from the UFRGS School of Administration who kept up with me every day on that path; and the UFRGS Urbanism Post Graduation, where I could understand better the nature of the cities' dynamic.

Thanks to my doctorate board professors – Prof. Dr. Luciana, Prof. Dr. Tiago e Prof. Dr. Roberto – who could guide me and qualify this subject, since from the PreSUST research program.

Thanks to my all professor colleagues and students from the Federal

University of Pelotas, Federal Institute Sul-Rio-Grandense Pelotas and Federal Institute of Rio Grande do Sul, where I could developed me as a management professor.

To my alma mater, Federal University of Santa Maria, raising the education flag for our social progress, to the professors from the Department of Administrative Sciences, specially Prof. Dr. Marcelo, my master advisor, Prof. Dr. Clandia and Prof. Dr. Lucia, by the Ecoinovar International Forum opportunities and Prof. Dr. Milton, my undergraduate research advisor. And to the Education Center, where I could learn more about didactic and to perceive the seminal role of education to change realities.

And, as a hopeful man that I am, thanks to God, or to that energy source that moves us forward!

ABSTRACT

In territorial analysis, the search for a sustainable regional development, the leaderships of most of the spheres first create projects of, first, a local and after, global impact. In this sense, innovation environments are instruments of developed and developing countries that confer greater local competitive advantage by transforming content of knowledge into wealth. The present exploratory study aims to investigate approaches and concepts that are getting closer to the management studies area, being it on the public or private organizations administration, about sustainable development, innovation processes and cities. Then, the research is arranged by the based concepts, and presented three published papers that organize the effort of to identify the state of art of this cities' sustainable management scenario. The first study consists of a bibliographic analysis on quintuple helices. To achieve the goal of mapping and evaluating the intellectual territory of the given area, the method focuses on establishing a research question that uses an explicit and systematic method to identify, select and evaluate relevant papers in order to collect and analyze data from them. By the triple and quadruple helices, their evolution – the quintuple helix – can show us that approaching variables as the environment and the community, we can have a better understanding of how we should improve innovation development processes, giving the importance that these helices have on changing development standards. The second study investigated the evolution of publication about smart cities on the Management knowledge field. As results, the study showed this subject is increasing recently and we believe that this manuscript is appropriate because it has data that can be used by researchers – as an organized analysis about smart cities evolution studies on Management field with most-researched subjects and growth rhythm – and managerial (public or particular) – as a reading to understand better how to contribute to build smarter cities. And the third study aimed to identify the state of the art of policy studies for intelligent cities in Brazil. The method, qualitative and exploratory- descriptive approach, was by documental analysis and systematic review of the literature. As results, the study showed that most of the authors have affiliation in Brazilian universities and that the number of studies is still reduced, given the prominence of the subject. Therefore, it is possible to analyze the relationships of this

arrangements and the opportunity of more investigations on this area, by the management approach, including the innovations and sustainability view; to highlight thar scientific area relevance to map, to identify and to create sustainable solutions for cities.

Keywords: Sustainable Cities; Innovation Helices; Sustainability; Innovation Management; Systematic Literature Review.

RESUMO

Em análise territorial, na busca de desenvolvimento regional sustentável, lideranças da maioria das esferas, primeiro, criam projetos de impacto, local e, depois, global. Nesse sentido, os ambientes de inovação funcionam como instrumentos de países desenvolvidos e em desenvolvimento, a conferirem maior vantagem competitiva local ao transformarem o montante do conhecimento em riqueza. O presente estudo exploratório visa investigar abordagens e conceitos que estão a se aproximar da área de estudos gerenciais, seja na administração de organizações públicas ou na de privadas, sobre desenvolvimento sustentável, gestão da inovação e cidades. Desse modo, a pesquisa é organizada na apresentação de fundamentações e conceitos tratados, e apresentará três trabalhos publicados, que organizam o esforço de identificar o estado da arte do cenário da gestão e sustentabilidade dessas cidades. O primeiro estudo consiste em uma análise bibliográfica sobre quíntupla hélice. Para atingir o objetivo de mapear e avaliar o território intelectual de uma determinada área, o método se concentra em estabelecer uma questão de pesquisa que usa um método explícito e sistemático para identificar, selecionar e avaliar artigos relevantes para coletar e analisar dados deles. Pelas hélices triplas e quádruplas, sua evolução – a quíntupla hélice – pode-se notar que ao abordar variáveis como o meio ambiente e comunidade, podemos analisar melhoraria nos processos de desenvolvimento da inovação, dando a importância que essas hélices têm em catalisar os padrões de desenvolvimento. O segundo estudo investigou a evolução de estudos sobre cidades inteligentes na área de conhecimento da Gestão. Como resultados, o estudo mostrou que tal pauta está em ascensão e justifica que essa investigação é apropriada por apresentar dados, que podem ser usados por pesquisadores – como uma análise organizada sobre a evolução dos estudos de cidades inteligentes/sustentáveis, na área de Gestão, com assuntos mais pesquisados e ritmo de crescimento – e gerenciais (organizações públicas ou privadas). E, por último, o terceiro estudo teve como objetivo identificar o estado da arte dos estudos de políticas para cidades inteligentes no Brasil. O método, de abordagem qualitativa e exploratório-descritiva, foi por meio de análise documental e revisão sistemática da literatura. Como resultados, o estudo mostrou que a maioria dos autores possui filiação a universidades brasileiras e que o número de estudos ainda é reduzido, dado o destaque do assunto.

Portanto, é possível analisar as relações desses arranjos e a oportunidade de mais investigações nessa área, pelo lente da gestão, a incluir as abordagens da inovação e da sustentabilidade; a evidenciar a relevância dessa área científica para mapeamento, identificação e criação de soluções sustentáveis para as cidades.

Palavras-chave: Cidades Sustentáveis; Hélices da Inovação; Sustentabilidade; Gestão da Inovação; Revisão Sistemática da Literatura.

LIST OF FIGURES

CONTENTS

INTRODUCTION

When we investigate the Administration knowledge field, we face the tendency of an economic scope and context intra and extra organizational, that are in a process of adaptation to the factors of culture and society and of better use of the natural resources (Sampaio, 2010). The regional development itself must also be adapted to the scenario of using these conditions, by strategies that contemplate the three dimensions of sustainability, or triple bottom line: environmental (planet), economic (profit) and social (people) (Elkington, 2001). Elkington (2001) also points to the importance of a management revolution, among other factors, for sustainable development.

In territorial analysis, the search for a sustainable regional development, the leaderships of most of the spheres first create projects of, first, a local and after, global impact. In this sense, innovation environments are instruments of developed and developing countries that confer greater local competitive advantage by transforming content of knowledge into wealth (Steiner; Cassim; Robazzi, 2008; WCDE, 1987).

An example is innovation environments whose function is the endogenous development from the application of knowledge - the creation of innovation - and to contribute to local businesses and initiatives, as well as to provide strategic alliances of the region in question; for mutual benefit (Medeiros, 1993; Rodrigues, 2013). According to Barbieri (2000), organizations that seek to collaborate better with the environment in which they interact, - the model of innovation environments - tend to provide a governance policy that prioritizes aspects not only economic, but also social and environmental. Consequently, a position that will contribute to sustainable regional development.

Ideas and business deployed in the 1950s in the stagnant San Francisco Bay (State of California, USA) - a pioneer in the concept of technology parks. Be this use of electronic devices, software, social networks and other applications. Observation given to account of the state economy, although diversified, rely on the innovation environments The Cartesian approach, which is only cost-effective in the short term, remains a priority in many respects in the corporate world. A model that does not privilege strategic thinking about

business continuity and its legacy for stakeholders (Mattos et al., 2005). In the case of innovation environments for sustainable regional development, the role of these initiatives as potential income generators is explained (Medeiros, 1993).

A posture of a sustainable innovation environment, in addition to a likely financial return, could create indirect feedback from community; such as the public/private installation of education and training institutions for local inhabitants, as well as the improvement of access infrastructure, through the attraction of other businesses or properly government investments. The sense of collectivity for local progress begins to increase (Vedovello; Judice; Maculan, 2006). However, according to Melo (2011) and Etzkowitz (2012), even though such environments have the capacity to develop sustainable competitive advantages, they still do not contribute decisively to this, with the participation of other spheres - fundamental factor.

When analyzing the tripod of sustainability, or triple bottom line, the studies of the social and economic contributions are, by themselves, of wide discussion. Results indicates one of the principles of the academic institution, - disseminator of teaching, research and extension and cradle of innovation - development of being and community (Santos, 2011). According to Jara (1998), the economic dimension is only sustainable, at the point where the quality of life prevails over the concern with the amount of production. As the cradle of knowledge, universities have a considerable contribution to the establishment of these innovation environments. Such relevance is due to the development of research that takes them as an object of analysis, both for innovation and development studies, and for possible improvements and experiments in the performance of their activities and policies. As a consequence of such practices for improvement in the processes of innovation environments. Vedovello (2000) states that these are treated as instruments of regional development policy, to make the cities more intelligent. *In this context, in a wide view, what are the best ways to develop sustainable cities and communities?*

Even though that question seems to be just a subjective and wide reflection, it is one the main subjects of United Nations agenda to 2030, according to the Sustainable Development Goals. The one that represents it is the Goal number 11 named Sustainable Cities and Communities.

Therefore, this study aims to discuss the highlights approaches about this theme, bringing the great areas of innovation and sustainability, being it on the evolution of cities until the models that their managers and involved actors can articulate to improve their quality of life, and as consequence, the community and the city.

The relevance of this work is justified because the thematic of innovation and sustainable development is inherent to the development of a nation and with this, the creation of more intelligent citizens. Mainly, because this knowledge area opens a huge offer of study possibilities, being it interdisciplinary, and, at the same time, an scarce field of sources and basements, given that it is a recent scientific topic, even more in Business and Economics area. It is possible to notice this subject as a remarkable field of knowledge for the area of administration, not only public, but also to the academic, business interests and other existing organizations; to investigate the understanding of relationships and attitudes, at institutional levels, concerned with sustainable development.

Then, I intend to explore what can we absorb from innovation and sustainability bases to help to solve theoretically, in fist time, the problem of UN Goal 11. More specifically, first we try to understand how sustainable development, innovation approaches and development can be associated with UN Goal 11. Finally, in order to overcome possible barriers, I propose possible alternatives that could solve this problem.

As a pathway for achieving it, I will analyze the object – sustainable cities and communities – in three ways, on the following:

I. *To identify the development study about innovations helices and its relationship with cities;*
II. *To analyze smart/sustainable cities by the management area approach;*
III. *To verify studies about public policies for smart cities for Brazilian cities.*

On the next sections we advance in the discussion, indicating theories and possible paths to consider. In the next sections we aim to discuss the following questions: What are the main references we can have from innovation and sustainability theories and how to develop sustainable cities and communities?

For sure, not an easy pitch. But here, I start the journey, registering and organizing findings to understand better the sustainable cities and communities scenario, based on UN agenda, and to improve the next steps of my dissertation study, together to my advisor and appraisers.

2 UN SUSTAINABLE DEVELOPMENT GOALS

In this section, I aim to present the main points of the United Nations Sustainable Development Goal 11, according to United Nations Development Program – Agenda 2030 (UN, 2015).

From the beginning, the Sustainable Development Goals (SDGs) ignited at the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012 (RIO+20). The objective was to produce a set of universal goals that meet the urgent environmental, political and economic challenges facing our world. They are consequence of the document “The Future We Want”, result of the event, which originated the Agenda 2030, formalized in 2015. The Agenda is considered as a plan of action for people, planet and prosperity, by eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development. Another characteristic of the goals is they are integrated and indivisible and balance the three dimensions of sustainable development: the economic, social and environmental. (UN, 2015).

Furthermore, the purpose is that the goals action until 2030 in five highlighted areas of critical importance for humanity and the planet (figure 1).

Figure 1: Agenda 2030 – Areas of Critical Importance

Agenda 2030 - Areas of Critical Importance	
People	We are determined to end poverty and hunger, in all their forms and dimensions, and to ensure that all human beings can fulfil their potential in dignity and equality and in a healthy environment.
Planet	We are determined to protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations.
Prosperity	We are determined to ensure that all human beings can enjoy prosperous and fulfilling lives and that economic, social and technological progress occurs in harmony with nature.
Peace	We are determined to foster peaceful, just and inclusive societies which are free from fear and violence. There can be no sustainable development without peace and no peace without sustainable development.
Partnership	We are determined to mobilize the means required to implement this Agenda through a revitalized Global Partnership for Sustainable Development, based on a spirit of strengthened global solidarity, focused in particular on the needs of the poorest and most vulnerable and with the participation of all countries, all stakeholders and all people.

Source: UN (2015).

Therefore, the SDGs replace the Millennium Development Goals (MDGs), which started a global effort in 2000 to improve the income inequality. The MDGs settled measurable and universally-agreed objectives for reducing extreme poverty and hunger, preventing deadly diseases, and expanding primary education to all children, and other development priorities (UN, 2015).

Then, the Sustainable Development Goals are composed by 17 goals and 169 targets (figure 2).

Figure 2: 2030 Sustainable Development Goals

Source: UN (2015).

Subsequently, we can see the goal with their brief description (figure 3).

Figure 3: SDGs Description

Sustainable Development Goals		
Goal		**Brief Description**
1	No Poverty	End poverty in all its forms everywhere
2	Zero Hunger	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
3	Good Health and Well-Being	Ensure healthy lives and promote well-being for all at all ages
4	Quality Education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
5	Gender Equality	Achieve gender equality and empower all women and girls
6	Clean Water and Sanitation	Ensure availability and sustainable management of water and sanitation for all
7	Affordable and Clean Energy	Ensure access to affordable, reliable, sustainable and modern energy for all
8	Decent Work and Economic Growth	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
9	Industry, Innovation and Infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
10	Reduced Inequalities	Reduce inequality within and among countries
11	Sustainable Cities and Communities	Make cities and human settlements inclusive, safe, resilient and sustainable
12	Responsible Consumption and Production	Ensure sustainable consumption and production patterns
13	Climate Action	Take urgent action to combat climate change and its impacts
14	Life Below Water	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
15	Life on Land	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
16	Peace, Justice and Strong Institutions	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
17	Partnerships for the Goals	Strengthen the means of implementation and revitalize the global partnership for sustainable development

Source: UN (2015).

Given that, in the next section I highlight the SDG 11, which one the work of my dissertation is going to be based on.

2.1 UN SDG 11: Sustainable Cities and Communities

Cities are becoming bigger! According to UN (2015), by 2050, 70% of the world's population will live in cities, making cities critical in achieving a sustainable future for the world. Businesses, together with Governments at various levels, and civil society organizations and citizens are collectively engaged in pursuing ambitious objectives to make cities more competitive, safe, resource-efficient, resilient and inclusive. Key areas of need in achieving progress on Goal 11 are:

1) identifying and agreeing the most sustainable ways to achieve the targets- what activities should be ceased and which ones accelerated;

2) building appropriate capacity and skills across these stakeholder groups to deliver;

3) attracting/securing finance, innovative designs and delivery models and projects for integrated city infrastructure– including buildings, energy, mobility, telecommunications, water, sanitation and waste management services, and;

4) ensuring practical processes for multistakeholder engagement in all stages of urban development that build consensus, inclusion, resilience and sustainability.

Then, it was disposed the key business themes addressed by SDG 11 (UN, 2015):

- Access to affordable housing;
- Infrastructure investments;
- Sustainable transportation;
- Access to public spaces;
- Sustainable buildings.

Hence, as each SDG has its target, the SDG 11 has its own that each country should work to achieve them (figure 4).

Figure 4: SDG Targets

SDG 11 - Targets	
11.1	By 2030, ensure access for all to adequate, safe and affordable housing and basic services, and upgrade slums.
11.2	By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons targets.
11.3	By 2030 enhance inclusive and sustainable urbanization and capacities for participatory, integrated and sustainable human settlement planning and management in all countries
11.4	Strengthen efforts to protect and safeguard the world's cultural
11.5	By 2030, significantly reduce the number of deaths and the number of affected people and decrease by y% the economic losses relative to GDP caused by disasters, including water-related disasters, with the focus on protecting the poor and people in vulnerable situations and natural heritage
11.6	By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality, municipal and other waste management
11.7	SDG By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, particularly for women and children, older persons and persons with disabilities
11.a	Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning
11.b	By 2020, increase by x% the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, develop and implement in line with the forthcoming Hyogo Framework holistic disaster risk management at all levels
11.c	Support least developed countries, including through financial and technical assistance, for sustainable and resilient buildings utilizing local materials

Source: Adapted from UN (2015).

By that myriad, UN (2015) presents the process of the SDG 11 until 2020. According to it, substantial progress has been made in reducing the proportion of the global urban population living in slums, though more than 1 billion people continue to live in such situations. With the areas occupied by cities growing faster than their populations, there are profound repercussions for sustainability.

Between 1990 and 2016, the proportion of the global urban population living in slums fell from 46 to 23 per cent. This progress was largely offset by internal population growth and rural-urban migration. In 2016, just over 1 billion people lived in slums or informal settlements, with over half (589 million) living in East, South-East, Central and South Asia. The proportion of urban residents who have convenient access to public transport (defined as living within 500 m walking distance of a bus stop and within 1,000 m of a railway and/or ferry terminal) remains low, particularly in developing countries. Based on data from 227 cities from 78 countries in 2018, on average, 53 per cent of urban residents in all regions had convenient access to public transport, from a low of 18 per cent in sub-Saharan Africa to a high of 75 per cent in Australia and New Zealand. In some regions that have low access to public transport, informal transport modes are highly prevalent and, in many cases, provide reliable transport for the majority of urban populations. (UN, 2015).

Between 2000 and 2014, areas occupied by cities grew 1.28 times faster than their populations. Closely related to this trend is that the urban densities of cities have been declining, creating profound repercussions for environmental sustainability at the local, regional and global scale. Better management of urban growth will be crucial in order to guarantee sustainable urbanization. Globally, 2 billion people do not have access to waste collection services and 3 billion people lack access to controlled waste disposal facilities. With increasing urban populations and the existence of consumer-oriented economies amid rising income levels and rapid urbanization, it is estimated that the total waste generated in the world will double from nearly 2 billion tons in 2016 to about 4 billion tons by 2050. While from 2010 to 2018 the proportion of solid waste collected was about 81 per cent globally, in sub-Saharan Africa it was only 52 per cent (UN, 2015).

In 2016, 9 in 10 people living in urban areas still breathed air that did not meet the World Health Organization’s air quality guidelines value for particulate matter – that particulate matter 2.5 microns or less in size (PM2.5) not exceed an annual mean of 10 micrograms per m3 or a daily mean of 25 micrograms per m3 – and more than half of the world population experienced an increase in PM2.5 from 2010 to 2016 (UN, 2015).

Most cities have struggled to ensure that their populations have convenient access to open public spaces (defined as spaces within 400 m walking distance of their residence). Based on data from 220 cities in 77 countries in 2018, only 21 per cent of the population had

convenient access to open public spaces. However, these results do not necessarily mean that there is an inadequate share of land dedicated to open public spaces in these cities, but rather that their distribution across urban areas is uneven. National urban policies are policy strategies that specifically respond to the urbanization challenges of today. As of the beginning of 2020, 150 countries had developed such policies, and almost half are already implementing them (UN, 2015).

It is important to analyze and consider these indexes and percentages for a better understanding of the context of cities and how relevant is to study the Sustainable Cities and Communities goal.

This way, about actual and future cities, we can merge directly to innovation, that is even one of the goals (SDG 9). How can a innovator citizen and innovative institutions and organizations can improve the quality of life in a city? A really wide question, but it is also fundamental to bring the ascension of technologies to this discussion, but not just hardware innovation, but too software, as people and institutions relationships and sharing processes.

3 INNOVATION AND CITIES

The level of competitive advantage in the markets instigates companies to be attentive to what is happening in their macroenvironment (stakeholders) and to seek differentials based on innovations that hinder the benchmarking of their competitors. According to Schumpeter (1985), innovating means recombining existing forces and materials, producing the same or other things, from the use of new methods. Thus, these authors (1985) also listed five forms of innovation: a) the creation of a new product; (b) introduction of a new production method; (c) opening up of a new market; (d) the discovery or acquisition of a new source of raw materials or semi-finished products (new suppliers) and (e) the creation of a new industry or monopoly. When imagining the process of innovation as waves over time, it is increasing its amplitude and reducing its frequency. That is, access to new technologies has allowed society to innovate more in a shorter period of time (Schumpeter, 1985; Tidd; Bessant; Pavitt, 2005; Takahashi & Takahashi, 2007).

The current technological areas are the development of information and communication technologies. However, these areas are no longer new where they came from. According to Lundvall (1988), universities, which foster innovation, by joining high-tech companies in the Bay Area (California, USA) during the Second World War period, promote the debate on complementarity between science and technology, with additional exchanges. The beginning of this was still in the 1930s, on the initiative of Stanford University (Stanford, California, USA), with the creation of scholarships and accompaniments to students who wanted to open businesses. New businesses were coming in, and the old ones remained, resulting in increased facilities and the establishment of Stanford Industrial Park in 1950.

The rationale was that companies of the future would be increasingly linked to their alma mater, not losing their ties to the knowledge environment. In 1974, the park had about 70 companies, and in 2005, 150. Silicon Valley (Silicon Valley), as it became known worldwide for clustering cutting-edge innovative companies, was the first real model of an innovation environment: the largest agglomeration of high-tech industries. Along with him, Route 128 (Massachussets, USA), sought to stimulate their stagnant economies by war. (Spolidoro & Audy, 2015). With the success of these two regions, the first European

innovation environments emerged, with emphasis on the British (Massey, Quintas & Wield, 1992). Such characteristics make this technological pole a model for other projects around the world (Ganzert & Martinelli, 2009). The nations, institutionalized in the figure of the United Nations (UN), has been working since the 1970s in encouraging the creation of business incubators and technology parks. Competent assignment to UNESCO, in the section Universities-Industries Partnerships (UNESCO, 2015). With this, it is noticed that amid so many devices and tactics in the race for competitive advantage, the innovation factor is always successful. Nations that have decided to invest in research and development (R&D) institutions, finance and labor market legislation, and industrial policies have progressed (Fritsch & Mueller, 2004).

This fact evidences the relation between technological progress and economic development, when investing in science and technology (Stopper, 1995). Although the presence of the academy generates greater numbers of innovations and patents, it can still negatively interfere in the business processes (Albahari et al., 2013). It remains to seek a balance on both sides, which according to many studies, prove successful when complemented. To this end, incentives from the public sector become necessary in order to make cities smarter. For Coffey and Polèse (2005) the development of a place refers to the capacity of a locality in the production and sale of its goods and services and, therefore, to involve the capacity of its inhabitants in the generation of income. Issues of characterization and interrelation between social, environmental and economic dimensions are in vogue (Jacobi, 2003).

Thus, Amaral Filho (1996) states that the term "development" has related variables such as: the use of competitiveness in an efficient way, social equity and the reduction of environmental impacts. With this, the sustainability tripod is necessary, in the concept of development of a given region, so that the progress of the region is sustained by policies and practices developed by a mutual articulation of its agents. Public management began to think globally, with a constant search for innovation, knowledge of the environment and its trends; but to act locally, favoring the territory in which the market of interest was concentrated. (Thompson & Strickland, Gamble, 2008).

The evolution of the concept of development occurred with the greater awareness of the future generations, the idea of sustainable regional development will emerge, to make

cities more intelligent. This approach, which is based on the principles of sustainability, is described as practices and policies that respect three fundamental criteria: social relevance (social viability), ecological prudence (environmental viability) and economic viability (Sachs, 2002). Complementing these principles, the United Nations (UN) (2003) stresses that the construction of regional development from a sustainable standpoint reflects a series of discussions on the economic, social and environmental dimensions.

As Boisier (1996) argues, it is a process of social transformation, aiming at the permanent and sustained progress of the territory in question, with the direct participation of the actors who live there. As for its design and relationship, Coe et al. (2004) argue that in sustainable regional development, territories are shaped by occurrences in both the endogenous environment (internal relations) and exogenous (external relations - competitive environment and markets).

This is a process characterized by a strong interest of local societies in formulating regional policies. This is so that the main topics of the present day are debated and for the region to be the main driver of its own development process (Dallabrida, 2000). On this evolution of innovation environments, we can find the appropriability of the urban space by people in a more innovative and sustainable place, where information technology is combined a sustainable process (social, economic and environmental) (Townsend , 2013).

According to Kitchin (2014), they are cities that are increasingly composed of and monitored by technology and its economy and governance is driven by innovation, creativity and entrepreneurship, by smart people. Scholl & Al-Awadhi (2015) complements it brings innovation, attractiveness, competitiveness, sustainability, and livability of an urban space. It could be about smart governance; smart human capital; smart environment; smart living; and smart economy (Lombardi et al., 2012).

4 CITIES AND DEVELOPMENT HELICES

Innovation must take place in a region that needs to be stimulated through the adoption of certain public policies that to regional development as a means of integrated, rather than fragmented and reductionist. In this way, the adoption of a new methodology is necessary as a strategy to cover all regional actors responsible for leveraging development.

As a way of highlighting the importance of innovation in the process of developing a region is that it highlights the concept that evidence of a joint action by the as Etzkowitz (2009) points out. The Triple Helix paradigm comes to the to the social aspirations of the adoption of policies of the governmental transversality, where it is necessary and fundamental for the participation of industry (private companies) with the contribution of capital, universities giving support and conceptual framework, together with the government acting through policies of tax incentives, with a view to the regional."

The Triple Helix describes this new model innovation and helps students, researchers and legislators in addressing issues such as: how we broaden the role of universities in social and regional development? How governments at all levels can encourage citizens to play a key role in active role in promotion and innovation and, conversely, how citizens can encourage their governments to do this? As the companies can collaborate with one another and with universities and governments to become innovative? What are the key elements and challenges to achieve such goals?

As you can see, innovation becomes an instrument of power, generating a competitive advantage, which emphasizes the adoption of this partnership methodology government - university - company with purpose of developing public policies of science and technology based on the interaction of triple helix. Thus, within the contribution of innovation, the Triple Helix dynamics, the government is the main protagonist and partner-supporter innovation and development together with the companies that bring together the productive country, based on universities, where the knowledge is the raw material.

Etzkowitz (2009) presents the Triple Helix as the key for innovation everywhere, being societies based on knowledge. Since the creation, dissemination and use of knowledge move from the periphery to the center of governance and production industry, the concept of innovation in products and processes, is itself being transformed into

(Etzkowitz & Leidesdorff, 1995).

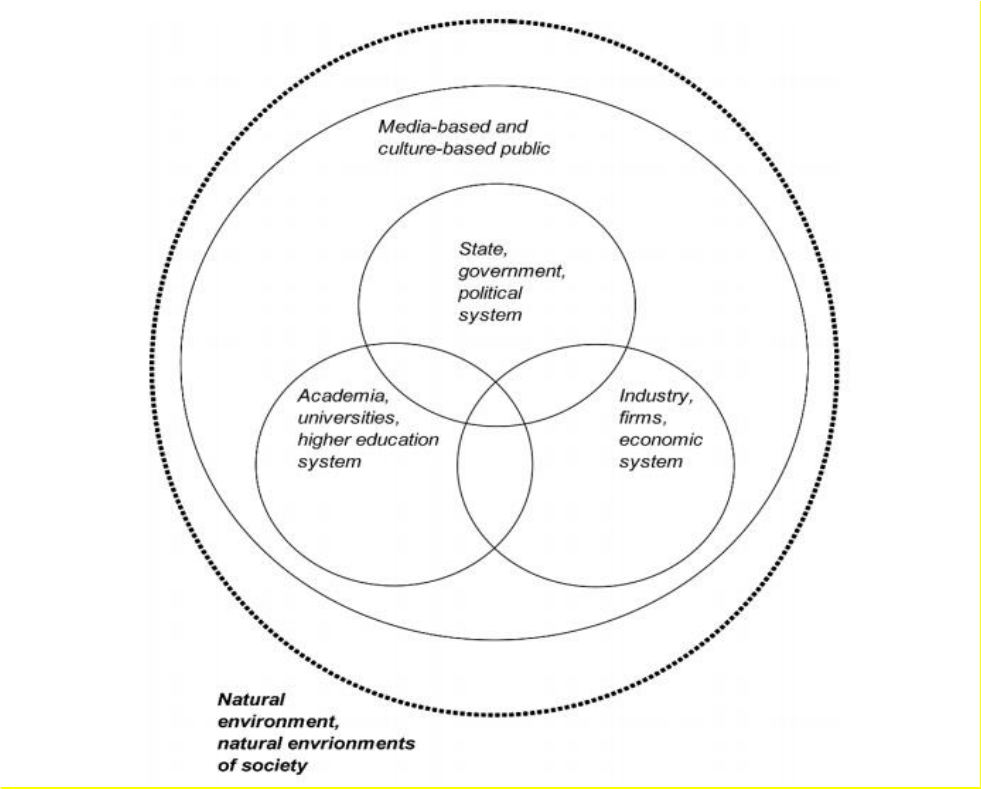
The authors Carayannis and Campapbell (2010), propose an interdisciplinary and transdisciplinary framework of analysis relating three important concepts, knowledge, innovation and the environment. Concepts that in themselves have a high complexity. The model title quintuple helix includes in its model the natural environments. These natural environments describe the complex relationship between different political, economic, and social systems that involve society.

Although the term natural environment gives an idea of the concept of nature, linked to ecology, the authors' proposal treats society as a "natural environment". Society with its multiple levels of aggregation: local - regional - supranational - global, formed by diverse actors. The natural environment includes the process of knowledge and innovation as intrinsic characteristics of society.

According to the Oslo Manual OECD (2018), the natural environment can be an important external factor that influences the decisions of firms, including changes in environmental amenities, flooding and other natural disasters, pandemics and epidemics, climate change, and water, soil and air pollution.

Figure 5 presently visible the model proposed by Carayannis and Campapbell (2010).

Figure 5: The Four and Five-Helix Model



Source: CARAYANNIS AND CAMPAPBELL (2010)

The quintuple helix covers, first, the triple helix - university, industry and government relation, and the quadruple helix with the media-based and culture-based public.

In this conception, the knowledge and innovation achieved in the previous phases would extend the capacity of non-linear models of innovation, where the application of development practices would overflow. According to the authors, Carayannis and Campapbell (2010), the Quintuple Helix has the potential to serve as an analytical framework for sustainable development and social ecology, by conceptually relating knowledge and innovation to the environment, besides enabling the description of what sustainable development, as well as issues such as eco-innovation and eco-entrepreneurship.

To Carayannis, Barth and Campbell (2012, p. 1), “The Quintuple Helix supports here the formation of a win-win situation between ecology, knowledge and innovation, creating

synergies between economy, society, and democracy". Opportunity use for global sustainability issues.

On the following, I present the tools and the framework for achieving the goals of this study.

5 METHOD

Although this study area - the management of cities and communities to become more sustainable – has the management in that essence, unfortunately, it is not common to find those issues on management studies. Thus, we can consider this work such as an explorative-descriptive one, using some metanalysis for a better understanding on management's terms and knowledges.

Then, to give one possible scientific answer to my study question "*what are the best ways to develop sustainable cities and communities?"*, I present the way I tracked my road, according to the purposed goals, by a pragmatic line, given the cities' complexity. The intention is that each goal configurates one published paper.

5.1 Goal I

The present work consists of a bibliographic analysis on quintuple helices. This is a method that fits well when the objective is mapping and evaluation a knowledge area, besides it enables to specify a research question in order to develop and advance the scientific background that requires an investigation (Tranfield, Denyer & Smart, 2003). To achieve the goal of mapping and evaluating the intellectual territory of the given area, the method focuses on establishing a research question that uses an explicit and systematic method to identify, select and evaluate relevant papers in order to collect and analyze data from them (De-La-Torre-Ugarte, Takahashi & Bertolozzi, 2010). In sum, this method allow the researcher to identify the evidences and synthesize them, aiming to present the state of art and future trends of a determined topic (De-La-Torre-Ugarte, Takahashi & Bertolozzi, 2010).

This paper will follow the three stages proposed by Tranfield et al. (2003): planning, executing and reporting the results. The planning stage consists in the identification of the need to do the revision, in the proposal preparation and in a review protocol development. Moreover, the execution phase is the stage that needs the studies identification that will be considered in the paper and, consequently, extracted, evaluated, monitored and synthetized. Lastly, in the reporting phase, it is necessary, besides reporting, to

recommend and to suggest the evidences collected.

During the planning phase, it was defined that the research objective consists in develop a review of the literature on innovation helices considering studies comprised between the years 2010 and 2022. The period under analysis was chosen due the fact that, when a preliminary research was done in order to identify the strategy possibilities, the first studies about the topic using the defined strategy was dated in 2010.

Besides, this scenario repeated when the proper research was effectively done. As the aiming of this study is map the knowledge arena, we decided to cover all the period in order to organize the existing knowledge and point out it possible trends. To doing it was necessary a broad and consolidated data source, with a high publication coverage, besides containing high impact and peer reviewed publications (Podsakoff et al., 2005). Therefore, the Scopus database was defined as the basis for the research due to the fact that it fulfilled those requirements.

The search term was defined based on an extensive bibliographic review that allowed the authors to create a list with the most relevant search terms for the article purpose. By doing so, it was defined “quintuple helix” as search terms and then applied it in the Scopus database aiming to verify how the results would behavior. In this sense, this search term generated papers to be analyzed and, as consequence, this scenario implied a need for new filters to refine this scope.

The new filters included then consists in “Business, Management and Accounting”, “Economics, Econometrics and Finance” and “Social Sciences” as the areas of coverage, “Article” as document type and, lastly, “Journals” as source. Besides, we select papers that use the English as a written language and specific keywords generated by the search terms applied in Scopus. These filters refined the results and provided more specificity. So, as it can be seen in the figure 1, our research protocol followed in defining the research strategies in the first step, then the first and second inclusion/exclusion criteria and, finally, the articles’ quality assessment. All these steps proposed in figure 1 will be totally explained along the methodology session.

5.2 Goal II

A qualitative study, with an exploratory approach, since the theme of smart cities is not yet in the traditional domain of the management area, as in the cases of Social Sciences, Anthropology and Urbanism; and descriptive. According to Loiola and Bastos (2003), surveys of this nature are particularly important to encourage reflection by the researchers themselves on the challenges and limits that surround their practice. The search for data to achieve the objectives was carried out from the survey of thematic articles, via Scopus databases.

Thus, articles were analyzed from these periods, based on the systematic review of the literature. We selected the papers with the expression "smart cit *" in the title or on the set of keywords, with temporal limitation from the first study, in 2012, until 2020; document type “article”, source type “journal”. After this selection, papers were identified that were read integrally for the analysis categories.

Thus, the categories gathered a set of items that evaluated each article in three dimensions, according to the one proposed by Hoppen, Lapointe and Moreau (1996) and in the adaptation of the classifications adopted by Hoppen and Meireles (2005) and Sampaio and Perin (2006), which classify the research methodologies in approach, type of research, nature and instrument of data collection. Also in this dimension, the category under analysis was included, aiming to identify the level of analysis used in the studies carried out (Figure 1). However, it was identified in some articles that the specification of some methodological aspects used was not described in a specific way, being necessary the interpretation and analysis of the researchers to carry out the classification.

5.3 Goal III

Qualitative study, with an exploratory approach, because the theme of smart cities is not yet a traditional domain of the management area, as in the cases of social sciences, anthropology, and urbanism; and descriptive. According to Loiola and Bastos (2003), surveys of this nature are particularly important to encourage researchers to reflect on the challenges and limits surrounding their practice. The search for data to achieve the objectives was carried

out from the survey of articles by theme, via the search platform, Scopus.

Thus, articles from these periods were analyzed, based on a systematic review of the literature. Articles that had the expressions “smart cit*” AND “Brazil” in the title or set of keywords were selected, with a time limit until 2022. After this selection, articles were identified that were read in full for the analysis of the research categories.

First presented by the name of the newspaper in which it appears and its concept according to the Sucupira platform of Web Qualis, of the Ministry of Education and Culture of Brazil, for the area of Public and Business Administration, Accounting Sciences and Tourism; and/or its impact factor. Therefore, it was organized according to the Higher Education Institution belonging to it, according to the affiliation of the editor-in-chief and country.

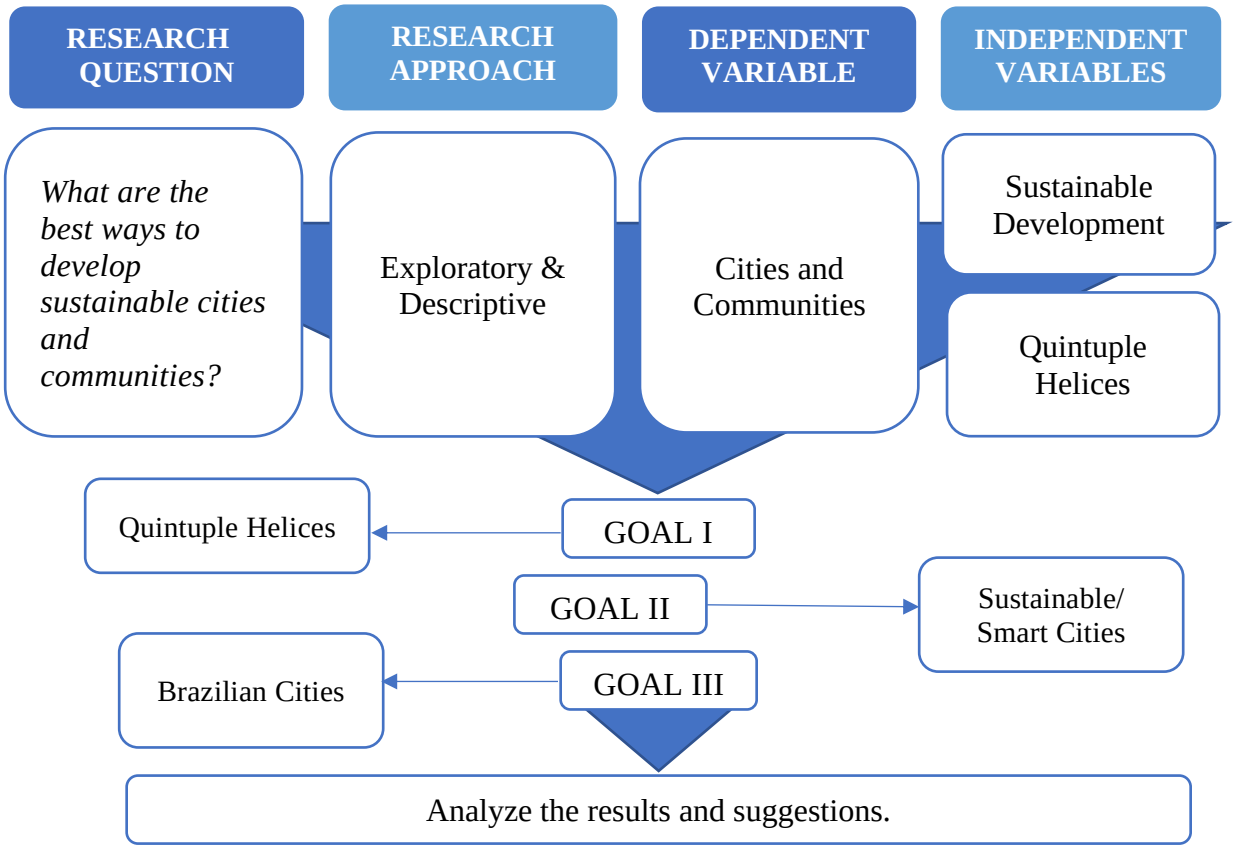
Thus, the categories bring together a set of items that evaluate each article in three dimensions, as proposed by Hoppen, Lapointe and Moreau (1996) and in the adaptation of the classifications adopted by Hoppen and Meireles (2005) and Sampaio and Perin (2006), which classify as research methodologies in approach, type of research, nature and data collection instrument. Still in this dimension, the category object of analysis was included, aiming to identify the level of analysis used in the studies carried out.

However, it was identified in some articles that the specification of some methodological aspects used was not specifically described, requiring the interpretation and analysis of the researchers to carry out the classification.

As Hoppen, Lapointe and Moreau (1996) state, every researcher who has undertaken the exercise of formally evaluating the content of an article scientifically knows that most published articles do not explicitly announce the research methods used, neglecting certain essential details for the research evaluation, which makes the study experience difficult. It is also noteworthy that the four theoretical articles were analyzed only from the first and third dimensions, in view of the specificity of the research.

This way, the research framework is presented (figure 9).

Figure 9: Method Framework



Source: Author (2022)

Hence, the goals are following in the next sections, organized in papers, each one.

6 ANALYSIS AND DISCUSSION

6.1 PAPER I

INNOVATION HELICES EVOLUTION: THE QUINTUPLE HELIX MODEL APPROACHES

ABSTRACT

Innovation is the most important goal that a firm must thrive, meanwhile by a widest view, Universities and Government are too much involved in this process, being it on offering scientific knowledges, qualified workforce, high technology politics and scholarships, tax incentives or others promotion programs. The literature has a relatively large number of studies approaching the Triple Helix model, which present us collaboration and relationship mechanisms between those institutions; however, there are a lack of studies seeking to organize this literature in order to point out this knowledge's state of art evolution of Innovation Helices. Perceiving this gap, the present work aims to make a bibliographic analysis aiming to organize the literature of what has been researched in terms of Quintuple Innovations Helix.

Key-words: Quintuple Helix; Innovation Helices Model; Sustainability.

1. INTRODUCTION

Innovation must take place in a region that needs to be stimulated through the adoption of certain public policies that to regional development as a means of integrated, rather than fragmented and reductionist. In this way, the adoption of a new methodology is necessary as a strategy to cover all regional actors responsible for leveraging development.

As a way of highlighting the importance of innovation in the process of developing a region is that it highlights the concept that evidence of a joint action by the as Etzkowitz (2009) points out. The Triple Helix paradigm comes to the to the social aspirations of the adoption of policies of the governmental transversality, where it is necessary and fundamental for the participation of industry (private companies) with the contribution of capital, universities giving support and conceptual framework, together with the government acting through policies of tax incentives, with a view to the regional."

The Triple Helix describes this new model innovation and helps students, researchers and legislators in addressing issues such as: how we broaden the role of universities in social and regional development? How governments at all levels can encourage citizens to play a key role in active role in promotion and innovation and, conversely, how citizens can encourage their governments to do this? As the companies can collaborate with one another and with universities and governments to become innovative? What are the key elements and challenges to achieve such goals?

As you can see, innovation becomes an instrument of power, generating a competitive advantage, which emphasizes the adoption of this partnership methodology government - university - company with purpose of developing public policies of science and technology based on the interaction of triple helix. Thus, within the contribution of innovation, the Triple Helix dynamics, the government is the main protagonist and partner-supporter innovation and development together with the companies that bring together the productive country, based on universities, where the knowledge is the raw material.

Therefore, how the innovation helices literature has been developed? What are the main trends in the topic? To answer these questions the present study aims to develop a bibliographic analysis on quintuple innovation helix, considering studies published

between 2010 and 2022, that is, during the last 12 years. The period under analysis comprises the absence of updated analyzes and, consequently, the unknown of what have been studied, possible new approaches, gaps and conceptual trends that have been developed within the period. By achieving the paper goal, the review will contribute to the development of innovation management studies, providing a knowledge roadmap for researchers and managers guiding them in the area.

2.INNOVATION HELICES

Etzkowitz (2009) presents the Triple Helix as the key for innovation everywhere, being societies based on knowledge. Since the creation, dissemination and use of knowledge move from the periphery to the center of governance and production industry, the concept of innovation in products and processes, is itself being transformed into (Etzkowitz & Leidesdorff, 1995).

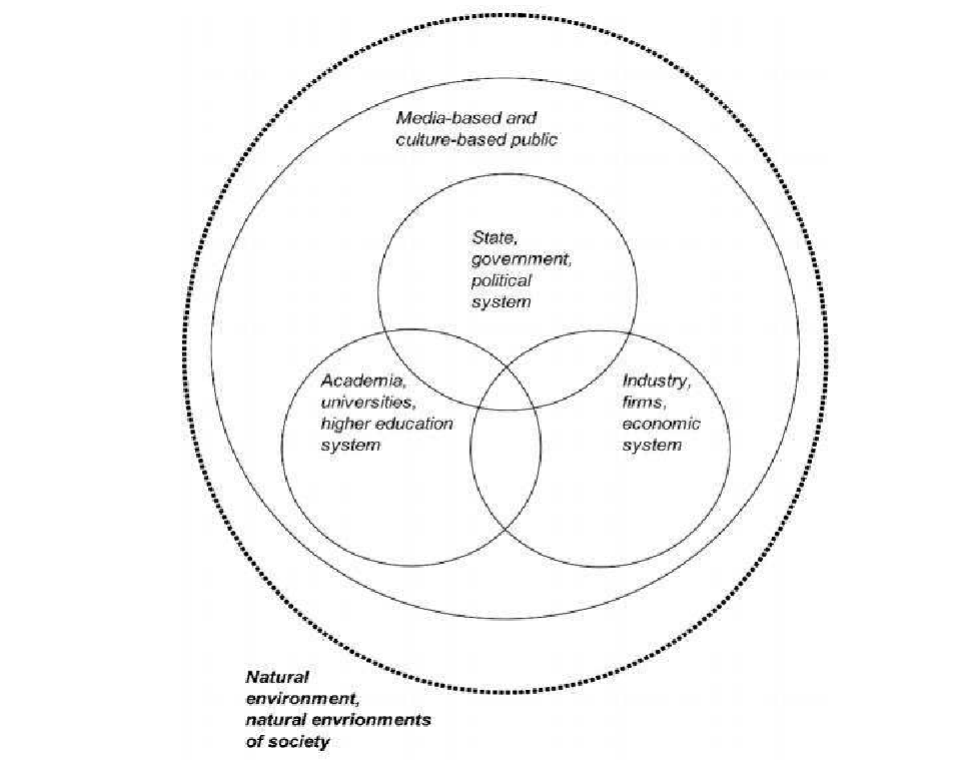
The authors Carayannis and Campapbell (2010), propose an interdisciplinary and transdisciplinary framework of analysis relating three important concepts, knowledge, innovation and the environment. Concepts that in themselves have a high complexity. The model title quintuple helix includes in its model the natural environments. These natural environments describe the complex relationship between different political, economic, and social systems that involve society.

Although the term natural environment gives an idea of the concept of nature, linked to ecology, the authors' proposal treats society as a "natural environment". Society with its multiple levels of aggregation: local - regional - supranational - global, formed by diverse actors. The natural environment includes the process of knowledge and innovation as intrinsic characteristics of society.

According to the Oslo Manual OECD (2018), the natural environment can be an important external factor that influences the decisions of firms, including changes in environmental amenities, flooding and other natural disasters, pandemics and epidemics, climate change, and water, soil and air pollution.

Figure 1 presently visible the model proposed by Carayannis and Campapbell (2010).

Figure 1: The four and five-helix model of the Quintuple Helix



Source: CARAYANNIS AND CAMPAPBELL (2010)

The quintuple helix covers, first, the triple helix - university, industry and government relation, and the quadruple helix with the media-based and culture-based public.

In this conception, the knowledge and innovation achieved in the previous phases would extend the capacity of non-linear models of innovation, where the application of development practices would overflow. According to the authors, Carayannis and Campapbell (2010), the Quintuple Helix has the potential to serve as an analytical framework for sustainable development and social ecology, by conceptually relating knowledge and innovation to the environment, besides enabling the description of what sustainable development, as well as issues such as eco-innovation and eco-entrepreneurship.

To Carayannis, Barth and Campbell (2012, p. 1), “The Quintuple Helix supports

here the formation of a win-win situation between ecology, knowledge and innovation, creating synergies between economy, society, and democracy". Opportunity use for global sustainability issues.

3.METHOD

The present work consists of a bibliographic analysis on quintuple helices. This is a method that fits well when the objective is mapping and evaluation a knowledge area, besides it enables to specify a research question in order to develop and advance the scientific background that requires an investigation (Tranfield, Denyer & Smart, 2003).

To achieve the goal of mapping and evaluating the intellectual territory of the given area, the method focuses on establishing a research question that uses an explicit and systematic method to identify, select and evaluate relevant papers in order to collect and analyze data from them (De-La-Torre-Ugarte, Takahashi & Bertolozzi, 2010). In sum, this method allow the researcher to identify the evidences and synthesize them, aiming to present the state of art and future trends of a determined topic (De-La-Torre-Ugarte, Takahashi & Bertolozzi , 2010).

This paper will follow the three stages proposed by Tranfield et al. (2003): planning, executing and reporting the results. The planning stage consists in the identification of the need to do the revision, in the proposal preparation and in a review protocol development. Moreover, the execution phase is the stage that needs the studies identification that will be considered in the paper and, consequently, extracted, evaluated, monitored and synthetized. Lastly, in the reporting phase, it is necessary, besides reporting, to recommend and to suggest the evidences collected.

3.1. Planning Stage

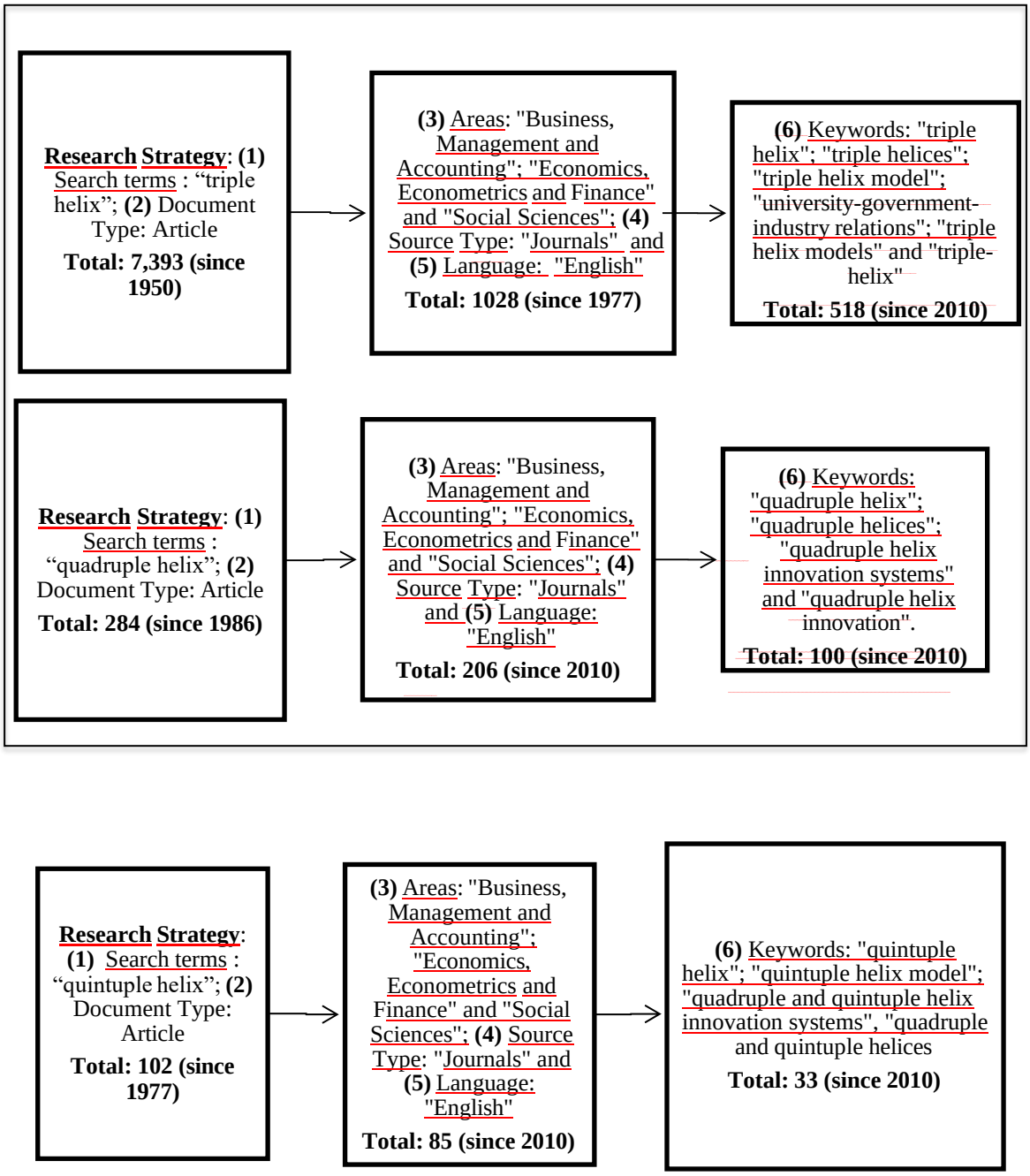
During the planning phase, it was defined that the research objective consists in develop a review of the literature on innovation helices considering studies comprised between the years 2010 and 2018. The period under analysis was chosen due the fact that,

when a preliminary research was done in order to identify the strategy possibilities, the first studies about the topic using the defined strategy was dated in 2010. Besides, this scenario repeated when the proper research was effectively done. As the aiming of this study is map the knowledge arena, we decided to cover all the period in order to organize the existing knowledge and point out it possible trends. To doing it was necessary a broad and consolidated data source, with a high publication coverage, besides containing high impact and peer reviewed publications (Podsakoff et al., 2005). Therefore, the Scopus database was defined as the basis for the research due to the fact that it fulfilled those requirements.

The search term was defined based on an extensive bibliographic review that allowed the authors to create a list with the most relevant search terms for the article purpose. By doing so, it was defined “quintuple helix” as search terms and then applied it in the Scopus database aiming to verify how the results would behavior. In this sense, this search term generated 36 papers to be analyzed and, as consequence, this scenario implied a need for new filters to refine this scope.

The new filters included then consists in “Business, Management and Accounting”, “Economics, Econometrics and Finance” and “Social Sciences” as the areas of coverage, “Article” as document type and, lastly, “Journals” as source. Besides, we select papers that use the English as a written language and specific keywords generated by the search terms applied in Scopus. These filters refined the results and provided more specificity, generating 33 papers. So, as it can be seen in the figure 1, our research protocol followed in defining the research strategies in the first step, then the first and second inclusion/exclusion criteria and, finally, the articles’ quality assessment. All these steps proposed in figure 1 will be totally explained along the methodology session.

Figure 2: Triple and Quadruple Helices Search for Data Comparision



Source: The Authors (2022).

3.2. Executing Stage

The execution stage proposed by Tranfield et al. (2003) comprises five steps: (1) grouping publications; (2) compiling the considerations; (3) classifying and defining result typologies and, lastly, (4) result synthesis. In the first one, we will collect all the papers

generated by the strategies applied in the Scopus and download them into the software Mendeley 1.18 version aiming to better manage all the articles. Then we will created an Excel spreadsheets containing cells to allocate and organize all the collected information from the articles, both included and excluded.

So, all the articles based on Mendeley 1.18 will be read at least the title and the abstract. If title and abstract matched with the inclusion criteria (innovation capability as dependent variable) we went further and read the article at all and extracted all the essentials information, such as title, authors name, journal that was published, method and results, then we to put into the Excel spreadsheet all these information.

The second inclusion criteria will consists in the assessing the quality of the studies included to verify if there were articles with unclear structure, objectives, methods and results, that is, articles unable to match with high quality standards of doing science. This step will allow us to better refine our paper by including only studies with the best scientific structure found by the research strategy applied in Scopus database.

After this grouping activity and all the articles organized inside the same topic, the results inside each topic were read again a categorized according to the common topic. Each topic generated by the classification will be organized in a common structure and the results will be written based on the common structure.

3.3. Reporting Stage

Lastly, to approach the reporting stage it is important to observe that, after read all the articles, we will organize them in constructs that are correlated to the variables found about the perspectives of quintuple helix.

In the results session final, we will build a table in order to present the results conclusion of this study in a synthetized way: In this way, the first column introduces the constructs; while the second will describe by the authors together that used the construct to approach innovation capability and, lastly; the third column which contain the highlights summarized by construct as a whole.

4. RESULTS AND ANALYSIS

In this section, it will be possible to organize the found studies, according to its mainly subjects citation. Hence, in the next subsections we will discuss detailed these groups in order to specify the main findings.

Figure 3: Papers analysed.

Year	Journal	Title	Authors
2022	Journal of Outdoor Recreation and Tourism	Meaningful community participation for effective development of sustainable tourism: Bibliometric analysis towards a quintuple helix model	Iqbal, A., Ramachandra, S., Siow, M.L., Subramaniam,T., Mohammad Afandi, S.H.
2022	Journal of the Knowledge Economy	Helix Trilogy: the Triple, Quadruple, and Quintuple Innovation Helices from a Theory, Policy, and Practice Set of Perspectives	Carayannis, E.G., Campbell, D.F.J., Grigoroudis, E.
2022	Journal of the Knowledge Economy	Assessing the Origins, Evolution and Prospects of National Innovation Systems	López-Rubio, P., Roig-Tierno, N., Mas-Verdú, F.
2022	Tourism	Analysis of the Social Challenge of the City of Barcelona Under the Model of the Quintuple Helix in a Covid-19 Context	Calderón-Fajardo, V.
2022	Triple Helix	Towards an Emerging Unified Theory of Helix Architectures (EUTOHA): Focus on the Quintuple Innovation Helix Framework as the Integrative Device	Carayannis, E.G., Campbell, D.F.J.
2022	IEEE Transactions on Engineering Management	The Noncontextual Drivers of Innovation: Development and Validation of the 5H-INN Survey	Canestrino, R., Carayannis, E.G., Magliocca, P.
2022	Defence Studies	Defence industries and open innovation: ways to increase military capabilities of the Portuguese ground forces	Reis, J., Melão, N., Costa, J., Pernica, B.
2021	Journal of the Knowledge Economy	Democracy of Climate and Climate for Democracy: the Evolution of Quadruple and Quintuple Helix Innovation Systems	Carayannis, E.G., Campbell, D.F.J.
2021	Sustainability	Digital Entrepreneurship Services Evolution: Analysis of Quadruple and Quintuple Helix Innovation Models for Open Data Ecosystems	Kitsios, F., Kamariotou, M., Grigoroudis, E.
2021	International Journal of Innovation and Technology Management	Digital Innovation Ecosystems for Circular Economy: The Case of ICESP, the Italian Circular Economy Stakeholder Platform	Del Vecchio, P., Passiante, G., Barberio, G., Innella, C.

2021	International Journal of Professional Business Review	The Quintuple Helix modeling technological innovation: characterization and the status of business accelerators in a metropolitan region	Lara, J.E., Esteves, C.M.A., Cremonez, V.G., Ribeiro, R.M.
2021	Changing Societies and Personalities	Knowledge: From Ethical Category to Knowledge Capitalism	Kochetkov, D.M., Kochetkova, I.A.
2021	Innovation and Management Review	The quadruple and quintuple helix in innovation environments (Incubators and science and technology parks)	Mineiro, A.A.D.C., de Souza, T.A., de Castro, C.C.
2021	International Journal of Urban Sustainable Development	Assessing the ASEAN Smart Cities Network (ASCN) via the Quintuple Helix Innovation Framework, with Special Regard to Smart City Discourse, Civil Participation, and Environmental Performance	Crumpton, C.D., Wongthanavasu, S., Kamnuansilpa, P., Draper, J., Bialobrzeski, E.
2020	Technological Forecasting and Social Change	Evidence from Network Analysis application to Innovation Systems and Quintuple Helix	Maruccia, Y., Solazzo, G., Del Vecchio, P., Passiante, G.
2020	Sustainability	Social entrepreneurship education as an innovation hub for building an entrepreneurial ecosystem: The case of the Kaist social entrepreneurship MBA program	Kim, M.G., Lee, J.-H., Roh, T., Son, H.
2020	Technological Forecasting and Social Change	Bridging the gap between circular economy and climate change mitigation policies through eco-innovations and Quintuple Helix Model	Durán-Romero, G., López, A.M., Beliaeva, T., (...), Garonne, C., Jones, P.
2020	Ekonomia i Srodowisko	Methodological approach of investment and innovation regional environmental policy using the smart specialization and quintuple helix models	Andryeyeva, N., Tiutiunnyk, H., Burkynskyi, B., Khumarova, N., Kupinets, L.
2020	Management Science Letters	Quintuple helix and innovation on performance of SMEs within ability of SMEs as a mediator variable: A comparative study of creative industry in Indonesia and Spain	Harwiki, W., Malet, C.
2019	Journal of the Knowledge Economy	Research Outputs as Vehicles of Knowledge Exchange in a Quintuple Helix Context: The Case of Biofuels Research Outputs	Alhassan, E., Schillo, R.S., Lemay, M.A., Pries, F.
2019	Entrepreneurship and Sustainability Issues Entrepreneurship and Sustainability Issues	The role of green economy in sustainable development (Case study: The eu states)	Lavrinenko, O., Ignatjeva, S., Ohotina, A., Rybalkin, O., Lazdans, D.
2017	Scientometrics	Quintuple helix structure of Sino-Korean research collaboration in science	Yoon, J., Yang, J.S.W., Park, H.W.

2017	Journal of the Knowledge Economy	Sustainable Development of the Russian Arctic zone energy shelf: the Role of the Quintuple Innovation Helix Model	Carayannis, E.G., Cherepovitsyn, A.E., Ilinova, A.A.
2017	Journal of the Knowledge Economy	The Balanced Development of the Spatial Innovation and Entrepreneurial Ecosystem Based on Principles of the Systems Compromise: A Conceptual Framework	Dubina, I.N., Campbell, D.F.J., Carayannis, E.G., Chub, A.A.e Grigoroudis, E.f; Kozhevina, O.V.
2016	Journal of the Knowledge Economy	A Quadruple and Quintuple Helix Approach to Regional Innovation Systems in the Transformation to a Forestry-Based Bioeconomy	Grundel, I., Dahlström, M.
2016	Journal of Teacher Education for Sustainability	The transformation of traditional universities into entrepreneurial universities to ensure sustainable higher education	Bikse, V., Lusena-Ezera, I., Rivza, B., Volkova, T.
2015	Journal of Innovation and Entrepreneurship	Mode 3 knowledge production: systems and systems theory, clusters and networks	Carayannis, E.G., Campbell, D.F.J.
2014	Journal of Innovation and Entrepreneurship	Developed democracies versus emerging autocracies: arts, democracy, and innovation in Quadruple Helix innovation systems	Carayannis, E.G., Campbell, D.F.J.
2013	International Journal of Social Ecology and Sustainable Development	The quality of democracy-concept vs. the quintuple helix: On the virtues of minimalist vs. maximalist approaches in assessing the quality of democracy and the quality of society	Schlattl, G.
2013	International Journal of Social Ecology and Sustainable Development	Freedom, equality and the quality of democracy: Democratic Life in the United States, Australia, Sweden and Germany	Barth, T.D.
2011	International Journal of Social Ecology and Sustainable Development	The idea of a green new deal in a Quintuple Helix Model of knowledge, know-how and innovation	Barth, T.D.
2011	International Journal of Social Ecology and Sustainable Development	The semi-aquatic theory: Semi-aquatic evolutionary phase and environment, language development of modern humans. with a short epilog on conceptualized evolution, social ecology and the Quintuple Helix	Carayannis, E.G., Campbell, D.F.J.
2010	International Journal of Social Ecology and Sustainable Development	Triple helix, Quadruple helix and Quintuple helix and how do Knowledge, Innovation and the Environment relate to Each other? a proposed framework for a trans-disciplinary analysis of sustainable development and social ecology	Carayannis, E.G., Campbell, D.F.J.

Source: Scopus (2022).

Then, according to figure 3 is possible to analyse the 33 papers found after the search guided by the method. The main authors with the majority of the published articles

about quintuple helix and their area center and affiliations are Carayannis – from the European Union Research Center, Department of Information Systems & Technology Management, School of Business of The George Washington University/USA – and Campbell – from the Unit for Quality Enhancement, University of Applied Arts Vienna and Faculty for Interdisciplinary Studies, Institute of Science Communication and Higher Education Research (WIHO)/Austria –, who started publishing the first study in 2010. The third author with more publications is Barth from University of Vienna/Austria, beign co-author on his first publication with Campbell, according to his description.

The journal with more publications about this thematic is the International Journal of Social Ecology and Sustainable Development, in which Carayannis is the chief-editor, presenting 5 from the 12 studies.

According to the issue of the studies, it is possible to analyze according to figure 4.

Figure 4: Papers' issues.

Title	Study Issue
Meaningful community participation for effective development of sustainable tourism: Bibliometric analysis towards a quintuple helix model	This study shows that there is a centrality of community participation in achieving the goal of sustainable development of tourism. The quintuple helix model is proposed to explore and understand the dynamic literary landscape and how it grows and evolves, thus facilitating future research in this area. It found that an strong community participation improves the sustainable development of tourism and it should be complemented by socio-economic and political empowerment at tourist destinations; more studies presenting about community participation as explained by the quintuple helix model points the need for meaningful engagement of destination communities in tourism development.
Helix Trilogy: the Triple, Quadruple, and Quintuple Innovation Helices from a Theory, Policy, and Practice Set of Perspectives	This study purposes that for an understanding of the concept of the Quadruple and Quintuple Helix Innovation Systems, it is basic that they were based on democracy and ecology, being the government and the political system, democratic in substance. This indicates how a Quadruple and Quintuple Helix differs from Triple approaches. Furthermore, within the framework of Quadruple and Quintuple Helix, the "Democracy of Climate" for innovation and the "Democracy of Knowledge" takes a nexus. A several implications for strategy, policy, and practice, also incorporating aspects of Industry 5.0 and Society 5.0.
Assessing the Origins, Evolution and Prospects of National Innovation	This paper purposes to assesses the origins, evolution and prospects of national innovation systems (NISs) using bibliometric techniques. That approach highlights

Systems	the fact that many studies belong to previous, well-developed research streams. It has focused on the adaptation of innovation systems to the actual global economic crisis and the application of the Quintuple Helix model to deal with this new scenario; the adaptation of innovation systems to developing countries and the specific fit of entrepreneurship and entrepreneurial innovations into NIS research.
Analysis of the Social Challenge of the City of Barcelona Under the Model of the Quintuple Helix in a Covid-19 Context	This study purposes an exhaustive analysis of the context of tourism phobia and touristification in the city of Barcelona. The Quintuple Helix supports the formation of a win-win context between ecology, knowledge, and innovation, thereby creating synergies between economy, society, and democracy. The results support the idea that tourism-phobia in Barcelona remains uncontrolled affecting different actors – the tourism monoculture. The study showed a precise diagnosis of the actors' lack of control, suggesting that policymakers rethink how to manage the city together with tourism. It found that the current context of the Covid-19 pandemic perpetuates a model of unsustainable tourism-philia that will feed back into tourism-phobia.
Towards an Emerging Unified Theory of Helix Architectures (EUTOHA): Focus on the Quintuple Innovation Helix Framework as the Integrative Device	This study purposes, by the view of the Environment, the Civil Society, the Government, University and Industry dimensions, the Quintuple Helices as a appropriate and even critical, given current events in Europe that starkly highlight the problems and struggle between democracies and autocracies, to enable, facilitate and even accelerate the further development of an Emerging Unified Theory of Helical Architectures (EUTOHA). It shows that bring coherence and consistency to the development and dynamics of the helical architectures to advance and the framework of solutions for the digital transformation of modern knowledge economies and societies towards more democratic and sustainable ones.
The Non-contextual Drivers of Innovation: Development and Validation of the 5H-INN Survey	This study proposes an integrated framework for identifying the drivers of innovation (different from cultural, geographic, and sectoral loci) that associates the Quintuple Helix Model and the Innovation Process Research. Then, was developed and validated the 5H-INN survey as an innovative and valuable tool to be applied. This new instrument for measure it is expected to support the understanding of the innovative dynamics and benefit future research and societal development.
Defense industries and open innovation: ways to increase military capabilities of the Portuguese ground forces	This study purposes to identify on the state-of-the-art of Quintuple Helices using PRISMA protocol to discover concepts, ideas, and debates about the defense industry and to analyze a case to ensure triangulation and corroboration. The results show that, about the quintuple helix innovation model, it was possible to bring applications from theory to practice. Then, by a scope of the triple helix, it was possible to develop, produce and test military products, allowing to improve the military capacity of ground forces.

Democracy of Climate and Climate for Democracy: the Evolution of Quadruple and Quintuple Helix Innovation Systems	This study purposes that Quadruple and Quintuple Helix innovation systems are based on democracy and ecology. Therefore, for an innovation system to be a Quadruple/Quintuple Helix innovation system, the political regime which develop these helices needs to be, in fact, democratic. Then, the next stage in evolution of innovation systems should treat a "democracy of climate" (social, cultural, economic, and political "climate for democracy"), where democracies as an innovation driver creates innovation that regard the ecology as a crucial part for a developed and responsible innovation.
Digital Entrepreneurship Services Evolution: Analysis of Quadruple and Quintuple Helix Innovation Models for Open Data Ecosystems	This paper purpose was to identify the challenges that open data hackathons players can face to present a model that supports the use of that events' innovations, by the quadruple/quintuple helix innovation model to drive innovation and entrepreneurship in an open data ecosystem to develop applications using it. Results showed that a new type of open data ecosystem that creates a win–win scenario between the entities in that ecosystem is required, promoting cooperation and networking among another surrounding actors, even improving the citizens' quality of life.
Digital Innovation Ecosystems for Circular Economy: The Case of ICESP, the Italian Circular Economy Stakeholder Platform	This study investigates how digital innovation ecosystem, and a quintuple helix model can develop Circular Economy, occurring in a productive and consumption system under the form of a new product, process, organizational or marketing model. Meanwhile, the digital innovation ecosystem subject was improved by the social and environmental sustainability approach, base of the Circular Economy. It presented a digital platform for stakeholders' engagement, supporting the creation of a digital innovation ecosystem focused on the Circular Economy.
The quintuple helix modeling technological innovation: characterization and the status of business accelerators in a metropolitan region	This study described and analyzed the current state of business accelerators in the metropolitan region of Belo Horizonte - MG (Brazil). Results showed the relevance of the constructs and variables, demonstrating the relevance and practical usage of the Quintuple Helix. That analysis of an emerging model and proposition of validations are compatible with the need for its consolidation as a theory.
Knowledge: From Ethical Category to Knowledge Capitalism	This study brought the impact of knowledge on economic growth and performance. Focusing on knowledge-based theories came out from corporate management to macrosystems and economic policy. Then, it described the main stages in the development of socio-economic concepts of knowledge and analyzed those approaches, formulating the critical problems in the analysis of the nowadays economic category of knowledge and suggested ways of overcoming them.
The quadruple and quintuple helix in innovation environments (Incubators and science and technology parks)	This study purposes to investigate the literature on the representation of the quadruple and quintuple helix (QQH) in innovation environments (incubators and science and technology parks - STPs). It noticed a lack of standardization on the representation of

	the quadruple helix, but the example of associations and community centers as representatives of the civil society. The quintuple helix does not have an actor that represents the environment, but STPs incentive sustainable actions, as green companies and stimulate sustainable practices in existing companies. Then, contributing by showing the role and functions of that new helices on practice.
Assessing the ASEAN Smart Cities Network (ASCN) via the Quintuple Helix Innovation Framework, with Special Regard to Smart City Discourse, Civil Participation, and Environmental Performance	This study purposes current study labels the collective product of this criticism as identification of the normalized problematics' of the Smart City Movement. It assessed the ASCN in terms of the SCM discourse and its normalized problematics through the Quintuple Helix frame of innovation economics. It pointed out the influence of powerful states are influencing the e decisions about ASEAN (Association of Southeast Asian Nations) urban planning and sustainability,
Evidence from Network Analysis application to Innovation Systems and Quintuple Helix	This study purpose is about connections between the Quintuple Helix and System Dynamics modelling from a quantitative perspective. It presents how the application of Network Analysis metrics collaborates to an innovation system mapped with a Quintuple Helix model. Then, there are benefits of coupling Network Analysis with System Dynamics modelling and valuable evidence of relationships among helices.
Social entrepreneurship education as an innovation hub for building an entrepreneurial ecosystem: The case of the Kaist social entrepreneurship MBA program	This study purposes a design and assessment framework for Social Entrepreneurship Education (SEE) program to foment ever-growing communities of social entrepreneurs while functioning as innovation hubs for entrepreneurial ecosystems (EEs) evolving on their own. About connections into members and externals, including universities, firms, government agencies, civil societies, and natural environments, by analyzing the case of an MBA degree SEE program in Korea, by integrating SEE's main features with social theories of learning and the quintuple helix model for sustainable innovation ecosystems.
Bridging the gap between circular economy and climate change mitigation policies through eco-innovations and Quintuple Helix Model	This study purposes to identify the contributions of the Circular Economy eco-innovations, that increase the resource use efficiency and minimize resource inputs, waste and emissions generation, for climate change mitigation goals, by the Quintuple Helix Model actors (companies, government, society, academia, and the natural environment). It results in discussions about Eco-innovation technologies from energy, waste, transportation, construction and manufacturing sectors and practical recommendations and implications for policymakers.
Methodological approach of investment and innovation regional environmental policy using the smart specialization and quintuple helix models	This study aims to stablish a methodological approach about the combination of Quintuple Helix and Smart Specialization arrangements to determine the strategic priorities of investment and innovation policy of the national economy. It allows not only to define the dominants in nature but also to determine the regional particularities based on scientific and technological

	potential, considering the priorities of individual Sustainable Development Goals.
Quintuple helix and innovation on performance of SMEs within ability of SMEs as a mediator variable: A comparative study of creative industry in Indonesia and Spain.	This study purpose is to analyze the effects of quintuple helix on small and medium enterprises (SMEs) performance; the ability of SMEs on SMEs performance, quintuple helix on ability of SMEs; innovation on SMEs performance and innovation on ability of SMEs. It presented comparations on Indonesian and Spanish creative industries and were significant the relationship of ability of SMEs on SMEs performance and innovation on ability of SMEs.
Research Outputs as Vehicles of Knowledge Exchange in a Quintuple Helix Context: The Case of Biofuels Research Outputs	This study compares Triple/Quadruple/Quintuple Helix theory to verify differences in perceptions of investigations outputs between researchers and users about advanced biofuels research. Authors pointed out that is necessary to integrate the most recent concepts of Quadruple/Quintuple Helix and the fundamental considerations of societal and environmental subjects about the practice of knowledge exchanges, measuring it and making it useful.
The role of green economy in sustainable development (Case study: The EU states)	This study presents that some authors believe that solution for environmental problems is to reduce the level of economic activity, restricting in the use of resources; others, that economic activity can continue to grow, but reducing impact on the environment; authors believe it is possible to achieve a balance between economic growth and care for the planet and people, being necessary to use a new paradigm that "environment" and "economic growth" cannot be seen as controversial, which is ratified by the authors who studied the situation in the European Nations from 2016 to 2017.
Quintuple helix structure of Sino-Korean research collaboration in science	The present study employs the N-tuple Helix Model as a suitable alternative to analyze the structure of scientific collaboration networks beyond university–industry–government (UIG) relations.
Sustainable Development of the Russian Arctic zone energy shelf: the Role of the Quintuple Innovation Helix Model	The objective of this paper is to develop the concept of sustainable development of the Russian Arctic zone energy shelf within the framework of the Quintuple Innovation Helix Model which focuses on university-industry-government relations, public and civil society, and the natural environment
The Balanced Development of the Spatial Innovation and Entrepreneurial Ecosystem	The purpose and interest of the article is to provide information for other discussion of these and other issues related to the organization

Based on Principles of the Systems Compromise: A Conceptual Framework	and management of stakeholder interaction in the process of sustainable development in space innovation and entrepreneurship ecosystem. In addition to presenting formal game theory modeling and business simulation games
A Quadruple and Quintuple Helix Approach to Regional Innovation Systems in the Transformation to a Forestry-Based Bioeconomy	This article aims to understand the possible preconditions for the transformation of a regional innovation system (RIS) into a quadruple and quintuple helix system applied to the development of a sustainable forestry-based bioeconomy in Värmland, Sweden.
The transformation of traditional universities into entrepreneurial universities to ensure sustainable higher education	This paper aims to investigate the experience and to identify the drivers of transforming traditional universities into Entrepreneurial Universities for ensuring sustainable higher education in Latvia.
Mode 3 knowledge production: systems and systems theory, clusters and networks	The purpose of the article is to establish a conceptual link between systems and systems theory and with knowledge application. They use concepts such as Systems theory, clusters and innovation networks.
Developed democracies versus emerging autocracies: arts, democracy, and innovation in Quadruple Helix innovation systems	The authors seek to investigate artistic research connections. innovation and innovation systems, based on and applying the concepts of the Quadruple and Quintuple Helix innovation systems. How does artistic research relate to research in the sciences, and how does artistic research relate to innovation and innovation systems?
The quality of democracy-concept vs. the quintuple helix: On the virtues of minimalist vs. maximalist approaches in assessing the quality of democracy and the quality of society	The aim of this paper is to highlight the need to avoid the fallacy of excessive conceptual effort in evaluating the quality of democracy.
Freedom, equality and the quality of democracy: Democratic Life in the United States, Australia, Sweden and Germany	By investigating the quality of democracy this article develops two theses:1.) Democracy with their quality rises or falls with the expression of freedom and/or equality; 2.) Democracy generates its stability from a balanced interaction between freedom and equality. With the concept of Democratic Life this article examines these two theses: Democratic Life as newly developed concept measures the quality of democracy with providing information about the type of a democracy and an approach to measure a democracy's democratic development for the top 20 of the Democracy Ranking (2009).
The idea of a green new deal in a Quintuple Helix Model of knowledge, know-how and innovation	This article is about the discussion of a correlation between a potential Green New Deal project and the scientific innovation model of a Quintuple Helix in advanced democracies to demonstrate that the sought for knowledge, sustainability, and green development can imply an excess in quality of democracies.
The semi-aquatic theory: Semi-aquatic evolutionary phase and environment, language development of modern humans. with a short epilog on conceptualized evolution, social ecology and the Quintuple Helix	This article presents the semi-aquatic theory motivated to provide an explanation for why or how did language of the modern humans develop?

Triple helix, Quadruple helix and Quintuple helix and how do Knowledge, Innovation and the Environment relate to Each other? a proposed framework for a trans-disciplinary analysis of sustainable development and social ecology	This article develops an inter-disciplinary and trans-disciplinary framework of analysis that relates knowledge, innovation and the environment (natural environments) to each other.

Source: Authors, 2022.

In this issues, we can observe the main related subjects as geopolitics, democracy, industries as tourism and defense, innovation and sustainability, approaching the European context of innovation development. About the method, most of the studies was descriptive, approaching case study, bibliographic data, survey and interviews.

A relevant observation is to identify that the studies approaching the helices with the community awareness and participation on public/city decisions are increasing, configurating the quintuple helix model.

FINAL REMARKS

The objective of this study was achieved by implementing a bibliographic analysis aiming to organize the literature of what has been researched in terms of Quintuple Innovation Helix. From the triple and quadruple helices, their evolution – the quintuple helix – can show us that approaching variables as the environment and the community, we can have a better understanding of how we should improve innovation development processes, giving the importance that these helices have on changing development standards.

It is possible to analyze that published studies are still a small number towards to the triple and quadruple helices, but the new world demands ask more about its contributions, trying to amplify the voice of local people and the nature situation and historic.

About the limitations of the study, it was used just one database and a basic bibliographic analysis for organizing this area of study.

For future studies, it is possible to highlight the relations between the three concepts of helices and to identify the main cases in the world, classifying them

according to their related thematic and datas as GDP and build the maps of relationships and shares between universities, governments, companies, the environment and the local community.

REFERENCES

BARTH, T. D. The idea of a green new deal in a Quintuple Helix Model of knowledge, know-how and innovation. **International Journal of Social Ecology and Sustainable Development (IJSESD)**, v. 2, n. 1, p. 1-14, 2011.

BARTH, T. D. Freedom, equality and the quality of democracy: democratic life in the United States, Australia, Sweden and Germany. In: **Human Rights and Ethics: Concepts, Methodologies, Tools, and Applications**. IGI Global, 2015. p. 1778-1804.

BIKSE, V.; LUSENA-EZERA, I.; RIVZA, B.; VOLKOVA, T. . The transformation of traditional universities into entrepreneurial universities to ensure sustainable higher education. **Journal of Teacher Education for Sustainability**, v. 18, n. 2, p. 75-88, 2016.

CARAYANNIS, E..; CAMPBELL, D. FJ. The semi-aquatic theory: semi-aquatic evolutionary phase and environment, language development of modern humans. With a short epilog on conceptualized evolution, social ecology and the quintuple helix. **International Journal of Social Ecology and Sustainable Development (IJSESD)**, v. 2, n. 1, p. 15-30, 2011.

___:.; BARTH, T.; CAMPBELL, D.. The Quintuple Helix innovation model: global warming as a challenge and driver for innovation. In: **Journal of innovation and entrepreneurship**, 2012.

___; CAMPBELL, D. Triple Helix, Quadruple Helix and Quintuple Helix and How Do Knowledge, Innovation and the Environment Relate To Each Other? A Proposed Framework for a Trans-disciplinary Analysis of Sustainable Development and Social Ecology **International Journal of Social Ecology and Sustainable Development** 1(1):41-69, 2010.

_; CAMPBELL, David FJ. Triple Helix, Quadruple Helix and Quintuple Helix and how do knowledge, innovation and the environment relate to each other?: a proposed framework for a trans-disciplinary analysis of sustainable development and social ecology. **International Journal of Social Ecology and Sustainable Development (IJSESD)**, v. 1, n. 1, p. 41-69, 2010.

_; CAMPBELL, David FJ. Developed democracies versus emerging autocracies:

arts, democracy, and innovation in Quadruple Helix innovation systems. **Journal of Innovation and Entrepreneurship**, v. 3, n. 1, p. 12, 2014.

__; CAMPBELL, David FJ; REHMAN, Scheherazade S. Mode 3 knowledge production: systems and systems theory, clusters and networks. **Journal of Innovation and Entrepreneurship**, v. 5, n. 1, p. 17, 2016.

__; CHEREPOVITSYN, Alexey E.; ILINOVA, Alina A. Sustainable development of the Russian Arctic zone energy shelf: The role of the quintuple innovation helix model. **Journal of the Knowledge Economy**, v. 8, n. 2, p. 456-470, 2017.

DUBINA, Igor N.; CAMPBELL, D. F., CARAYANNIS, Elias G.; CHUB, A. A.,
GRIGOROUDIS, E., KOZHEYINA, O. V. The balanced development of the spatial innovation and entrepreneurial ecosystem based on principles of the systems compromise: a conceptual framework. **Journal of the Knowledge Economy**, v. 8, n. 2, p. 438-455, 2017.

GRUNDEL, Ida; DAHLSTRÖM, Margareta. A quadruple and quintuple helix approach to regional innovation systems in the transformation to a forestry-based bioeconomy. **Journal of the Knowledge Economy**, v. 7, n. 4, p. 963-983, 2016.

DE-LA-TORRE-UGARTE, M. C., TAKAHASHI, R. F., & BERTOLOZZI, M. R. Revisão

sistemática: noções gerais. **Revista da Escola de Enfermagem da USP**, *45* (5),

1260-1266, 2011.

ETZKOWITZ, H. Hélice Tríplice**: Universidade-Indústria-Governo:** Inovação em

Movimento. Porto Alegre: EDIPUCRS, 2009.

_____; LEYDESDORFF, L. Universities and the global knowledge economy: a

triple helix of university-industry-government relations. Amsterdam: University of

Amsterdam, 1995.

MANUAL, OECD Oslo . Guidelines for collecting, reporting and using data on

innovation**. The measurement of scientific, technological and innovation**

activities, 2018.

PODSAKOFF, P. M., MACKENZIE, S. B., BACHRACH, D. G., & PODSAKOFF, N. P. The

influence of management journals in the 1980s and 1990s. **Strategic Management Journal**,

26(5), 473-488, 2005.

SCHLATTL, Gerhard. The Quality of Democracy-Concept vs. the Quintuple Helix: On the Virtues of Minimalist vs. Maximalist Approaches in Assessing the Quality of

Democracy and the Quality of Society. **International Journal of Social Ecology and Sustainable Development (IJSESD)**, v. 4, n. 1, p. 66-85, 2013.

TRANFIELD, D., DENYER, D. & SMART, P. Towards a methodology for developing evidence- informed management knowledge by means of systematic review. **British Journal of Management**, *14*(3), 207-222, 2003.

YOON, J.; YANG, J. S.; PARK, H. W.. Quintuple helix structure of Sino-Korean research collaboration in science. **Scientometrics**, v. 113, n. 1, p. 61-81, 2017.

6.2 PAPER II

GLOBALIZATION AND CITIES: EVOLUTION OF SMART CITIES STUDIES ON MANAGEMENT KNOWLEDGE FIELD

ABSTRACT

From such an approach of the sustainable development, the focus is on the elaboration of policies and practices of economic, social and environmental scope, which allows the evolution of the quality of life of the generations to come. With the globalization phenomena, the emergence of innovations brought about at a given scenery, citizens begin to appropriate urban spaces, which fragments the view of the public thing as something of the other. In this direction, the process of rethinking this space begins, in order that the cities become more intelligent. Therefore, this study investigated the evolution of publication about smart cities on the Management knowledge field. As results, the study showed this subject is increasing recently and we believe that this manuscript is appropriate because it has data that can be used by researchers – as an organized analysis about smart cities evolution studies on Management field with most-researched subjects and growth rhythm – and managerial (public or particular) – as a reading to understand better how to contribute to build smarter cities.

Keywords: Smart Cities; Globalization; Sustainable Development; Innovation.

INTRODUCTION

When we investigate the Management knowledge field, we face the tendency of an economic scope and context intra and extra organizational, that are in a process of adaptation to the factors of culture and society and of better use of the natural resources (Sampaio, 2010). The regional development itself must also be adapted to the scenario of using these conditions, by strategies that contemplate the three dimensions of sustainability, or triple bottom line: environmental (planet), economic (profit) and social (people) (Elkington, 2001). Elkington (2001) also points to the importance of a management revolution, among other factors, for sustainable development.

In territorial analysis, the search for a sustainable regional development, the leaderships of most of the spheres first create projects of, first, a local and after, global impact. In this sense, innovation environments are instruments of developed and developing countries that confer greater local competitive advantage by transforming content of knowledge into wealth (Steiner; Cassim; Robazzi, 2008; WCDE, 1987).

An example is innovation environments whose function is the endogenous development from the application of knowledge - the creation of innovation - and to contribute to local businesses and initiatives, as well as to provide strategic alliances of the region in question; for mutual benefit (Medeiros, 1993; Rodrigues, 2013).According to Barbieri (2000), organizations that seek to collaborate better with the environment in which they interact, - the model of innovation environments - tend to provide a governance policy that prioritizes aspects not only economic, but also social and environmental. Consequently, a position that will contribute to sustainable regional development.

Ideas and business deployed in the 1950s in the stagnant San Francisco Bay (State of California, USA) - a pioneer in the concept of technology parks. Be this use of electronic devices, software, social networks and other applications. Observation given to account of the state economy, although diversified, rely on the innovation environments The Cartesian approach, which is only cost-effective in the short term, remains a priority in many respects in the corporate world. A model that does not privilege strategic thinking about business continuity and its legacy for stakeholders (Mattos et al., 2005). In the case of innovation

environments for sustainable regional development, the role of these initiatives as potential income generators is explained (Medeiros, 1993).

A posture of a sustainable innovation environment, in addition to a likely financial return, could create indirect feedback from the community; such as the public / private installation of education and training institutions for local inhabitants, as well as the improvement of access infrastructure, through the attraction of other businesses or properly government investments. The sense of collectivity for local progress begins to increase (Vedovello; Judice; Maculan, 2006). However, according to Melo (2011) and Etzkowitz (2012), even though such environments have the capacity to develop sustainable competitive advantages, they still do not contribute decisively to this, with the participation of other spheres - fundamental factor.

When analyzing the tripod of sustainability, or triple bottom line, the studies of the social and economic contributions are, by themselves, of wide discussion. Results indicates one of the principles of the academic institution, - disseminator of teaching, research and extension and cradle of innovation - development of being and community (Santos, 2011).

According to Jara (1998), the economic dimension is only sustainable, at the point where the quality of life prevails over the concern with the amount of production. As the cradle of knowledge, universities have a considerable contribution to the establishment of these innovation environments. Such relevance is due to the development of research that takes them as an object of analysis, both for innovation and development studies, and for possible improvements and experiments in the performance of their activities and policies.

As a consequence of such practices for improvement in the processes of innovation environments. Vedovello (2000) states that these are treated as instruments of regional development policy, to make the cities more intelligent. In this context, how is the evolution of research about smart cities on the Management knowledge field?

Therefore, this study aims to investigate the evolution of publication about smart cities on the Management knowledge field. To do this: a) to analyze the publications about smart cities on the Management knowledge field and b) to

present a characterization of the production, methodological aspects of research and the themes associated with the studies.

The relevance of the study is justified because the thematic of innovation and sustainable development is inherent to the development of a nation and with this, the creation of intelligent cities. One notes this subject as a remarkable field of knowledge for the area of management, not only public, but also to the academic, business interests and other existing organizations; to investigate the understanding of relationships and attitudes, at institutional levels, concerned with sustainable development.

2. INNOVATION AND SMART CITIES

The level of competitive advantage in the markets instigates companies to be attentive to what is happening in their macroenvironment (stakeholders) and to seek differentials based on innovations that hinder the benchmarking of their competitors. According to Schumpeter (1985), innovating means recombining existing forces and materials, producing the same or other things, from the use of new methods. Thus, these authors (1985) also listed five forms of innovation: a) the creation of a new product; (b) introduction of a new production method; (c) opening up of a new market; (d) the discovery or acquisition of a new source of raw materials or semi-finished products (new suppliers) and (e) the creation of a new industry or monopoly. When imagining the process of innovation as waves over time, it is increasing its amplitude and reducing its frequency. That is, access to new technologies has allowed society to innovate more in a shorter period of time (Schoppe 1985; Tidd; Bessant; Pavitt, 2005; Takahashi & Takahashi, 2007).

The current technological areas are the development of information and communication technologies. However, these areas are no longer new where they came from. According to Lundvall (1988), universities, which foster innovation, by joining high-tech companies in the Bay Area (California, USA) during the Second World War period, promote the debate on complementarity between science and technology, with additional exchanges. The beginning of this was still in the 1930s, on the initiative of Stanford University (Stanford, California, USA), with the creation

of scholarships and accompaniments to students who wanted to open businesses. New businesses were coming in, and the old ones remained, resulting in increased facilities and the establishment of Stanford Industrial Park in 1950.

The rationale was that companies of the future would be increasingly linked to their alma mater, not losing their ties to the knowledge environment. In 1974, the park had about 70 companies, and in 2005, 150. Silicon Valley (Silicon Valley), as it became known worldwide for clustering cutting-edge innovative companies, was the first real model of an innovation environment: the largest agglomeration of high-tech industries.

Along with him, Route 128 (Massachussets, USA), sought to stimulate their stagnant economies by war. (Spolidoro & Audy, 2015). With the success of these two regions, the first European innovation environments emerged, with emphasis on the British (Massey, Quintas & Wield, 1992). Such characteristics make this technological pole a model for other projects around the world (Ganzert & Martinelli, 2009). The nations, institutionalized in the figure of the United Nations (UN), has been working since the 1970s in encouraging the creation of business incubators and technology parks. Competent assignment to UNESCO, in the section Universities-Industries Partnerships (UNESCO, 2015). With this, it is noticed that amid so many devices and tactics in the race for competitive advantage, the innovation factor is always successful. Nations that have decided to invest in research and development (R&D) institutions, finance and labor market legislation, and industrial policies have progressed (Fritsch & Mueller, 2004).

This fact evidences the relation between technological progress and economic development, when investing in science and technology (Stopper, 1995). Although the presence of the academy generates greater numbers of innovations and patents, it can still negatively interfere in the business processes (Albahari et al., 2013). It remains to seek a balance on both sides, which according to many studies, prove successful when complemented. To this end, incentives from the public sector become necessary in order to make cities smarter. For Coffey and Polèse (2005) the development of a place refers to the capacity of a locality in the production and sale of its goods and services and, therefore, to involve the capacity of its inhabitants in the generation of income. Issues of

characterization and interrelation between social, environmental and economic dimensions are in vogue (Jacobi, 2003).

Thus, Amaral Filho (1996) states that the term "development" has related variables such as: the use of competitiveness in an efficient way, social equity and the reduction of environmental impacts. With this, the sustainability tripod is necessary, in the concept of development of a given region, so that the progress of the region is sustained by policies and practices developed by a mutual articulation of its agents. Public management began to think globally, with a constant search for innovation, knowledge of the environment and its trends; but to act locally, favoring the territory in which the market of interest was concentrated. (Thompson & Strickland, Gamble, 2008).

The evolution of the concept of development occurred with the greater awareness of the future generations, the idea of sustainable regional development will emerge, to make cities more intelligent. This approach, which is based on the principles of sustainability, is described as practices and policies that respect three fundamental criteria: social relevance (social viability), ecological prudence (environmental viability) and economic viability (Sachs, 2002). Complementing these principles, the United Nations (UN) (2003) stresses that the construction of regional development from a sustainable standpoint reflects a series of discussions on the economic, social and environmental dimensions.

As Boisier (1996) argues, it is a process of social transformation, aiming at the permanent and sustained progress of the territory in question, with the direct participation of the actors who live there. As for its design and relationship, Coe et al. (2004) argue that in sustainable regional development, territories are shaped by occurrences in both the endogenous environment (internal relations) and exogenous (external relations - competitive environment and markets).

This is a process characterized by a strong interest of local societies in formulating regional policies. This is so that the main topics of the present day are debated and for the region to be the main driver of its own development process (Dallabrida, 2000). On this evolution of innovation environments, we can find the appropriability of the urban space by people in a more innovative and sustainable place, where information technology is combined a sustainable process (social, economic and environmental). (Townsend , 2013)

According to Kitchin (2014), they are cities that are increasingly composed of and monitored by technology and its economy and governance is driven by innovation, creativity and entrepreneurship, by smart people. Scholl and Al-Awadhi (2015) complements it brings innovation, attractiveness, competitiveness, sustainability, and livability of an urban space. It could be about smart governance; smart human capital; smart environment; smart living; and smart economy. (Lombardi et al., 2012). By this way, we introduce the research method to achieve the goals.

3 METHOD

A qualitative study, with an exploratory approach, since the theme of smart cities is not yet in the traditional domain of the management area, as in the cases of Social Sciences, Anthropology and Urbanism; and descriptive. According to Loiola and Bastos (2003), surveys of this nature are particularly important to encourage reflection by the researchers themselves on the challenges and limits that surround their practice. The search for data to achieve the objectives was carried out from the survey of thematic articles, via Scopus databases.

Thus, articles were analyzed from these periods, based on the systematic review of the literature. We selected the papers with the expression "smart cit *" in the “Article Title”, with temporal limitation from the first study, in 2012, until 2020; document type “Article”, subject area “Business, Management and Accounting”, language “English” and source type “Journal”. After this selection, 320 articles were identified that were read integrally for the analysis categories.

Thus, the categories gathered a set of items that evaluated each article in three dimensions, according to the one proposed by Hoppen, Lapointe and Moreau (1996) and in the adaptation of the classifications adopted by Hoppen and Meireles (2005) and Sampaio and Perin (2006), which classify the research methodologies in approach, type of research, nature and instrument of data collection. Also in this dimension, the category under analysis was included, aiming to identify the level of analysis used in the studies carried out (Figure 1). However, it was identified in some articles that the specification of some

methodological aspects used was not described in a specific way, being necessary the interpretation and analysis of the researchers to carry out the classification.

Figure 1 – Scrypt analysis of the papers

Classification of Analytical Categories		
1st Dimension Articles Characterizatio n	Authorship	i) Authors; ii) Filiation (University/Country)
2nd Dimension Methodological Aspects	Methodological Approaches	i) Qualitative; ii) Quantitative; iii) Qualitative/quantitative
	Research Type	i) Survey; ii) Experimental; iii) Case Study; iv) Multiple Case Study; v) Action Research
	Research Nature	i) Exploratory; ii) Descriptive; iii) Exploratory-descriptive; iv) Causal
	Data Collection Instrument	i) Interview; ii) Questionnaire; iii) Primary e Secondary; iv) Secondary; v) Multimethod
	Object of Analysis	i) Individual; ii) Group; iii) Organization
3rd Dimension Correlations	Contextual Subjects	Associated Thematic

Source: Adapted of Hoppen, Lapointe & Moreau (1996); Hoppen & Meirelles (2005); Sampaio & Perin (2006).

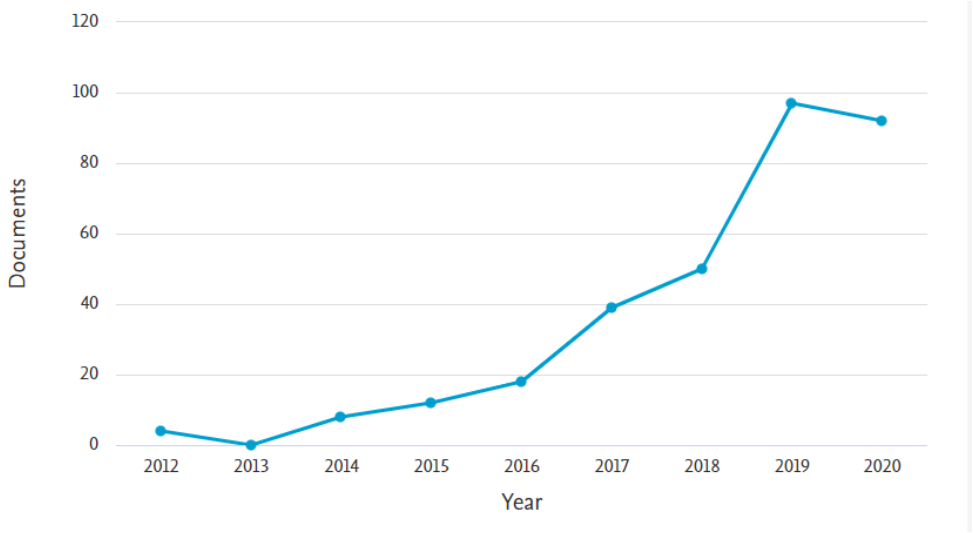
As Hoppen, Lapointe, and Moreau (1996) argue, each researcher who has done the exercise of formally evaluating the content of a scientific article knows that much of the published articles do not explicitly advertise the research methods used, neglecting certain essential details for the evaluation, which makes it difficult to assess the study. It should be emphasized that the four theoretical articles were analyzed only from the first and third dimensions, considering the specificity of the researches. As explained, we present the results on the next part.

In order to guarantee the depth in the analysis of these articles, it was decided to organize the results of the research in three parts. The first deals with the characterization of production and the authors, while the second presents aspects related to the methodology of the studies, involving the approach, the type and nature of the research, the data collection instrument and the object of analysis. The third one focuses on the analysis of research content, focusing on the themes associated with the subject.

3.1 First Dimension: Author and Papers

According to results, the 320 papers are distributed on 132 different journals, according to the Management, Business and Accounting area. Almost 50% (146 studies) from the studies are published on the top 10 most published journals identified (Figure 2).

Figure 2: Documents by year



Source: Authors, 2021.

Figure 3 – Top 10 journal and its publications

Top 10 Journals	2012 (4)	2014 (8)	2015 (12)	2016 (18)	2017 (39)	2018 (50)	2019 (97)	2020 (92)	Total (320)
1. Technological Forecasting and Social Change	-	2	1	-	1	1	30	9	43
2. Cities	-	2	1	-	7	6	13	12	41
3. Journal of Cleaner Production	-	-	-	-	-	6	7	4	17
4. International Journal of Services, Technology and Management	-	-	-	-	10	-	-		10
5. International Journal of Recent Technology and Engineering	-	-	-	-	-	-	9		9
6. Journal of Science and Technology Policy Management	-	-	-	-	-	5	-	1	6
7. Journal of Management in Engineering	-	-	-	-	-	-	-	6	6
8. Knowledge Management and E-Learning	-	4	-	-	1	-	-		5
9. International Entrepreneurship and Management Journal	-	-	-	-	-	-	-	5	5
10. Technology Innovation Management Review	-	-	-	-	-	-	4		4

Source: Authors, 2021.

We can observe the interesting evolution about this knowledge subject that has presenting increases on your citations and studies published on recognized journals (Figure 3).

The number of publications about smart cities turned out from 4 in 2012, to 97 in 2019, increasing approximately 24 times. According to the affiliations which are responsible by studies, the Universitá degli Studi Di Torino (Italy) is on the first position. About country, Italy is the one that has a protagonism on that field (Figure 4).

Figure 4 – Top 10 Ranking University x Country

	University		Country
1	Universitá degli Studi di Torino (Italy, 11 articles)	1	Italy (45)
2	Hong Kong Polytechnic University (China, 7)	2	United States (37)
3	Ural Federal University (Russia, 7)	3	United Kingdom (35)
4	Laboratory for International and Regional Economics (Russia, 6)	4	India (29)
5	HSE University (Russia, 5)	5	China (21)
6	Université de Liège (Belgium, 4)	6	Australia (20)
7	Università degli Studi di Salerno (Italy, 4)	7	Netherlands (19)
8	Università degli Studi di Messina (Italy, 4)	8	Spain (19)
9	University of Leeds (UK, 4)	9	France (14)
10	Aristotle University of Thessaloniki (Greece, 4)	10	Russia (14)

Source: Authors, 2021.

3.2 Second Dimension: Methodologic Analysis

3.2.1 Methodologic approach

The major part of the studies presented the quantitative methodologic approach on its development, being on the second positions the qualitative. It can demonstrate there is a balance about the studies approach (Figure 5).

Figure 5 – Methodological Approach

Methodological Approach	Total (320)
Qualitative	103
Quantitative	134
Qualitative-Quantitative	83

Source: Authors, 2021.

3.2.2 Research Type

About the research type most common on the studies, highlights the case study, which could bring the case of many cities that has experienced the opportunity of being smarter (Figure 6).

Figure 6 – Research Type

Research Type	Total (320)
Survey	114
Experimental	29
Case Study	126
Multiple Case Study	51
Action Research	-

Source: Authors, 2021.

Referring to the case study, it was identified that the single case studies stand out in relation to the multiple case studies. According to Yin (2005), the case study is an empirical investigation that is adequate to apply in an attempt to explain causal connections in real life situations, because these are too complex for treatment by means of experimental strategies or data collection.

3.2.3 Research Nature

About the research nature, we could identify the supremacy of descriptive studies (163 studies) against just 56 exploratories. (Figure 7)

Figure 7 – Research Nature

Research Nature	Total (320)
Exploratory	56
Descriptive	163
Exploratory and Descriptive	101

Source: Authors, 2021.

3.2.4 Data Collection Instrument

According to the main data collection instrument applied on the studies, it was more common the use of Questionnaire (113 studies) and Interview (89 studies). (Figure 8)

Figure 8 – Data Collection Instrument

Instruments	**Total (320)**
Interview	89
Questionnaire	113
Primary and Secondary	73
Secondary	21
Multimethod	24

Source: Authors, 2021.

3.2.5 Object of Analysis

We identified that the leading object of analysis on studies was about Organizations, Politics and Systems, verifying the context and actuation of governments, corporations and other institutions reacting to improve our cities. (Figure 9).

Figure 9 – Object of Analysis

Research Nature	Total (320)
Individual	57
Groups	93
Organizations, Politics or Systems	170

Source: Authors, 2021.

There is a lack of studies that address the perspective of the individual who, as addressed in the biases of sustainable development, is the fundamental part of cultural change, more specific in learning and relationships for this area.

3.3 Third Dimension: Correlating Subjects

The analyzed journals treat the theme in a broad way. The main themes involved are presented (Figure 10). It is possible to identify that many studies treat about Innovation and Information Technology, corroborating on what theory indicates about smart cities, as the same with Sustainability.

Figure 10 – Contextual Subjects

Research Nature	Total (320)
Innovation and Information Technology	97
Sustainability	72
Governance	33
Urban/Regional Development	65
Globalization	53

Source: Authors, 2021.

Finally, based on the results discussed, it follows a summary with main findings (Figure 11) on the studies about Smart Cities, on the Management knowledge field.

Figure 11 – Research Highlights

Top Publisher University	Universitá degli Studi di Torino (Italy)
Top Publisher Country	Italy
Methodologic Approach	Quantitative
Research Type	Case Study
Research Nature	Descriptive
Data Collect Instrument	Questionnaire
Object of Analysis	Organizations, Politics or Systems
Contextual Subjects	Innovation and Information Technology

Source: Author, 2021.

4 FINAL REMARKS

The analysis of the articles published on the subject in the given period allowed to present an overview about the authors, methodological strategies and the thematic content of the identified researches. Through the analysis of the periodicals there is recognition of the importance of the theme, but a small number has been found.

From the articles analyzed, it is possible to note that emerging countries as a whole still remain far from policies and practices for the development of smarter cities, with the protagonism of public and private entities and universities. Factors such as large income and gentrification, resulting in significant social inequality; lack of basic infrastructure in many regions and the lack of a culture of belonging to the public seem to fortify walls to the best practices of governance and quality of life.

In approximately 8 years, 320 publications in periodicals of impact are still a low number because this is a subject that has been diffusing theoretically and taken as a means for sustainable development. It is notable that well-reputed journals are interested in studies in the area of intelligent cities, as analyzed.

We believe that this manuscript is appropriate because it has data that can be used by researchers – as an organized analysis about smart cities evolution studies on Management field with most-researched subjects and growth rhythm – and managerial (public or particular) – as a guide to understand better how to contribute to build smarter cities.

One of the limitations of the study was the use of only the Scopus database, due to the search for larger journals. Thus, in order to expand this study, it is suggested to carry out investigations in the interactions between the triple helix (Academy, State and Industry) for sustainable development, to compare with cities already considered intelligent and also a possible systematic review of the literature.

REFERENCES

Albahari, A; Pérez-Canto; S.; Barge-Gil, A.; Modrego, A., 2013. Technology Parks Versus Science Parks: Does The University Make The Difference? *Munich Personal Repec Archive*, N. 49227, Aug., 2013. Source:

<http://mpra.Ub.Unimuenchen.De/49227/1/Mpra_Paper_49227.Pdf>. Accessed In : 6 Jul. 2018.

Amaral Filho, J., 1996. Desenvolvimento Regional Endógeno Em Um Ambiente Federalista. *Planejamento E Políticas Públicas*, N.14. Brasília: Ipea.

Barbieri, J. C, 2000. Desenvolvimento Sustentável Regional E Municipal: Conceitos, Problemas E Pontos De Partida. *Administração Online*, V. 1, N. 4, 2000. Source:

<Http://Www.Fecap.Br/Adm_Online/Art14/Barbieri.Htm>. Accessed In: 6 Jul. 2018.

Boisier, S. 1996. Em Busca Do Esquivo Desenvolvimento Regional: Entre A Caixa-Preta E O Projeto Político. *Planejamento E Políticas Públicas*, N.13, Instituto De Pesquisa Econômica Aplicada, Brasília: Ipea. Source:

<Http://Www.Cni.Unc.Br/Unc2009/Mestrado/Mestrado_Materiais/Boisier,_S_Em_Busca_Do_Esquiv O.Pdf>. Accessed In: 3 Jul. 2018.

Capes*. Sistema Webqualis.* Source:

<Http://Qualis.Capes.Gov.Br/Webqualis/Publico/Documentosdearea.Seam?Conversationpropagati On=Begin>. Accessed In: 7 Jul. De 2018.

Coe, N. M. H.; Martin, H.; Wai-Chung, Y.; Dicken, P.; Henderson, J. Globalizing

Regional Development: A Global Production Networks Perspective. *Transactions Of The Institute Of British Geographers*, V.29, P.468–484, 2004.

Coffey, W.; Poleèse, M. The Concept Of Local Development: A Stages Model Of Endogenous Regional Growth. *Papers In Regional Science.* V.55, N.1, P.1-12, 2005.

Dallabrida, V. R. *O Desenvolvimento Regional:* A Necessidade De Novos Paradigmas. Ijuí: Ed. Unijuí, 2000.

Elkington, J. *Canibais Com Garfo E Faca.* Trad. Patrícia Martins Ramalho. São Paulo: Makron Books, 2001.

Etzkowitz, H. Triple Helix Clusters: Boundary Permeability At University-Industry-Government Interfaces As A Regional Innovation Strategy. Environment & Planning C:

Government And Policy. In Press, 2012.

Fritsch, M; Mueller, C. The Effects Of New Business Formation On Regional Development Overtime: The Case Of Germany. *Regional Studies*, V. 4, N. 38, P. 961-975, 2004. Source: <Http://Download.Springer.Com/Static/Pdf/950/Art%253a10.1007%252fs11187-007-9067-9.Pdf?Auth66=1427265799_E5fa9ba63d0c85ad2aa13da5004d063e&Ext=.Pdf>.

Accessed In: 5 Jul. 2018.

Ganzert, C. C.; Martinelli, D. P. Transferência De Conhecimento Em Sistemas Regionais De Inovação: A Perspectiva Do Caso Do Vale Do Silício Californiano. *Interações:* Revista Internacional De Desenvolvimento Local, V. 10, N. 2, Campo Grande, Jul-Dez, 2009. Source: <http://Www.Scielo.Br/Pdf/Inter/V10n2/V10n2a03.Pdf>. Accessed In: 5 Jul. 2018.

Hoppen, N.; Meirelles, F.S. Sistemas De Informação: Um Panorama Da Pesquisa Científica Entre 1990 E 2003**.** *Revista De Administração De Empresas (Rae),* V.45, N.1, P. 24-35, Jan./Mar. 2005.

Hoppen, N., Lapointe, L. E Moreau, E. Um Guia Para Avaliação De Artigos De Pesquisa Em Sistemas De Informação. *Revista Eletrônica De Administração, N. 3, Ago. 1996.*

Iasp. 29th World Iasp Conference: Theme. Source:

<Http://Www.Iasp2012tln.Com/En/Conference/Theme >. Accessed In: 4 Jul.

2018.

Jacobi, P. Educação Ambiental, Cidadania E Sustentabilidade. *Cadernos De Pesquisa,* N. 118,

P. 189-205, 2003. Source: <Http://Www.Scielo.Br/Pdf/Cp/N118/16834.Pdf >. Accessed In:6 Jul. 2018.

Jara, C. J. *A Sustentabilidade Do Desenvolvimento Local:* Desafios De Um Processo Em Construção. Brasília: Instituto Interamericano De Cooperação Para A Agricultura (Iica)/ Recife: Secretaria Do Planejamento Do Estado De Pernambuco (Seplan), 1998. Source:

<Http://Repiica.Iica.Int/Docs/B1128p/B1128p.Pdf>. Accessed In: 4 Jul. 2018.

Kitchin, R. , 2014. The real-time city? Big data and smart urbanism. GeoJournal, 79(1), 1–14.

Loiola, E.; Bastos, A.V.B. A Produção Acadêmica Sobre Aprendizagem Organizacional No Brasil. *Revista De Administração Contemporânea,* V. 7, N. 3, P. 181-201, Jul./Set., 2003.

Lombardi, P., Giordano, S., Farouh, H., & Yousef, W., 2012. Modelling the smart city performance. *Innovation:* The European Journal of Social Science Research, 25(2), 137–149.

Lundvall, B. A. Innovation As An Interactive Process: From User-Producer Interaction To The National System Of Innovation. In: Technical Change And Economic Theory, Dosi, G. Et Al. (Org.). Londres: Pinter Publishers, 1988. Disponível Em:

<Http://Www.Carlotaperez.Org/Downloads/Pubs/Structuralcrisesofadjustment.Pdf>. Accessed In: 9 Jul. 2018.

Mattos, K. M. C.; Mattos, K. M. C.; Mattos, A. Valoração Econômica Do Meio Ambiente Dentro Do Contexto Do Desenvolvimento Sustentável*. Revista Gestão Industrial,* V. 1, N. 2, P. 109-121, 2005. Source:

<Http://Www.Pg.Utfpr.Edu.Br/Ppgep/Revista/Revista2005/Pdf2/Art09vol1nr2.Pdf >. Accessed In: 9 Jul. 2018.

Massey, D.; Quintas, P.; Wield, D. *High Tech Fantasies:* Science Parks In Society, Science And Space. Routledge, 1992. Disponível Em:

<Https://Books.Google.Com.Br/Books?Hl=Ptbr&Lr=&Id=Lrqjagaaqbaj&Oi=Fnd&Pg=Pp1&Ot S=1jcklnxma&Sig=Wtn3rul8iwl39khxt5omksrrdpm&Redir_Esc=Y#V=Onepage&Q&F=Fal Se>. Accessed In: 3 Jul. 2018

Medeiros, J. A. *Polos Tecnológicos E Competitividade.* Instituto De Estudos Avançados Da Universidade De São Paulo/Usp, 1993. Source:

<Http://Www.Iea.Usp.Br/Publicacoes/Textos/Polos-Tecnologicos-E-Competitividade>. Accessed In: 8 Jul. 2018.

Melo, L. J. *Governança E Gestão Dos Ativos De Conhecimento Em Ambientes De Inovação:* Estudo De Caso Sobre O Parque Tecnológico Do Rio. Dissertação – Programa De Pós-Graduação Em Políticas Públicas, Estratégias E Desenvolvimento, Instituto De Economia, Universidade Federal Do Rio De Janeiro, Rio De Janeiro, 2011. Source:

<Http://Www.Ie.Ufrj.Br/Images/Posgraducao/Pped/Defesas/18leonardo_De_Jesus_Melo.Pdf>. Accessed In: 5 Jul. 2018.

Onu, Organização Das Nações Unidas. *Ecossistemas E O Bem-Estar Humano:* Estrutura Para Uma Avaliação. Washington: World Resources Institute, 2003.

Rodrigues, R. F*. Parques Tecnológicos:* Relações Entre Território E Inovação E Os Desafios Das Políticas E Práticas Territoriais Na Criação De Valor Compartilhado. Tese – Programa De Pós-Graduação Em Engenharia De Produção, Universidade Federal De Santa Catarina, Florianópolis, 2013. Source:

<Https://Repositorio.Ufsc.Br/Bitstream/Handle/123456789/122781/325606.Pdf?Sequence=1>. Accessed In: 9 Jul. 2018.

Sachs, I., 2002. *Caminhos Para O Desenvolvimento Sustentável.* Rio De Janeiro:

Garamond.

Sampaio, C. A. C. *Gestão Que Privilegia Uma Outra Economia:* Ecossocioeconomia Das Organizações. Blumenau: Edifurb, 2010.

Sampaio, C. H.; Perin, M. G. Pesquisa Científica Da Área De Marketing: Uma Revisão Histórica. Revista De Administração Contemporânea, V.10, N.2, P. 179-202, Abr./Jun. 2006. Santos, D. A. *Cooperação Tecnológica Universidade-Empresa-Governo:* Um Estudo De Casos Múltiplos Da Universidade Federal De Sergipe. 2011. Dissertação – Mestrado Em Desenvolvimento Regional E Gestão De Empreendimentos Locais, Universidade Federal De Sergipe, Sergipe, 2011. Source:

<Http://200.17.141.110/Pos/Economia/Dissertacoes/A09/Dissertacao_De_%20danielle_Andrade_ Dos_Santos.Pdf>. Accessed In: 7 Jul. 2018.

Scholl, H. J., & Alawadhi, S., 2015. Pooling and leveraging scarce resources: The smart eCity gov alliance. *Proceedings of the annual Hawaii international conference on system sciences.* Vol. 2015.

Schumpeter, J. A Teoria Do Desenvolvimento Econômico. Rio De Janeiro: Nova Cultural, 1985.

Spolidoro, R.; Audy, J. Parque Científico E Tecnológico Da Pucrs - Tecnopuc - Capítulo 2: Origens E Evolução Dos Parques Tecnológicos. Edipucrs. Source: < Http://Www.Pucrs.Br/Edipucrs/Tecnopuc/Capitulo2.Pdf>. Accessed In: 9 Jul. 2018.

Steiner, J. E.; Cassim, M. B.; Robazzi, A. C. *Parques Tecnológicos: Ambientes De Inovação*, Instituto De Estudos Avançados Da Universidade De São Paulo/Usp, São Paulo, 2008. Source:

<Http://Www.Iea.Usp.Br/Publicacoes/Textos/Steinercassimrobazziparquestec.Pdf>. Accessed In: 5 Jul. 2018.

Stopper, M. Regional Technology Coalitions An Essential Dimension Of National Technology Policy. *Research Policy.* Elsevier, V. 24, N. 6, P. 895-911, 1995. Source:

<Http://Www.Sciencedirect.Com/Science/Article/Pii/0048733394008108>. Accessed In: 7 Jul. 2018.

Takahashi, S.; Takahashi, V. P. *Gestão Da Inovação Dos Produtos:* Estratégia, Processo, Organização E Conhecimento. Rio De Janeiro: Elsevier, 2007.

Thompson, A. A.; Strickland, A. J.; Gamble, J. E. *Administração Estratégica.* 15. Ed. São Paulo: Mcgraw Hill, 2008.

Tidd, J., Bessant,J.; Pavitt, K. Managing Innovation: Integranting Technological, Managerial Organizacional Change. 3º Ed. Nova York: Mcgraw-Hill, 2005.

Unesco-Wta. Unesco-Wta Iniciatives: Science Park And Technology Business Incubator (2006-2010). Paris: Unesco, 2005. Source:

<Http://www.unesco.Org/New/Fileadmin/Multimedia/Hq/Sc/Pdf/Sc_Unesco-Wta_Initiatives_En.Pdf>. Accessed In: 7 Jul. 2018.

Townsend, A., 2013. Smart cities: Big data, civic hackers, and the quest for a new utopia. WW Norton & Company. Urquhart, C., Lehmann, H., & M

Vedovello, C. A. Aspectos Relevantes De Parques Tecnológicos E De Incubadoras De Empresas. *Revista Do Banco Nacional De Desenvolvimento,* V. 7, N. 14, P. 237-300, Rio De Janeiro, Dez. 2000. Source:

<Http://Www.Bndes.Gov.Br/Sitebndes/Export/Sites/Default/Bndes_Pt/Galerias/Arquivos/Conhe Cimento/Revista/Rev1410.Pdf>. Accessed In: 9 Jul. 2018.

_____.; Judice, V. M. M.; Maculan, A. M. D. Revisão Crítica Às Abordagens A Parques Tecnológicos: Alternativas Interpretativas Às Experiências Brasileiras Recentes. *Revista De Administração E Inovação*, V.3. 2006. Source: <Http://Www.Revistarai.Org/Rai/Article/View/58/88 >. Accessed In: 4 Jul. 2018

WCDE, 1987. *Our Common Future.* Oxford: Oxford University Press.

Yin, R.K., 2005. *Estudo De Caso: Planejamento E Métodos*. 3 Ed. Porto Alegre: Bookman.

6.3 PAPER III

INOVAÇÃO PARA O DESENVOLVIMENTO SUSTENTÁVEL: ESTUDOS SOBRE CIDADES INTELIGENTES BRASILEIRAS

RESUMO

À Gestão Pública cabe uma fundamental função: a ordem e o progresso de uma sociedade. À Academia, o desenvolvimento e a difusão de conhecimento. E ao setor privado, aplicação de tal conhecimento e a geração de renda. Organizações essas que, a partir do uso de parcerias e projetos em conjunto em vista do fomento à inovação, podem implicar em importantes transformações em sua região, de modo inclusivo, a aumentar a qualidade do capital intelectual existente e, logo, a própria qualidade de vida de seus habitantes. De tal abordagem a visar o desenvolvimento sustentável, o foco dá-se na elaboração de políticas e práticas de abrangência econômica, social e ambiental, o que permite a evolução da qualidade de vida das gerações a virem. Com a emergência de inovações propiciadas em dada conjuntura, os cidadãos começam a se apropriar dos espaços urbanos, o que fragmenta a visão da coisa pública como algo do outro. Nesse rumo, começa o processo de repensar a esse espaço, a fim de que as cidades se tornem mais inteligentes. Mediante isso, este estudo objetivou identificar o desenvolvimento científico de estudos sobre cidades inteligentes brasileiras. O método, qualitativo e de abordagem exploratório-descritiva, deu-se por análise documental e revisão sistemática da literatura. A plataforma de busca de artigos foi a Scopus. Como resultados, o estudo apresentou que maioria dos autores têm afiliação em universidades brasileiras e que o número de estudos ainda é reduzido, dado o destaque do assunto.

Palavras-chave: Cidades Inteligentes; Inovação e Desenvolvimento Sustentável.

ABSTRACT

Public management has a fundamental function: order and progress of a society. To Academy, the development and diffusion of knowledge. And to private sector, the application of such knowledge and the generation of income. Organizations that, using partnerships and joint projects, to the innovation development, can involve important transformations in their region, in an inclusive way, to increase the quality of existing intellectual capital and, therefore, the very quality of life of its inhabitants. From such an approach of the Triple Helix to aim at sustainable development, the focus is on the elaboration of policies and practices of economic, social and environmental scope, which allows the evolution of the quality of life of the generations to come. With the emergence of innovations brought about at a given scenery, citizens begin to appropriate urban spaces, which fragments the view of the public thing as something of the other. In this direction, the process of rethinking this space begins, in order that the cities become more intelligent. Therefore, this study aimed to identify the state of the art of policy studies for intelligent cities in Brazil. The method, qualitative and exploratory- descriptive approach, was by documental analysis and systematic review of the literature. The search platform for articles was Scopus. As results, the study showed that most of the authors have affiliation in Brazilian universities and that the number of studies is still reduced, given the prominence of the subject.

Keywords: Smart Cities; Innovation and Sustainable Development.

INTRODUÇÃO

Ao investigar a gestão, o pesquisador depara-se à tendência de um escopo econômico e contexto intra e extra organizacionais, que estão em um processo de adaptação aos fatores de cultura e sociedade e de melhor utilização dos recursos naturais (SAMPAIO, 2010). O próprio desenvolvimento regional também deve se adequar ao cenário de aproveitamento dessas condições, por estratégias que contemplem as três dimensões da sustentabilidade, *ou triple bottom line:* ambiental (*planet*), econômica (*profit*) e social (*people*) (ELKINGTON, 2001). Elkington (2001) também aponta para a importância de uma revolução na gestão, entre outros fatores, para que o desenvolvimento seja sustentável.

Em análise territorial, a busca de um desenvolvimento regional sustentável, as lideranças da maioria das esferas primam por criar projetos de, primeiramente, um impacto local e após, global. Nesse sentido, os ambientes de inovação são instrumentos de países desenvolvidos e em desenvolvimento, que conferem maior vantagem competitiva local, ao transformar conteúdo de conhecimento em riqueza (STEINER; CASSIM; ROBAZZI, 2008; WCDE, 1987).

Um exemplo são os ambientes de inovação que têm como função o desenvolvimento endógeno a partir da aplicação do conhecimento – a criação de inovação – e aportar negócios e iniciativas locais, além de propiciar alianças estratégicas da região em questão; para um beneficiamento mútuo (MEDEIROS, 1993; RODRIGUES, 2013).

Segundo Barbieri (2000), as organizações que buscam colaborar de melhor forma para com o meio onde interagem, – a modelo de ambientes de inovação – tendem a prover uma política de governança que priorize os aspectos não apenas econômicos, mas também sociais e ambientais. Consequentemente, uma postura que colaborará para o desenvolvimento regional sustentável.

Ideias e negócios implantados na década de 50 na estagnada Baía de San Francisco (Estado da Califórnia, EUA) – pioneirismo no conceito de parques tecnológicos – estão ativamente a fazer parte do cotidiano brasileiro e

mundial. Seja esse uso de aparelhos eletrônicos, *softwares*, redes sociais e demais aplicativos. Conforme Bloomberg (2015), nos últimos meses, o estado da Califórnia (EUA) tem figurado como a 8ª maior economia do mundo, quando comparado ao *ranking* de Produto Interno Bruto (PIB) mundial. Uma visão onde, com o favorável crescimento californiano e crise econômica brasileira, a tendência é de que essa unidade estadunidense ultrapasse o Brasil, a ocupar seu lugar de 7ª economia mundial (BLOOMBERG, 2015). Observação dada por conta de a economia do estado, apesar de diversificada, ter como base os ambientes de inovação.

A abordagem cartesiana, de apenas custo-benefício em um curto prazo permanece tomada como a prioritária em vários aspectos, no mundo corporativo. Modelo que não privilegia o pensamento estratégico de continuidade do negócio e seu legado para os *stakeholders* (MATTOS et al., 2005). No caso dos ambientes de inovação para o desenvolvimento regional sustentável, é explicitada a função dessas iniciativas como potenciais geradores de renda (MEDEIROS, 1993).

Uma postura de um ambiente de inovação sustentável, além de provável retorno financeiro, poderá criar retroações indiretas da comunidade; como a instalação pública/privada de instituições de ensino e capacitação aos habitantes do local como também a melhoria na infraestrutura de acesso, por meio de atração de outros negócios ou propriamente investimentos governamentais. Começa a ser potencializado o senso de coletividade para o progresso local (VEDOVELLO; JUDICE; MACULAN, 2006).

Porém, conforme Melo (2011) e Etzkowitz (2012), por mais que tais ambientes tenham a capacidade de desenvolver vantagens competitivas sustentáveis, ainda não contribuem de modo decisivo para isso, sendo a participação das outras esferas – o poder público e Academia – um fator fundamental.

Ao analisar o tripé da sustentabilidade, ou *triple bottom line*, os estudos das contribuições sociais e econômicas são, por si só, de vasta discussão. Fato resultante por ser um dos princípios da instituição acadêmica, – disseminadora de ensino, pesquisa e extensão e berço da inovação – o desenvolvimento do ser e da comunidade (SANTOS, 2011). Conforme Jara (1998), a dimensão

econômica apenas é sustentável, no ponto em que a qualidade de vida tiver preponderância frente à preocupação com a quantidade de produção.

Por ser o berço do conhecimento, as universidades têm considerável contribuição para o estabelecimento desses ambientes de inovação. Tal relevância dá-se por desenvolver pesquisas que os tomem como objeto de análise, tanto para estudos de inovação e desenvolvimento, quanto para possíveis melhorias e experimentos no desempenho de suas atividades e políticas. Como consequência de tais práticas para a melhoria nos processos dos ambientes de inovação. Vedovello (2000) afirma que esses são tratados como instrumentos de política de desenvolvimento regional, a tonar as cidades mais inteligentes. Nesse contexto, como está o Brasil quanto a essas políticas e práticas de cidades inteligentes e como sua Gestão Pública tem contribuído para isso?

Logo, este estudo objetiva identificar o desenvolvimento científico de estudos sobre cidades inteligentes brasileiras. Para isso: a) analisar os estudos sobre políticas para cidades inteligentes no Brasil e b) apresentar uma caracterização da produção, dos aspectos metodológicos de investigação e das temáticas associadas aos estudos.

Justifica-se a relevância do estudo, por a temática de inovação e desenvolvimento sustentável ser inerente ao desenvolvimento de uma nação e com isso, a criação de cidades inteligentes. Nota-se tal assunto como um notável campo de conhecimento para a área de gestão, não apenas pública, mas também aos interesses acadêmicos, empresariais e das demais organizações existentes; a investigar o entendimento sobre relações e posturas, perante níveis institucionais, em causa do desenvolvimento sustentável.

2. INOVAÇÃO PARA O DESENVOLVIMENTO SUSTENTÁVEL

O nível de vantagem competitiva dos mercados instiga as empresas a estarem atentas ao que está a acontecer em seu macroambiente (*stakeholders*) e buscarem diferenciais baseados em inovações que dificultem o *benchmarking* de seus concorrentes. Em acordo a Schumpeter (1985), inovar significa a recombinação de forças e materiais já existentes, a produzir as mesmas ou outras coisas, a partir do uso de novos métodos.

Assim, esse autores (1985) também elencou cinco formas de inovação: a) a criação de um novo produto; b) introdução de um novo método de produção; c) abertura de um novo mercado; d) descoberta ou conquista de uma nova fonte de matérias-primas ou produtos semiacabados (novos fornecedores) e e) criação de uma nova indústria ou monopólio. Ao se imaginar o processo de inovação como ondas ao longo do tempo, esse está aumentar sua amplitude e reduzir sua frequência. Ou seja, o acesso às novas tecnologias tem permitido com que a sociedade inove mais em menor período de tempo (SCHUMPETER, 1985; TIDD; BESSANT; PAVITT, 2005; TAKAHASHI e TAKAHASHI, 2007).

As áreas tecnológicas atuais em destaque são as de desenvolvimento de tecnologias de informação e comunicação. Entretanto, essas áreas não são mais novidade no local onde surgiram. Conforme Lundvall (1988), universidades, fomentadoras da inovação, ao se aliarem a empresas de alta tecnologia na *Bay Area* (Califórnia, EUA), durante o período da Segunda Guerra mundial, promovem até os dias de hoje o debate sobre a complementariedade entre a ciência e tecnologia, com intercâmbios adicionais.

O princípio disso foi ainda na década de 30, por iniciativa da Universidade de Stanford (Stanford, Califórnia, EUA), com a criação de bolsas e acompanhamentos a alunos que queriam abrir negócios. Empresas novas foram chegando, e as antigas ali permaneciam, resultando no aumento das instalações e no estabelecimento do Stanford Industrial Park, em 1950.

O raciocínio vigente era o de que empresas do futuro estariam cada vez mais vinculadas à sua *alma mater,* a não perda de vínculo com o ambiente do conhecimento. Em 1974, o parque contava com cerca de 70 empresas, e em 2005, 150. O Vale do Silício (*Silicon Valley*), como ficou conhecido mundialmente por

aglomerar empresas inovadoras de ponta, foi o primeiro real modelo de um ambiente de inovação: ainda a maior aglomeração de indústrias de alta tecnologia. Junto com ele, a Rota 128 (Massachussets, EUA), buscavam estimular suas economias estagnadas pela guerra. (SPOLIDORO e AUDY, 2015).

Com o sucesso dessas duas regiões, surgiram os primeiros ambientes de inovação europeus, com destaque para os britânicos (MASSEY; QUINTAS; WIELD, 1992). Tais características tornam esse polo tecnológico, um modelo para outros projetos mundo afora (GANZERT e MARTINELLI, 2009). As nações, institucionalizadas na figura da Organização das Nações Unidas (ONU), vem trabalho desde os anos 70 no incentivo para a criação de incubadoras de negócios e parques tecnológicos. Tarefa competente à UNESCO, na seção de Parcerias Universidades- Indústrias (UNESCO, 2015).

Com isso, nota-se que em meio a tantos artifícios e táticas na corrida pela vantagem competitiva, o fator inovação é sempre bem-sucedido. As nações que decidiram investir em instituições de suporte à pesquisa e desenvolvimento (P&D), legislações de finanças e do mercado de trabalho e políticas industriais progrediram (FRITSCH e MUELLER, 2004).

Fato esse que evidencia a relação entre progresso tecnológico e desenvolvimento econômico, ao investir em ciência e tecnologia (C&T) (STOPPER, 1995). Por mais que a presença da academia gere maior números de inovações e patentes, ainda pode interferir negativamente nos processos de negócio (ALBAHARI et al., 2013). Resta buscar um equilíbrio em ambos os lados, que conforme muitos estudos, se mostram bem-sucedidos quando complementados. Para tal, incentivos provindos do setor público tornam-se necessários, a fim de tornar as cidades mais inteligentes.

Para Coffey e Polèse (2005) o desenvolvimento de um local refere-se à capacidade de uma localidade na produção e venda de seus bens e serviços e, portanto, a envolver a capacidade de seus habitantes na geração de renda.

Estão em voga, questões de caracterização e inter-relação entre dimensões sociais, ambientais e econômicas (JACOBI, 2003). De tal modo, Amaral Filho (1996) afirma que a expressão “desenvolvimento” tem relacionado variáveis como: o uso da competitividade de forma eficiente, a equidade social e a diminuição dos impactos ambientais. Com isso, faz-se a necessidade do tripé da sustentabilidade, no conceito

de desenvolvimento de dada região, para que o progresso da região seja sustentado por políticas e práticas desenvolvidas por uma articulação mútua de seus agentes. A gestão pública começou a pensar global, com constante busca pela inovação, conhecimento do ambiente e suas tendências; porém a agir local, a favorecer o território no qual se concentrava o mercado de interesse. (THOMPSON; STRICKLAND; GAMBLE, 2008).

A evolução do conceito de desenvolvimento deu-se com a maior conscientização da população quanto à condição de vida das gerações futuras, a emergir a ideia de desenvolvimento regional sustentável., a possibilitar cidades mais inteligentes.

Essa abordagem contemplada pelos princípios da sustentabilidade é descrita como práticas e políticas que respeitem a três critérios fundamentais que são: a relevância social (viabilidade social), prudência ecológica (viabilidade ambiental) e a viabilidade econômica (SACHS, 2002). A complementar sob esses preceitos, a Organização das Nações Unidas (ONU) (2003) salienta que a construção do desenvolvimento regional sob uma ótica sustentável reflete uma série de discussões a respeito das dimensões econômica, social e ambiental.

Como defende Boisier (1996), é um processo de transformação social, a objetivar o progresso permanente e sustentado do território em questão, com participação direta dos atores que ali vivem.

Quanto ao seu desenho e relacionamento, Coe *et al.* (2004) afirmam que no desenvolvimento regional sustentável, territórios moldam-se por conta de ocorrências tanto no ambiente endógeno (relações internas), quanto no exógeno (relações externas - ambiente de concorrência e de mercados).

Esse é um processo que se caracteriza por um forte interesse das sociedades locais em formular políticas regionais. Isso para que se debatam os principais tópicos da atualidade e para que a região seja a maior impulsionadora de seu próprio processo de desenvolvimento (DALLABRIDA, 2000).

3 MÉTODO

Estudo qualitativo, de abordagem exploratória, por o tema de cidades inteligentes não ser ainda de domínio tradicional da área de gestão, como nos casos de ciências sociais, antropologia e urbanismo; e descritivo. Conforme Loiola e Bastos (2003), levantamentos desta natureza são particularmente importantes para incentivar a reflexão pelos próprios pesquisadores sobre os desafios e limites que cercam a sua prática. A busca de dados para o atingimento dos objetivos foi realizada a partir do levantamento de artigos a temática, via a plataforma de busca, Scopus.

Assim, foram analisados os artigos a partir destes períodos, a partir da revisão sistemática da literatura. Foram selecionados os artigos que apresentavam no título, resumo ou no conjunto de palavras-chave, as expressões “smart cit*” AND “Brazil”, na área de estudo “Business, Management and Accounting”, tipo de fonte “Journal”, tipo de documento “Articles”, nos idiomas “English” e “Portuguese”. Após esta seleção, foram identificados 18 artigos que foram lidos integralmente para a análise das categorias da pesquisa.

Primeiramente apresentados pelo nome do journal no qual consta e seu conceito conforme a plataforma Sucupira do Web Qualis, do Ministério da Educação e Cultura do Brasil, para a área de Administração Pública e de Empresas, Ciências Contábeis e Turismo; e/ou seu fator de impacto. Logo, organizou-se quanto à Instituição de Ensino Superior (IES) pertencente, conforme afiliação do editor-chefe e país.

Com isso, as categorias reuniram um conjunto de itens que avaliaram cada artigo em três dimensões, de acordo com o proposto por Hoppen, Lapointe e Moreau (1996) e na adaptação das classificações adotadas por Hoppen e Meireles (2005) e Sampaio e Perin (2006), os quais classificam as metodologias de pesquisa em abordagem, tipo de pesquisa, natureza e instrumento de coleta de dados. Ainda nesta dimensão, foi incluída a categoria objeto de análise, visando identificar o nível de análise empregado nos estudos realizados (Quadro 1).

No entanto, identificou-se em alguns artigos que a especificação de alguns aspectos metodológicos utilizados não estava descrita de forma específica, sendo necessária a interpretação e análise dos pesquisadores para realizar a classificação.

Como afirma Hoppen, Lapointe e Moreau (1996), cada pesquisador que fez o

exercício de avaliar formalmente o conteúdo de um artigo científico sabe que grande parte dos artigos publicados não anunciam de modo explícito os métodos de pesquisa utilizados, negligenciando certos detalhes essenciais para a avaliação da pesquisa, o que torna difícil a apreciação do estudo. Ressalta-se ainda, que os quatro artigos teóricos foram analisados somente a partir da primeira e terceira dimensões, tendo em vista a especificidade das pesquisas.

Quadro 1 - Roteiro de análise dos artigos pesquisados

Classificação das Categorias Analíticas		
Primeira Dimensão Caracterização dos artigos	Autores	i) Autores; ii) Instituição de Ensino Superior (IES)/País
Segunda Dimensão Aspectos metodológicos	Abordagem metodológica	i) Qualitativa; ii) Quantitativa; iii) Qualitativa/quantitativa
	Tipo de pesquisa	i) Survey; ii) Experimental; iii) Estudo de caso único; iv) Estudo de caso múltiplo; v) Pesquisa Ação
	Natureza da pesquisa	i) Exploratória; ii) Descritiva; iii) Exploratório-descritiva; iv) causal
	Instrumento de coleta de dados	i) Entrevista; ii) Questionário; iii) Primários e Secundários; iv) secundários; v) Multimétodos
	Objeto de análise	i) Indivíduo; ii) Grupo; iii) Organização
Terceira Dimensão	Temas correlatos	Conteúdo temático e Temáticas associadas

Fonte: Adaptado de Hoppen, Lapointe e Moreau (1996); Hoppen e Meirelles (2005); Sampaio e Perin (2006).

4 ANÁLISES E DISCUSSÕES

As análises permitiram identificar 18 artigos, que se adequaram ao método descrito. Este fato remete ao entendimento de que, mesmo sendo reconhecida a grande relevância da temática pela literatura de diversas áreas, há um número reduzido de investigações, no contexto acadêmico acerca do assunto.

Visando garantir a profundidade na análise destes artigos, optou-se por organizar os resultados da pesquisa em três partes. A primeira aborda a

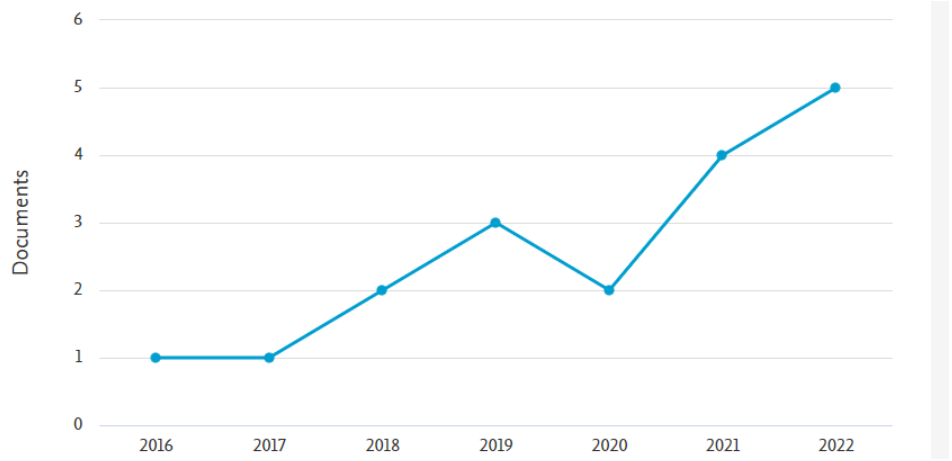
caracterização da produção e a autores, enquanto a segunda apresenta aspectos relacionados à metodologia dos estudos, envolvendo a abordagem, o tipo e a natureza de pesquisa, o instrumento de coleta de dados e o objeto de análise. Já a terceira, apresenta como foco a análise do conteúdo das pesquisas, centrando-se nas temáticas associadas ao assunto.

4.1 Caracterização da Produção e Autores

Constatou-se na lista geral de busca (Quadro 2) da plataforma Scopus que os estudos na área têm ganhado notoriedade, a começar em 2016 e aumentar sua quantidade, de forma ininterrupta.

Outro ponto relevante entre os journals é a presença de journals bem-conceituados na área de Administração Pública e de Empresas, Ciências Contábeis e Turismo.

Figura 1: Publicações por ano.



Fonte: Autores, 2022

Quadro 2: Relação entre periódicos e artigos relacionados à temática

Journals	**2016 (1)**	**2017 (1)**	**2018 (2)**	**2019 (3)**	**2020 (2)**	**2021 (4)**	**2022 (5)**	**Total (18)**
1. Journal of Cleaner Production (A1, FI: 5.651)	-	-	1	3	1	-	-	5
2. Cities	-	-	-	-	-	1	1	2
3. Annals of Data Science	-	1	-	-	-	-	-	1
4. Estudios Gerenciales	-	-	-	-	-	-	1	1
5. Industrial Management and Data Systems	-	-	-	-	-	-	1	1
6. Industrial Marketing Management	-	-	-	-	-	-	1	1
7. International Journal of Automotive Technology and Management	-	-	-	-	-	-	1	1
8. International Journal of Grid and Utility Computing	-	-	1	-	-	-	-	1
9. International Journal of Tourism Cities	1	-	-	-	-	-	-	1
10. Journal of Science and Technology Policy Management	-	-	-	-	1	-	-	1
11. Technology Analysis and Strategic Management	-	-	-	-	-	1	-	1
12. International Journal of Knowledge-Based Development	-	-	-	-	-	1	-	1
13. International Journal of Professional Business Review	-	-	-	-	-	-	1	1

Fonte: Elaborado pelos autores com base nos dados da pesquisa.

Quanto aos periódicos pesquisados é possível que são oriundos de diversos países, não havendo alguma revista brasileira especializada listada entre esses (Quadro 3).

Quadro 3 - Relação de publicações por Instituição/País

IES/País	**Artigo**
• Instituto de Ciência e Tecnologia (ICT), UNIFESP, Osasco, Brazil • CEMADEN, São José dos Campos, Brazil • UDESC, Lages, Brazil	Optimal rain gauge network to reduce rainfall impacts on urban mobility – a spatial sensitivity analysis
• Örebro University School of Business, Örebro, Sweden • Department of Entrepreneurship and Relationship Management, University of Southern Denmark, Denmark	Individual strategies as interaction modes for handling institutional logic diversity over time: A case study on a public-private collaboration project
• Urban Modelling and Metabolism Assessment (uMAMA), Centre for Complex Systems in Transition, School of Public Leadership, Stellenbosch University, South Africa	Governing informality through representation: Examples from slum policies in Brazil and South Africa
• Laboratoire de Tribologie et Dynamique des Systèmes - LTDS, France • Laboratoire de Droit des Affaires et Nouvelles Technologies - DANTE, Faculté de Droit et de Science Politique (UVSQ), France • Procuradoria da República no Paraná, Curitiba, Brazil • Laboratoire Magellan, Université Jean Moulin Lyon 3, École Centrale Lyon, France	Artificial intelligence as a determinant for reshaping the automotive industry and urban mobility services
• The University of Caxias do Sul (UCS), Brazil • The Pontificia University Católica of Rio Grande do Sul (PUC-RS), Brazil	Antecedent and consequents of eco-innovation for sustainability: generations' perceptions in Brazil and Portugal | [antecedente e consequentes da eco-inovação para a sustentabilidade: percepções das gerações no brasil e em portugal]
• Department of Biological Sciences and Sustainability, Universidade Paulista, Brazil • Faculty of Economics, Administration and Accounting, Universidade de São Caetano Do Sul, São Paulo, Brazil	The development of cities supported by communication and information technologies | [O desenvolvimento das cidades apoiado nas tecnologias da informação e comunicação]
• Utrecht School of Governance, Utrecht University, Utrecht, Netherlands • Fundação Getulio Vargas, São Paulo School of Business Administration, São Paulo, Brazil • Management School, University of Stirling, Scotland, United Kingdom	Smart governance in institutional context: An in-depth analysis of Glasgow, Utrecht, and Curitiba

• Engineering and Knowledge Management Department, Federal University of Santa Catarina (UFSC), Florianópolis, Brazil	Co-production in public management: A case study towards a smart city
• Department of Industrial Engineering, Federal University of Technology, Curitiba, Brazil • Department of Industrial Engineering, Pontificia Universidade Católica do Paraná (PUC), Curitiba, Brazil	Projects aimed at smart cities: a hybrid MCDA evaluation approach
• School of Management, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil • Universidade do Vale do Rio dos Sinos, Sao Leopoldo, Brazil	The orchestration process for emergence of clusters of innovation
• Federal University of Pernambuco (UFPE), Recife, 50670-901, PE, Brazil • University Potiguar (UnP), Departament of Doctorate and Master in Business Administration, Natal, Brazil	Governance and quality of life in smart cities: Towards sustainable development goals
• University of Caxias Do Sul, Brazil • Faculty CNEC, Brazil • IMED Business School, Brazil	Smart sustainable cities evaluation and sense of community
• Civil Engineering Department, Federal University of São Carlos (UFSCar), Brazil • Sostenipra, Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona (UAB), Spain • Department of Chemical Engineering, Xarxa de Referència en Biotecnologia (XRB), School of Engineering (ETSE), Universitat Autònoma de Barcelona, Spain	Potential of technology parks to implement Roof Mosaic in Brazil
• Faculdade Meridional (IMED), Brazil • University of Caxias do Sul (UCS), Brazil	“Green, but not as green as that”: An analysis of a Brazilian bike-sharing system
• University of Caxias do Sul (UCS) • ISAE (FGV), Paraná, Brazil • IMED Business School, Brazil • IMED Health School, Brazil	Smart city and quality of life: Citizens’ perception in a Brazilian case study
• Department of Informatics and Statistics (INE), Federal University of Santa Catarina (UFSC), Brazil • Department of Computer Science (DCC), Federal University of Juiz de Fora (UFJF), Brazil • Department of Information Science (CIN), Federal University of Santa Catarina (UFSC), Brazil	An infrastructure model for smart cities based on big data

• Centre of Management and Socioeconomic Science (ESAG), State University of Santa Catarina (UDESC), Brazil	
• Universidade Tecnológica Federal do Paraná,, Brazil • Laboratório Nacional de Computação Científica, Petropólis, Brazil	Three Decades of Business Activity Evolution in Curitiba: A Case Study
• Department of Tourism, Universidade Federal do Rio Grande do Norte, Brazil • Department of Design, Universidade Federal de Santa Catarina, Brazil • Department of Arts, Universidade Federal do Rio Grande do Norte, Brazil • Metropole Digital Institute, Universidade Federal do Rio Grande do Norte, Brazil	Mobile tourist guide supporting a smart city initiative: a Brazilian case study

Fonte: Elaborado pelos autores com base nos dados da pesquisa.

Percebe-se relevante presença de periódicos oriundos de universidades internacionais na busca de tais artigos. Porém nota-se relevante presença de estudos de autores filiados à instituições brasileiras, mas ainda com pouca produção, para a temática tão emergente na literatura internacional.

4.2 Perfil Metodológico dos Estudos

4.2.1 Abordagem metodológica

Na análise realizada nesses estudos, em relação à abordagem da pesquisa houve a predominância das pesquisas quantitativas. No total, a metodologia quantitaitva representou 9 artigos e a qualitativa, 6 artigos (Quadro 4).

Quadro 4 – Abordagem Metodológica

Abordagem Metogológica	Total (18)
Qualitativa	6
Quantitativa	9
Qualitativa-Quantitativa	3

Source: Authors, 2022.

4.2.2 Tipo de pesquisa

Em relação aos tipos de pesquisa, percebe-se a predominância de estudos de caso, sendo apenas 3 estudos survey (Quadro 5).

Quadro 5 - Tipo de Pesquisa

Tipo de Pesquisa	**Total (18)**
Estudo de Caso Único	10
Estudo de Caso Múltiplo	5
Survey	3
Pesquisa-Ação	-
Narrativa	-
História de Vida	-

Fonte: Autores, 2022.

Referindo-se ao estudo de caso, identificou-se que os estudos de caso único sobressaem em relação aos estudos de caso múltiplo. Conforme Yin (2005), o estudo de caso é uma investigação empírica adequada a se aplicar na tentativa de explicar ligações causais em situações da vida real, pois estas são complexas demais para o tratamento por meio de estratégias experimentais ou de levantamento de dados.

4.2.3 Natureza da pesquisa

Nos artigos investigados, quanto à natureza da pesquisa, metade trata-se de estudos descritivos, sendo 5 exploratórios (Quadro 6).

Quadro 6 - Natureza da Pesquisa

Natureza da Pesquisa	**Total (18)**
Descritiva	9
Exploratória	5
Descritiva e Exploratória	4

Fonte: Autores, 2022.

Percebeu-se repetida utilização de multimétodos, o que pode representar uma tendência para consolidação e maior compreensão da temática, o que demonstra a preocupação dos pesquisadores em fundamentar os dados obtidos, através de diferentes fontes de evidência.

Quanto ao objeto de análise (Quadro 7), a maior relevância para Organizações, políticas e sistemas como objeto foi sobre sua dinâmica em dado local. Já sobre indivíduos, baseado na comparação entre cidades e regiões.

Quadro 7 - Objeto de Análise

Objeto de Análise	**Total (18)**
Organização, políticas, sistemas	7
Individuo	6
Grupos	3
Mais de um objeto analisado	1

Fonte: Autores, 2022.

Nota-se a carência de estudos que tratem a perspectiva de grupos que, tão abordado nos vieses de desenvolvimento sustentável, é a parte fundamental da mudança cultural, mais específico na aprendizagem e relações para essa área.

4.3 Principais temáticas

Os periódicos analisados tratam o tema de forma ampla. As principais temáticas envolvidas identificadas estão apresentadas (Quadro 7).

Quadro 8 - Temas relacionados

Relação entre as universidades e os parques tecnológicos para o desenvolvimento sustentável	**Total (18)**
Inovação e Tecnologia da Informação	9
Governança	4
Desenvolvimento Urbano/Regional	3
Qualidade de Vida	2

Fonte: Autores, 2022.

Por fim, com base nos resultados discutidos, segue as principais constatações (Quadro 8) sobre os estudos de políticas para cidades inteligentes no Brasil, a fim do desenvolvimento sustentável.

Quadro 9 – Síntese dos principais resultados da pesquisa

Abordagem Metodológica	Qualitativa
Tipo de Pesquisa	Estudo de Caso Único
Natureza da Pesquisa	Descritiva
Instrumento de Coleta de Dados	Multimétodos
Objeto de Análise	Organização, políticas, sistemas
Temática Associadas	Inovação e Tecnologia da Informação

Fonte: Autores, 2022

5 CONSIDERAÇÕES FINAIS

A análise dos artigos publicados sobre a temática no dado período permitiu apresentar um panorama acerca da autores, estratégias metodológicas e conteúdo temático das pesquisas identificadas. Através da análise dos periódicos há o reconhecimento da importância do tema, porém encontrou-se um número reduzido.

A partir dos artigos analisados, é possível notar que Brasil, e a América Latina como um todo, ainda permanecem distantes de políticas e práticas para o desenvolvimento de cidades mais inteligentes, com o protagonismo dos entes públicos, privados e universidades. Fatores como grande amplitude de renda e gentrificação, a resultar em relevante desigualdade social; carência de infraestrutura básica em muitas regiões e a falta de uma cultura de pertencimento ao público parecem fortificar muros à melhores práticas de governança e qualidade de vida.

Em cerca de 7 anos, 18 publicações em periódicos de impacto é um número ainda aquém por trata-se de um assunto que vem se difundindo teoricamente e tomado como meio para o desenvolvimento sustentável. É notável que revistas bem-conceituadas têm interesse em estudos na área de cidades inteligentes, conforme o analisado.

Uma das limitações do estudo foi o uso apenas da base Scopus, por conta de buscar periódicos de maior abrangência. Desta forma, visando ampliar este estudo, sugere-se a realização de investigações nas interações entre a tríplice hélice (Academia, Estado e Indústria) para o desenvolvimento sustentável, a comparar com cidades já consideradas inteligentes, para que seja possível a indicação de uma melhor adaptação ao perfil brasileiro.

REFERÊNCIAS

ALBAHARI, A; PÉREZ-CANTO; S.; BARGE-GIL, A.; MODREGO, A. Technology parks versus Science parks: does the university make the difference?, **Munich Personal RePec Archive**, n. 49227, aug., 2013. Disponível em: <http://mpra.ub.unimuenchen.de/49227/1/MPRA_paper_49227.pdf>. Acesso em : 6 jul. 2018. AMARAL FILHO, J. Desenvolvimento regional endógeno em um ambiente federalista.

Planejamento e políticas públicas, n.14. Brasília: IPEA, 1996

BARBIERI, J. C. Desenvolvimento sustentável regional e municipal: conceitos, problemas e pontos de partida. **Administração Online**, v. 1, n. 4, 2000. Disponível em: <http://www.fecap.br/adm_online/art14/barbieri.htm>. Acesso em: 6 jul. 2018. BLOOMBERG. **Bloomberg Business**: Brown's California overtakes Brazil with companies leading the world. Acesso em: 5 jul. 2018. Disponível em: <http://www.bloomberg.com/news/articles/2015-01-16/brown-s-california-overtakes- brazil- with-companies-leading-world>. Acesso em: 6 jul. 2018.

BOISIER, S. Em busca do esquivo desenvolvimento regional: entre a caixa-preta e o projeto político. **Planejamento e Políticas Públicas**, n.13, Instituto de Pesquisa Econômica Aplicada, Brasília: IPEA, 1996. Disponível em: <http://www.cni.unc.br/unc2009/mestrado/mestrado_materiais/boisier,_s_em_busca_do_esqui v o.pdf>. Acesso em: 3 jul. 2018.

CAPES. **Sistema WebQualis**. Disponível em: <http://qualis.capes.gov.br/webqualis/publico/documentosDeArea.seam?conversationPropagat i on=begin>. Acesso em: 7 jul. de 2018.

COE, N. M. H.; MARTIN, H.; WAI-CHUNG, Y.; DICKEN, P.; HENDERSON, J. Globalizing regional development: a global production networks perspective. **Transactions of the Institute of British Geographers**, v.29, p.468–484, 2004.

COFFEY, W.; POLEÈSE, M. The concept of local development: a stages model of endogenous regional growth. **Papers in Regional Science.** v.55, n.1, p.1-12, 2005. DALLABRIDA, V. R. **O desenvolvimento regional:** a necessidade de novos paradigmas. Ijuí: Ed. UNIJUÍ, 2000.

ELKINGTON, J. **Canibais com garfo e faca**. Trad. Patrícia Martins Ramalho. São Paulo: Makron Books, 2001.

ETZKOWITZ, H. Triple Helix Clusters: Boundary Permeability at University-Industry- Government Interfaces as a Regional Innovation Strategy. Environment & Planning C: **Government and Policy**. In Press, 2012.

FRITSCH, M; MUELLER, C. The Effects of New Business Formation on Regional Development Overtime: the case of Germany. **Regional Studies**, v. 4, n. 38, p. 961-975, 2004. Disponível em: <http://download.springer.com/static/pdf/950/art%253A10.1007%252Fs11187-007-9067-9.pdf?auth66=1427265799_e5fa9ba63d0c85ad2aa13da5004d063e&ext=.pdf>.

Acesso em: 5 jul. 2018.

GANZERT, C. C.; MARTINELLI, D. P. Transferência de conhecimento em sistemas regionais de inovação: a perspectiva do caso do Vale do Silício Californiano. **Interações:** Revista Internacional de Desenvolvimento Local, v. 10, n. 2, Campo Grande, jul-dez, 2009. Disponível em: <http://www.scielo.br/pdf/inter/v10n2/v10n2a03.pdf>. Acesso em: 5 jul. 2018.

HOPPEN, N.; MEIRELLES, F.S. Sistemas de Informação: um panorama da pesquisa científica entre 1990 e 2003**. Revista de Administração de Empresas (RAE),** v.45, n.1, p. 24-35, jan./mar. 2005.

HOPPEN, N., LAPOINTE, L. e MOREAU, E. Um guia para avaliação de artigos de pesquisa em Sistemas de Informação. **Revista Eletrônica de Administração**, n. 3, Ago. 1996.

IASP. **29th World Iasp Conference:** theme. Disponível em: <http://www.iasp2012tln.com/en/Conference/theme >. Acesso em: 4 jul. 2018.

JACOBI, P. Educação ambiental, cidadania e sustentabilidade. **Cadernos de pesquisa**, n. 118,

p. 189-205, 2003. Disponível em:

<http://www.scielo.br/pdf/cp/n118/16834.pdf >. Acesso em: 6 jul. 2018.

JARA, C. J. **A sustentabilidade do desenvolvimento local:** desafios de um processo em construção. Brasília: Instituto Interamericano de Cooperação para a Agricultura (IICA)/ Recife: Secretaria do Planejamento do Estado de Pernambuco (Seplan), 1998. Disponível em: <http://repiica.iica.int/DOCS/B1128P/B1128P.PDF>. Acesso em: 4 jul. 2018.

LOIOLA, E.; BASTOS, A.V.B. A produção acadêmica sobre Aprendizagem Organizacional no Brasil. **Revista de Administração Contemporânea**, v. 7, n. 3, p. 181-201, jul./set., 2003. LUNDVALL, B. A. Innovation as an interactive process: from user-producer interaction to the national system of innovation. In: **Technical change and economic theory**, DOSI, G. et al. (org.). Londres: Pinter Publishers, 1988. Disponível e <http://www.carlotaperez.org/downloads/pubs/StructuralCrisesOfAdjustment.pdf>. Acesso em: 9 jul. 2018.

MATTOS, K. M. C.; MATTOS, K. M. C.; MATTOS, A. Valoração econômica do meio ambiente dentro do contexto do desenvolvimento sustentável. **Revista Gestão Industrial**, v. 1, n. 2, p. 109-121, 2005. Disponível em: <http://www.pg.utfpr.edu.br/ppgep/revista/revista2005/PDF2/Art09Vol1Nr2.pdf >. Acesso em: 9 jul. 2018.

MASSEY, D.; QUINTAS, P.; WIELD, D. **High tech fantasies:** science parks in society, science and space. Routledge, 1992. Disponível em: <https://books.google.com.br/books?hl=ptBR&lr=&id=LrqJAgAAQBAJ&oi=fnd&pg=PP 1&ots=1jcKLnXma&sig=wtN3ruL8iwL39KhxT5OMksrRDpM&redir_esc=y#v=onepage&q&f =fal se>. Acesso em: 3 jul. 2018

MEDEIROS, J. A. **Polos tecnológicos e competitividade.** Instituto de Estudos Avançados da Universidade de São Paulo/USP, 1993. Disponível em: <http://www.iea.usp.br/publicacoes/textos/polos-tecnologicos-e-

competitividade>. Acesso em: 8 jul. 2018.

MELO, L. J. **Governança e gestão dos ativos de conhecimento em ambientes de inovação:** estudo de caso sobre o Parque Tecnológico do Rio. Dissertação – Programa de Pós-graduação em Políticas Públicas, Estratégias e Desenvolvimento, Instituto de Economia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, 2011. Disponível em: <http://www.ie.ufrj.br/images/posgraducao/pped/defesas/18Leonardo_de_Jesus_Melo.pdf >. Acesso em: 5 jul. 2018.

ONU, Organização das Nações Unidas. **Ecossistemas e o bem-estar humano:** estrutura para uma avaliação. Washington: World Resources Institute, 2003.

RODRIGUES, R. F. **Parques tecnológicos:** relações entre território e inovação e os desafios das políticas e práticas territoriais na criação de valor compartilhado. Tese – Programa de Pós-graduação em Engenharia de Produção, Universidade Federal de Santa Catarina, Florianópolis, 2013. Disponível em: <https://repositorio.ufsc.br/bitstream/handle/123456789/122781/325606.pdf?sequence=1>. Acesso em: 9 jul. 2018.

SACHS, I. **Caminhos para o desenvolvimento sustentável.** Rio de Janeiro: Garamond, 2002.

SAMPAIO, C. A. C. **Gestão que privilegia uma outra economia:** ecossocioeconomia das organizações. Blumenau: Edifurb, 2010.

SAMPAIO, C. H.; PERIN, M. G. Pesquisa científica da área de marketing: uma revisão histórica. Revista de Administração Contemporânea, v.10, n.2, p. 179-202, abr./jun. 2006. SANTOS, D. A. **Cooperação tecnológica universidade-empresa-governo:** um estudo de casos múltiplos da Universidade Federal de Sergipe. 2011. Dissertação – Mestrado em Desenvolvimento Regional e Gestão de Empreendimentos Locais, Universidade Federal de Sergipe, Sergipe, 2011. Disponível em: <http://200.17.141.110/pos/economia/dissertacoes/a09/Dissertacao_de_%20Danielle_Andrade _ dos_Santos.pdf>. Acesso em: 7 jul. 2018.

SCHUMPETER, J. **A teoria do desenvolvimento econômico.** Rio de Janeiro: Nova Cultural, 1985.

SPOLIDORO, R.; AUDY, J. **Parque Científico e tecnológico da PUCRS - TECNOPUC** - Capítulo 2: Origens e evolução dos parques tecnológicos. EDIPUCRS. Disponível em: < http://www.pucrs.br/edipucrs/tecnopuc/capitulo2.pdf>. Acesso em: 9 jul. 2018.

STEINER, J. E.; CASSIM, M. B.; ROBAZZI, A. C. **Parques Tecnológicos: Ambientes de Inovação**, Instituto de Estudos Avançados da Universidade de São Paulo/USP, São Paulo, 2008. Disponível em: <http://www.iea.usp.br/publicacoes/textos/steinercassimrobazziparquestec .pdf>. Acesso em: 5 jul. 2018.

STOPPER, M. Regional Technology Coalitions an Essential Dimension of National Technology Policy. **Research Policy**. Elsevier, v. 24, n. 6, p. 895-911, 1995.

Disponível em: <http://www.sciencedirect.com/science/article/pii/0048733394008108>. Acesso em: 7 jul. 2018.

TAKAHASHI, S.; TAKAHASHI, V. P. **Gestão da inovação dos produtos:** estratégia, processo, organização e conhecimento. Rio de Janeiro: Elsevier, 2007.

THOMPSON, A. A.; STRICKLAND, A. J.; GAMBLE, J. E. **Administração estratégica.** 15. ed. São Paulo: McGraw Hill, 2008.

TIDD, J., BESSANT,J.; PAVITT, K. **Managing Innovation:** integranting technological, managerial organizacional change. 3º Ed. Nova York: McGraw-Hill, 2005.

UNESCO-WTA. **UNESCO-WTA iniciatives:** science park and technology business incubator (2006-2010). Paris: UNESCO, 2005. Disponível em: <http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/pdf/sc_unesco-wta_initiatives_en.pdf>. Acesso em: 7 jul. 2018.

VEDOVELLO, C. A. Aspectos relevantes de parques tecnológicos e de incubadoras de empresas. **Revista do Banco Nacional de Desenvolvimento**, v. 7, n. 14, p. 237-300, Rio de Janeiro, dez. 2000. Disponível em: <http://www.bndes.gov.br/SiteBNDES/export/sites/default/bndes_pt/Galerias/

Arquivos/c onhe cimento/revista/rev1410.pdf>. Acesso em: 9 jul. 2018.

_____.; JUDICE, V. M. M.; MACULAN, A. M. D. Revisão crítica às bordagens a parques tecnológicos: alternativas interpretativas às experiências brasileiras recentes. **Revista de Administração e Inovação**, v.3. 2006. Disponível em: < http://www.revistarai.org/rai/article/view/58/88 >. Acesso em: 4 jul. 2018.

WCDE. **Our Common Future**. Oxford: Oxford University Press, 1987.

YIN, R.K. **Estudo de Caso: planejamento e métodos**. 3 ed. Porto Alegre: Bookman, 2005.

7 FINAL REMARKS

Finally, according to UN (2015), a city is a hub for ideas, science, culture, commerce, productivity, social development and many other characteristics. At their best, cities have enabled people to advance socially and economically.

By this view, businesses can help cities navigate these challenges and turn a high-level vision into practical and implementable action plans. Business can provide not specific infrastructure, technology, services and financing solutions, but also in contributing to the strategy that will support the overall optimization of urban systems to create inclusive, safe, sustainable and disaster resilient cities. Cities seeking to realize their sustainability objectives can benefit from engaging with business early in the planning and strategy development process, leveraging the capability of business to identify innovative and cost-effective solutions to complex, cross-cutting urban sustainability challenges (UN, 2015).

Given that approach, it is possible to identify that is a hot potato theme – many countries thinking on it together by UN policies and development program and working to achieve the purposed targets – with diverse approaches and aspects that can be studied to. In my case, I intend to organize the literature production about the thematic of SDG 11, smart cities and innovation helices of development.

Another relevant issue, that deserve space here is about the impact of Coronavirus Disease (COVID-19) in cities and communities, resulting in more than 6.600.000 deaths (December, 2022) worldwide and over 90% of cases happened in urban areas (WHO, 2020). For sure, a fact that still is changing patterns and bringing us new challenges about sanitary security, economic crisis and lifestyle; foregrounding known problems and deficiencies as huge rent inequality, inequal health plan quality access, low rates in investments on scientific researches development, etc.

To investigate the nature of the state of art of innovations helices, smart/sustainable cities on the management area and the investigations about Brazilian polices for its smart/sustainable cities can show us that this study area in growing up and the management studies should specialize itself better to treat to it, being that managers able to solve many of the problems and difficulties from a great complexity place that is the cities, and its culture, its characteristics, its governments, its habits, its religions, etc. This way, the investigating on that studies area for future

studies brings us an important opportunity for cities development and sustainable and innovative practices e policies.

The inequal nations challenges worldwide of surveillance basic conditions as shelter, potable water, food, electric energy, health assistance, education, security, infrastructure, etc. It makes all the differences among countries and their human development index; as the SDG 11 highlights.

The importance and need for that studies, as this study initiative, were presented by the demands from a stronger view by world commissions and development programs, as SDG 11 – the seminal part of this study creation and arrangement – for a greater understanding how and what is going on about how to make cities and communities smarter and sustainable, by innovation helixes and the complex state of art from that exploratory area on Management approaches.

About the 3 studies presented here:

a) Analyzing the trajectory of the innovation helices process by theoretical view and its practice by this avant-garde approach which highlights the community participation on the decisions for better cities and better qualities of life indexes – the Quintuple Helices framework; developing regions and making citizens with an stronger local sense of belonging and stimulating sustainable innovation.

b) Identifying studies about smart cities and its points of view. The state of art od future sustainable cities and communities comes from those investigations and perceptions about the urban space and its actors relationships and organizations within them.

c) Verify positions, focus and intentions about smarter and sustainable Brazilian cities, as an emergent economy and its great importance to the world food and commodities market supply; incentivizing more studies about its cities and citizens behaviors and their dynamics of organizations to create endogenous solutions for that cities, developing economy, the nations e its market partnerships.

In summary, the way we can design and think our cities and lifestyle tell us too much about our culture, and beyond, our future. Which one do we want? Just from the nowadays complexity, we can consider the best solutions and adapt the society

advances direction.

REFERENCES

Albahari, A; Pérez-Canto; S.; Barge-Gil, A.; Modrego, A., (2013). Technology Parks Versus Science Parks: Does The University Make The Difference? *Munich Personal Repec Archive*, N. 49227, Aug., 2013. Source: <http://mpra.Ub.Unimuenchen.De/49227/1/Mpra_Paper_49227.Pdf>. Accessed In : 6 Jul. 2020.

Amaral Filho, J. (1996). Desenvolvimento Regional Endógeno Em Um Ambiente Federalista. *Planejamento E Políticas Públicas*, N.14. Brasília: Ipea.

Barbieri, J. C (2000). Desenvolvimento Sustentável Regional E Municipal: Conceitos, Problemas E Pontos De Partida. *Administração Online*, V. 1, N. 4. Source: <Http://Www.Fecap.Br/Adm_Online/Art14/Barbieri.Htm>. Accessed In: 6 Jul. 2020.

Boisier, S. (1996). Em Busca Do Esquivo Desenvolvimento Regional: Entre A Caixa-Preta E O Projeto Político. *Planejamento E Políticas Públicas*, N.13, Instituto De Pesquisa Econômica Aplicada, Brasília: Ipea. Source: <http://Www.Cni.Unc.Br/Unc2009/Mestrado/Mestrado_Materiais/Boisier,_S_Em_Busca_Do_Esquiv O.Pdf>. Accessed In: 3 Jul. 2020.

Carayannis, Elias; Barth, Thorsten; Campapbell, David (2012). The Quintuple Helix innovation model: global warming as a challenge and driver for innovation. *Journal of innovation and entrepreneurship.*

Carayannis, Elias; Campapbell, David (2010). Triple Helix, Quadruple Helix and Quintuple Helix and How Do Knowledge, Innovation and the Environment Relate To Each Other? A Proposed Framework for a Trans-disciplinary Analysis of Sustainable Development and Social Ecology *International Journal of Social Ecology and Sustainable Development* 1(1):41-69.

Coffey, W.; Poleèse, M. (2005). The Concept Of Local Development: A Stages Model Of Endogenous Regional Growth. *Papers In Regional Science.* V.55, N.1, P.1-12.

Dallabrida, V. R. (2000). *O Desenvolvimento Regional:* A Necessidade De Novos Paradigmas. Ijuí: Ed. Unijuí.

Dewey, A. & Drahota, A. (2016) *Introduction to systematic reviews:* online learning module Cochrane Training.
Source: https://training.cochrane.org/interactivelearning/module-1-introduction-conducting-systematic-reviews. Accessed In: 5 Jul. 2020.

Elkington, J. (2001). *Canibais Com Garfo E Faca.* Trad. Patrícia Martins Ramalho. São Paulo: Makron Books.

Etzkowitz, H.; Leydesdorff, L. (1995). Universities and the global knowledge economy: a triple helix of university-industry-government relations. Amsterdam: University of Amsterdam.

Etzkowitz, H. (2009). Hélice Tríplice: Universidade-Indústria-Governo: Inovação em Movimento. Porto Alegre: EDIPUCRS.

_____, H. (2012). Triple Helix Clusters: Boundary Permeability At University-Industry-Government Interfaces As A Regional Innovation Strategy. Environment & Planning C: *Government And Policy.* In Press.

Fritsch, M; Mueller, C. (2004). The Effects Of New Business Formation On Regional Development Overtime: The Case Of Germany. *Regional Studies*, V. 4, N. 38, P. 961-975.. Source: <http://Download.Springer.Com/Static/Pdf/950/Art%253a10.1007%252fs11187- 007-9067-9.pdf?Auth66=1427265799_E5fa9ba63d0c85ad2aa13da5004d063e&Ext=.Pdf>. Accessed In: 5 Jul. 2020.

Ganzert, C. C.; Martinelli, D. P. (2009). Transferência De Conhecimento Em Sistemas Regionais De Inovação: A Perspectiva Do Caso Do Vale Do Silício Californiano. *Interações:* Revista Internacional De Desenvolvimento Local, V. 10, N. 2, Campo Grande, Jul-Dez. Source: <http://Www.Scielo.Br/Pdf/Inter/V10n2/V10n2a03.Pdf>.

Accessed In: 5 Jul. 2020.

Jacobi, P. (2003) . Educação Ambiental, Cidadania E Sustentabilidade. *Cadernos De Pesquisa,* N. 118, P. 189-205. Source: <Http://Www.Scielo.Br/Pdf/Cp/N118/16834.Pdf >. Accessed In:
6 Jul. 2020.

Jara, C. J. (1998). *A Sustentabilidade Do Desenvolvimento Local:* Desafios De Um Processo Em Construção. Brasília: Instituto Interamericano De Cooperação Para A Agricultura (Iica)/ Recife: Secretaria Do Planejamento Do Estado De Pernambuco (Seplan). Source:
<Http://Repiica.Iica.Int/Docs/B1128p/B1128p.Pdf>. Accessed In: 4 Jul. 2020.

Kitchin, R. (2014). The real-time city? Big data and smart urbanism. *GeoJournal*, 79(1), 1–14.

Lombardi, P., Giordano, S., Farouh, H., & Yousef, W., (2012). Modelling the smart city performance. *Innovation:* The European Journal of Social Science Research, 25(2), 137–149.

Lundvall, B. A. (1988). Innovation As An Interactive Process: From User-Producer Interaction To The National System Of Innovation. In: *Technical Change And Economic Theory*, Dosi, G. Et Al. (Org.). Londres: Pinter Publisher.
Source:
<Http://Www.Carlotaperez.Org/Downloads/Pubs/Structuralcrisesofadjustment.Pdf>. Accessed In: 9 Jul. 2020.

Manual, OECD Oslo (2018). Guidelines for collecting, reporting and using data on innovation*. The measurement of scientific, technological and innovation activities***.** WCDE, 1987. *Our Common Future.* Oxford: Oxford University Press.

Massey, D.; Quintas, P.; Wield, D. (1992). *High Tech Fantasies:* Science Parks In Society, Science And Space. Routledge, 1992. Disponível Em:
<Https://Books.Google.Com.Br/Books?Hl=Ptbr&Lr=&Id=Lrqjagaaqbaj&Oi=Fnd&Pg=Pp1

&Ot
S=1jcklnxma&Sig=Wtn3rul8iwl39khxt5omksrrdpm&Redir_Esc=Y#V=Onepage&Q&F=FalSe>. Accessed In: Jul. 4th 2020

Mattos, K. M. C.; Mattos, K. M. C.; Mattos, A. (2005). Valoração Econômica Do Meio Ambiente Dentro Do Contexto Do Desenvolvimento Sustentável. *Revista Gestão Industrial,* V. 1, N. 2, P. 109-121. Source: <Http://Www.Pg.Utfpr.Edu.Br/Ppgep/Revista/Revista2005/Pdf2/Art09vol1nr2.Pdf >. Accessed In: Jul. 5th, 2020.

Medeiros, J. A. (1993). *Polos Tecnológicos E Competitividade.* Instituto De Estudos Avançados Da Universidade De São Paulo/Usp,. Source: <Http://Www.Iea.Usp.Br/Publicacoes/Textos/Polos-Tecnologicos-E-Competitividade>. Accessed In: Jul. 8th, 2020.

Melo, L. J. (2011). *Governança E Gestão Dos Ativos De Conhecimento Em Ambientes De Inovação:* Estudo De Caso Sobre O Parque Tecnológico Do Rio. Dissertação – Programa De Pós-Graduação Em Políticas Públicas, Estratégias E Desenvolvimento, Instituto De Economia, Universidade Federal Do Rio De Janeiro, Rio De Janeiro. Source: <Http://Www.Ie.Ufrj.Br/Images/Posgraducao/Pped/Defesas/18leonardo_De_Jesus_Melo.Pdf>. Accessed In: Jul. 5th, 2020.

Rodrigues, R. F. (2013). *Parques Tecnológicos:* Relações Entre Território E Inovação E Os Desafios Das Políticas E Práticas Territoriais Na Criação De Valor Compartilhado. Tese – Programa De Pós-Graduação Em Engenharia De Produção, Universidade Federal De Santa Catarina, Florianópolis. Source: <https://Repositorio.Ufsc.Br/Bitstream/Handle/123456789/122781/325606.Pdf?Sequence=1>. Accessed In: Jul. 9th 2020.

Sachs, I. (2002). *Caminhos Para O Desenvolvimento Sustentável.* Rio De Janeiro: Garamond.

Sampaio, C. A. C, (2010). *Gestão Que Privilegia Uma Outra Economia:*

Ecossocioeconomia Das Organizações. Blumenau: Edifurb

Santos, D. A. (2011). *Cooperação Tecnológica Universidade-Empresa-Governo:* Um Estudo De Casos Múltiplos Da Universidade Federal De Sergipe. 2011. Dissertação – Mestrado Em Desenvolvimento Regional E Gestão De Empreendimentos Locais, Universidade Federal De Sergipe, Sergipe. Source: <Http://200.17.141.110/Pos/Economia/Dissertacoes/A09/Dissertacao_De_%20daniell e_Andrade_ Dos_Santos.Pdf>. Accessed In: Jul.7th , 2020.

Scholl, H. J., & Alawadhi, S. (2015). Pooling and leveraging scarce resources: The smart eCity gov alliance. *Proceedings of the annual Hawaii international conference on system sciences.* Vol. 2015.

Schumpeter, J. A (1985). Teoria Do Desenvolvimento Econômico. Rio De Janeiro: Nova Cultural, 1985.

SDG Index and Dashboards (2020), *United Nations*, Cambridge University Press, JunSource: <https://s3.amazonaws.com/sustainabledevelopment.report/2020/2020_sustainable_development_report.pdf>. Accessed: Aug. 20th, 2020.

Steiner, J. E.; Cassim, M. B.; Robazzi, A. C. (2008). *Parques Tecnológicos: Ambientes De Inovação*, Instituto De Estudos Avançados Da Universidade De São Paulo/Usp, São Paulo. Source: <Http://Www.Iea.Usp.Br/Publicacoes/Textos/Steinercassimrobazziparquestec.Pdf>. Accessed In: Jun. 2nd, 2020.

Spolidoro, R.; Audy, J. Parque Científico E Tecnológico Da Pucrs - Tecnopuc - Capítulo 2: Origens E Evolução Dos Parques Tecnológicos. Edipucrs. Source: < Http://Www.Pucrs.Br/Edipucrs/Tecnopuc/Capitulo2.Pdf>. Accessed In: Jul. 3rd 2020.

Stopper, M. (1995). Regional Technology Coalitions An Essential Dimension Of National

Technology Policy. *Research Policy.* Elsevier, V. 24, N. 6, P. 895-911. Source: <Http://Www.Sciencedirect.Com/Science/Article/Pii/0048733394008108>. Accessed In: 7th Jul. 2019.

Sudiana, K; SULE, E. T.; Soemaryani, I.; Yunizar, Y. (2020). The development and validation of the penta helix construct, *Business:* Theory and Practice, V. 21, I. 1: p.:136–145.

Takahashi, S.; Takahashi, V. P. (2007). *Gestão da inovação dos produtos:* estratégia, processo, organização e conhecimento. Rio De Janeiro: Elsevier.

Tidd, J., Bessant,J.; Pavitt, K. (2005). *Managing innovation*: integranting technological, managerial organizacional Change. 3º Ed. Nova York: Mcgraw-Hill.

Thompson, A. A.; Strickland, A. J.; Gamble, J. E. (2008). *Administração Estratégica.* 15. Ed. São Paulo: Mcgraw Hill.

UN, United Nations Organization (2003). *Ecossistemas E O Bem-Estar Humano:* Estrutura Para Uma Avaliação. Washington: World Resources Institute.

_____, (2015). *Agenda 2030*. Source: https://sustainabledevelopment.un.org/post2015/transformingourworld. Accessed in: Jun 8th, 2020.

Vedovello, C. A. (2000). Aspectos Relevantes De Parques Tecnológicos E De Incubadoras De Empresas. *Revista Do Banco Nacional De Desenvolvimento,* V. 7, N. 14, P. 237-300, Rio De Janeiro, Dec. Source: <http://Www.Bndes.Gov.Br/Sitebndes/Export/Sites/Default/Bndes_Pt/Galerias/Arquivos/Conhe Cimento/Revista/Rev1410.Pdf>. Accessed In: Jul 9th, 2020.

_____.; Judice, V. M. M.; Maculan, A. M. D. (2006). Revisão Crítica Às Abordagens A Parques Tecnológicos: Alternativas Interpretativas Às Experiências Brasileiras Recentes. *Revista De Administração E Inovação*, V.3. Source: <Http://Www.Revistarai.Org/Rai/Article/View/58/88 >. Accessed In: Jul. 4th, 2020.

WCDE, World Commision of Environment and Development (1987). *Our Common Future*. Oxford: Oxford University Press.

WHO, World Health Organization. *WHO Coronavirus Disease (COVID-19) dashboard*. Source: < https://covid19.who.int/>. Accessed In: Sep. 20th, 2020.