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Chapter 7

Entrepreneurship and Sustainability as Key Elements for Innovation: A Brazilian Dilemma

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Abstract

Considering the socio-economic reality of Brazil and from the relevance of the issues related to entrepreneurship and organizational innovation in the country, the importance of sustainability for the organizations could become a solution for the integration of entrepreneurship with innovation. The objective of this research is to highlight the relevance of sustainability for organizations as a way to trigger the integration of entrepreneurship toward innovation in the Brazilian context. Various exploratory and descriptive researches on the dynamics of entrepreneurship, innovation and sustainability in the main organizations of the Serra Gaúcha (RS), Brazil were carried out through the Multidisciplinary Research Group on Innovation and Competitiveness, in partnership with a research Nucleus on Innovation, Entrepreneurship and Sustainability. The main results indicate that the key sectors of this Brazilian regional economy present less "innovation intensity," which are mainly characterized by internal organizational activities of innovation, preventing them to become "regional systems of innovation," and which presupposes the lack of sustainability. Those limitations can be characterized as "innovation ghettos." In that logic, the researchers have also demonstrated the presence of "ghettos of sustainability, ghettos of innovation, and therefore, ghettos of sustainability

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and innovation" in the sectors of this Brazilian regional economy, but in differentiated and restricted perspectives

Keywords: entrepreneurship, sustainability, innovation, Brazilian organizations, sectors, economy, research academic, research group

1. Introduction

In the late 19th century in Brazil, the industrial development began encouraging the entrepreneurial character of the nation. In more than 100 years, the Brazilian industries have covered most of the regions of their country and have developed various areas of the civil society. But today, it is not possible to approximate and explain the role of entrepreneurship toward the practice of innovation, since many entrepreneurs still come to the market with similar ideas, creating some wealth, despite most of them are still not innovating [1]. However, Drucker [2] has suggested that innovation is directly related to the economic or social potential of entrepreneurship change, which consists in creating and using new products, processes, organizations or production systems. It represents the key to competitiveness and knowledge development [3], but it still occurs in very few Brazilian organizations [1].

In [4], Brazil is ranked in the 69th position among 128 countries, behind the economies of Panama, Colombia, Mongolia, South Africa and others. The Global Innovation Index assists in adapting policies for long-term development to increase productivity and generate employment. According to Ref. [4], the growth forecasts for 2016 were not optimistic as well as the economic recovery slowed down even in high-income countries like the United States, Japan and some European countries. At the same time, low- and middle-income countries face lower growth expectations than they were 2 years ago. Africa, Latin America and the Caribbean have reduced their growth rates to levels considered modest by the report, and for Brazil, this impact was mainly felt by the fall in commodity prices, which increases the economic fragility of the country. In this scenario, innovation is distant, since there is no wealth for investment in research and development [4]. The Central Bank of Brazil reports that, since 1980, the country has followed a sinusoidal trajectory with its economic growth (**Figure 1**), considering that the past 3 years are with negative results.

This reality has become a fact, since this country of Latin America has not evolved beyond its GDP, demonstrating that Brazilian organizations do not invest in innovation. It is important to note that Brazilian companies, research institutions and government are making an effort to keep on their agenda the generation of innovation. However, at a moment where Brazil has entered in a period of economic turbulence, it has become necessary for the country to overcome the short-term constraints and to stick to the commitments that generate results with innovation. An interaction and a stronger cooperation within Latin America could perhaps contribute to the recovery of the economy and consequently reach a higher level of innovations in the country [4]. An Innovation Survey (PINTEC) highlights that for the period of 2012–2014, Brazil had 132,529 innovation intense companies (industry and services). Those companies

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Figure 1. Brazil's economic growth (1980–2014). Source: [5].

seek competitiveness and an improvement in financial performance, suffering a constant pressure on normative issues and legal impositions [6]. Still facing economic, social, political and environmental problems, the Brazilian industry has been declining nowadays. According to data released by the Brazilian Institute of Geography and Statistics (IBGE) in February 2017, the Brazilian industrial production fell by 6.6% in 2016 compared to 2015. In this context, the effort of companies to invest and generate innovations stayed at a minimum level of investment, due to the lack of both sustainability and expansion in productive capacity.

So, in a Brazilian context, what would be the link between a centenary background of entrepreneurship activity and an almost inexistent rate of consistent innovation intensity?

The investigation of the dynamics between the entrepreneurial reality, sustainability and innovations in the leading organizations of Serra Gaúcha (RS), Brazil constitutes the main mandate of the Multidisciplinary Research Group in Innovation and Competitiveness [7], in partnership with the Nucleus of Innovation, Entrepreneurship and Sustainability [8]. Both Groups are associated to the MSc and Doctorate Programs in Administration of the University of Caxias do Sul (RS), Brazil, and focus on the development of new research paths based on integration and interdisciplinary. One of their objectives is to develop new evaluation tools on the potential of Brazilian companies to allow a better recognition of business realities in terms of entrepreneurial development, sustainability and innovation in organizations.

As introduced by Schumpeter in 1934, the concept of entrepreneurship is considered as the main generator of companies' competitiveness as well as a guarantor for their development [9]. It constitutes the elements for the local leading organizations to generate the development

of a region and to improve the quality of life of a community [10]. In that perspective, the Brazilian entrepreneurs know how to take advantage of the opportunities of the local business dynamic, by improving their organizational characteristics that allow their development and competitiveness. However, data on the issues of entrepreneurship and innovation development in Brazil are contradictory, and no scientific link has yet been scientifically established [1]. However, the importance of innovation for business growth and the economic development of the regions is already recognized in the literature and is of common interest to all actors in a society of organizations [11, 12]. Porter [13], in his book "The Competitive Advantage of Nations," examines why some nations achieve success in international competition and others fail. The author reports that business success is based on its economic environment, the relevance of its government policies and the presence and efficiency of its support institutions. In this context, innovations have assumed a fundamental role in all the advanced economies of the world and are considered as essential for the growth and the development of a nation. However, since it is not possible to directly insert the practice of innovation into entrepreneurship and, since the Brazilian entrepreneurs do undertake action and also create wealth despite of not innovating [1]; why cannot we directly link entrepreneurship to innovation in most of the Brazilian economy?

A prosperous path to economic growth starts by enhancing the existing entrepreneurial potential in a country through support mechanisms that allow the economic development of the organizations [13]. The search for innovation is to ensure, if not enlarge, a market share of a company and to trigger impacts beyond the simple economic sphere. In this sense, and according to Lundvall [14], the innovation is the key to development and constitutes the economic and social advance of a region or a nation. Thus, the literature demonstrates that innovation can strongly contribute to the socio-economic development of a region, but does not guarantee its specific sustainable development [1]. In a strategic perspective, it is necessary for an organization to generate innovations as a part of its growth strategy, since it represents a basic standard for sustainable and innovative behavior toward its own development [15]. Through such dilemma, how to link the entrepreneurial effort to success in innovation? In that context, the results generated by sustainability could lead to a new and different level of innovation that generates organizational competitiveness and stability. Consequently, both sustainability and innovation can become critical to ensuring the competitiveness of organizations in the global context [16].

Concerns about sustainability and innovation are shown to managers as a new business strategy, since it provides a competitive differential, attracting the most demanding and frequent segments of society [17]. In order to ensure a "posture for innovation," a society of organizations [18] seeks to implement mechanisms of sustainable management, involving the commitment of the actors themselves, aligned with a corporate strategy [19]. In such scenario, a logic emerges between entrepreneurship and the actions focused on change and innovation [16, 20]. Any innovative management strategies implemented in a leading organization envision a sustainable endogenous action. It then confirms their activities and actions toward a sustainable growth, which generates a variety of direct and indirect impacts within and outside the organization, and ranging from the consumers and employees to the regional community [21, 22].

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Nevertheless, such action is limited to the organization's own environment and does not grow in a socio-economic context. The Brazilian organizations innovate in isolation with no perspective of open diffusion [23, 24]. Who innovates does not divulge. Whoever undertakes imitates but does not innovate. Considering the socio-economic reality of Brazil and from the relevance of the issues related to entrepreneurship and organizational innovation in the country, the importance of sustainability for the organizations could become a solution for the integration of entrepreneurship with innovation. Such is our premise.

2. Theory

2.1. Entrepreneurship

There is an extensive theoretical basis produced on the economic approach to entrepreneurship, and the foundations are related to the various schools of economic thought, such as the works of Schumpeter, Kirzner and Knight. According to Schumpeter [9], the entrepreneur is the one who destroys the existing economic order by introducing new products and services, by creating new forms of organizations or by exploiting new resources and materials. According to the economist, the entrepreneur is considered as an engine of the economic system who perceives the essence of entrepreneurship in the use of new business opportunities and by associating this concept with innovation [25]. Such a view leads to a trend toward economic growth and a value system peculiar to it, by creating an environment for product consumption, profit, competitiveness and organizational development [26].

The work of the economists has demonstrated a tendency to concentrate on issues such as wealth, commerce and social welfare. However, some authors like McClelland [27], Stevenson and Gumpert [28] and Gartner [29] introduced new perspectives of study on entrepreneurship. McClelland [27] postulates that the psychological approach considers that the entrepreneur has specific characteristics and behavior. Stevenson and Gumpert [28] believe that entrepreneurship research should focus on what the entrepreneur does and not on what he is, since the entrepreneurial process can be considered as a set of behaviors that the entrepreneur develops. Gartner [29] postulates that an entrepreneurial organization may be driven by the perception of the opportunities and the oriented actions, where the actions of the entrepreneur must be the starting point for theorizing about entrepreneurship.

The social approach to entrepreneurship proposes different levels of analysis that are above the individual entrepreneur. It looks into the interpersonal network, the organizational structure, the population, as well as the institutional environment [30]. Thus, such approach aggregates the traditional focus given to financial and market conditions, by introducing the issue of socio-economic sustainability. Pirich et al. [31] postulate that to encounter innovation actions in conjunction with an entrepreneurship reality, three key elements must be met: (1) the economic antecedents and an incentive of open business behavior; (2) a sophistication and efficiency in spreading knowledge generation and (3) an adequate capacity of the organizations, their employees and the individuals in general. Therefore, since researches tend to explain and define the "entrepreneur" by using axioms from different disciplines [27], the field of entrepreneurship

can be studied through economic, psychological, social and organizational theories [29, 32, 33]. Consequently, the entrepreneurial perspectives of research include the study of the socio-economic forces that interfere in a regional economic development perspective, through certain axioms coming from the field of psychology, social sciences and organizational studies.

2.2. Sustainability

On one hand, a globalized and competitive market demands an increasingly strategic position, where companies are induced to establish defined strategies to maintain competitive advantage. On the other hand, consumers are pressing for quality, safety and different new products. In order to meet the pressures set by the consumers and the business world, companies are starting to pay attention to sustainability as a solution for growth. The role of the organizations in the development is an upward movement in an entire social system. It is characterized not only by endogenous economic and non-economic factors but also by induced and implemented exogenous elements, such as government policies and laws [34]. The idea of development is multidimensional and involves the economic, environmental, cultural, social and political dimensions [35, 36].

The concept of sustainability related to the use of available resources, whether natural, capital or human, has a process of historical construction that has resulted in indicators used by the various nations. In Brazil, "sustainable development" indicators are part of a series of international efforts to achieve the ideas and the principles formulated at the United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro in 1992 [37]. The publication of "Indicators of Sustainable Development – Brazil 2015," from IBGE, brings data on the Brazilian reality through environmental, social, economic and institutional perspectives [37]. In this context, the economic effects are relatively easy to predict due to the important amount of developed instruments, but the social and environmental effects are more difficult to assess in advance because they involve many more variables, uncertainties and interactions. According to Schot and Geels [38], sustainable development requires the combination of technical and social changes, since they are deeply related. Therefore, the authors raise the necessity to transform the conventional understanding on sustainability, by incorporating new axioms of study that may facilitate the understanding on sustainability and its implications [39].

2.3. Economic dimension

More recently, the concept of economic sustainability has appeared in the development of growth models. Until the 1970s, economic analyses only included the axioms of monetary flow and economic growth and relegating the limits of the natural environment to the background [40]. In 1971, Georgescu-Roegen [41] presented the idea that the economy must consider the law of entropy in the process of growth, given the fact that the expansion of the countries occurs by increasing the use of energy. Martine [42] analyzes the effects of energy consumption per capita, per country and relates it to the growth in population. The study concludes that the production and the consumption patterns of industrial economies continue to have a greater participation in their quality of life compared to the demographic growth of the developing countries. According to [43], one of the greatest challenges the world will face in this new

millennium will be to make the organizations protective and improve the quality of the environment. The author postulates on the necessity to establish performance standards based on a judicious use of economic instruments and harmonious framework regulatory policies, since the organizations that will take the lead on the environmental issue will have to cover high risks to get significant competitive advantages in the market.

Today, the Brazilian economy experiences an internal crisis of frightening socio-economic size. The International Monetary Fund has presented negative economic data for the last 18 months and foresees a downturn for the entire South American continent. IMF [44] reported that "[… as the global recovery continues to struggle to gain its footing, growth in Latin America and the Caribbean has been marked down further and is likely to contract for the second consecutive year in 2016]." A further deterioration of the situation in Brazil could lead to a reduction in the demand for exports between trading partners in the region and an increase in the perception of risk, which could create more difficulties for the leading companies and become more vulnerable in an already fragile global market [44]. According to data from such survey, Brazil has shown the third worst growth performance projection in Latin America for 2015, 2016 and 2017, after Ecuador and Venezuela. Nevertheless, the situation is expected to improve in 2017, considering the proposed changes and measures by the Brazilian Government to boost fiscal sustainability, as well as the measures taken to liberalize and open the economy in order to significantly enhance the country's competitiveness. IMF [44] also mentioned that growth in Latin America and the Caribbean is expected to remain below historical trends for a near future. In that context, it becomes relevant to rethink the dimensions of study about the companies, their economic performance and their real capacity to innovate.

2.4. Environmental dimension

In the literature, the debates about the environmental dimension of sustainability mainly consider the aspects that touch on the renewable natural resources, the impacts caused in the environment and the environmental actions used by the organizations [6, 45, 46]. For many years, the environmental issue has been understood as something that was not part of the organizational context. Companies were seen as economic institutions that were concerned with resolving economic problems (what they produce, how to produce and to whom to produce for). The environmental problems were perceived as outside threats to corporate profitability and established business practices. By the mid-1990s, a new phase of integration of environmental issues began to be implemented in the organizations. It proposes (1) the progressive introduction of a sustainability perspective; (2) the proliferation of collective engagements; (3) a greater interaction between the public and private spheres and (4) a greater involvement of the organized civil society. This scenario postulates that companies begin to focus their activities and actions toward sustainable development. The premise is that everything that is done inside an organization generates a variety of direct and indirect impacts inside and outside of its core competence, affecting consumers, community collaborators and the environment [22].

Given the evolution of society toward an environmental conscience, the organizations started to adopt a different posture than the original one aimed at achieving a maximum profit [43].

Thus, since it was essential for the organizations to not only maintain the role of producers of goods and services but also to become responsible for the environment in which they are inserted [47], new managerial tools and the adaptation of the existing management systems were developed to give a more effective approach to the problem. From that moment, the environmental issue became strategic within the organizations [48]. According to Fisher [47], the concept of environmental responsibility as an organizational strategic vector has recently gained ground. The author postulates that the companies start to realize that the respect for the environment and the valorization of man are among the main factors that directly reflect their success as a way to gain competitive advantage in the market. The environmental dimension emerges as a viable alternative, allowing economistic objectives to be maintained and incorporating environmental issues into the economic model of development [48]. Accordingly, the environmental dimension can become a new business strategy, as it provides a competitive edge and attracts the most demanding and environmentally conscious segments of society.

2.5. Social dimension

The social sustainability dimension, historically referred to as "social responsibility," emerged as a way for the wealthiest to help the most in need [49]. The idea to let the organizations reroute some profit to "invest" in social development projects began to win support after World War II. It represented a new and stronger concept of the society of the organizations and it was socially making sense [18]. According to Melo Neto and Froes [50], social responsibility is a collective action aimed at fostering civility. The author postulates that social responsibility focuses on the "civic duty" of the organizations, which requires management, periodicity and systematization [47]. Considered as the "Father of Social Responsibility," Bowen [51], in his book "Social Responsibilities of the Businessman," initiated the modern era of the literature on social responsibility [52, 53].

A global movement of non-governmental organizations (NGOs) in search of values such as ethics, solidarity and trust has generated interest among various actors like the civil society, governments, investors, financiers, insurance companies, consumers and the media [54]. The diffusion of the concept of social responsibility in the organizations has occurred with greater scope with the creation of entities that disseminate and support companies in their actions of social responsibility. Generating profits for shareholders is no longer the sole concern of companies. Environmental, social, legal and ethical concerns have penetrated the strategic core of the companies, which have undergone a transition period in their way to re-think their strategies and their mission [55]. Any socially responsible company implements ethical practices with its established relationships, including the shareholders, clients, employees, suppliers or with the whole community. According to [56, p. 118], "[…a socially responsible company is the one that can generate profit as well as be beneficial for society.]."

Social responsibility actions enable the organizations to stand out from their environment. In addition, customers, suppliers, shareholders and stakeholders of the organization perceive those actions as a competitive edge, which makes them stand out from other competitors [57]. When a company is socially responsible, it attracts consumers and increases sales potential, generating greater profits for shareholders. Socio-economic sustainability is becoming a factor

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of differentiation in organizational management, being characterized as a business opportunity [48]. According to [58], being socially responsible is one of the cornerstones of business sustainability and must be considered as important as the concepts of quality, technology and the capacity for innovation.

2.6. Innovation

The movement for sustainable development seems to be one of the most important social movements of this century. There are many voluntary initiatives related to sustainable development subscribed by the organizations. By committing themselves to sustainable development, entrepreneurs must necessarily change their way of acting in order to achieve economic sustainability and social sustainability, in a neoclassical perspective, in order to reduce their negative social impacts arising from a purely economic perspective. This requires a new way of looking at innovation, which leads to the idea of "innovation intensity" because of the implementation and the presence of sustainability [39].

Schumpeter [9] emphasizes the importance of innovations for the development of the economy of a country. The author postulates that the innovations introduced by innovative entrepreneurs constitute the main stimulus for the generation of a new economic cycle. Consequently, the innovation process is aimed at discovering, experimenting, developing, adopting new products, new production processes and new organizational forms [59, 60]. According to Drucker [2], innovation is the specific instrument of the entrepreneurial spirit. Dosi [60] postulates that the innovation is the search, the discovery, the experimentation and the adoption of new products, new processes and new organizational forms. Therefore, companies that want to increase their competitiveness feel the need to invest in practices aimed at the systematic development of new technologies, by seeking new ways to develop their activities, through the creation of new products, services or processes [61, 62].

In principle, innovation can be characterized as a type of change that introduces new organizational practices and they can be classified into four categories. The first one refers to products or services innovation, which represents the changes of a product or a service offered by an organization. The second one refers to process innovation, which represents the changes in the way products or services are created and distributed in an organization. The concept of management of innovation refers to the adaptations in the underlying mental models that shape the core competence of an organization. Finally, the concept of marketing innovation (competitive position) represents the changes in the context that the products or services are introduced in the market [12, 63]. Oslo Manual [64] introduces four main categories in its model: product, process, marketing and organization. According to Gallouj [65], the classification of Oslo Manual [64] brings the analysis of the restrictive definitions to the industrial sector, in addition to focus on technology innovations. However, considering the sectoral scope proposed and interpreted by Oslo Manual [64], innovations can occur in any sector of the economy. The adoption of an innovation respects a process where the deciders act to use innovation as the best available option. Rogers [23] points out the internal environment of the organization as one of the determinants that can contribute to the success or the failure of adopting a technology innovation. However, recent researches have linked social matters

with the concept of innovation; denominated as social innovation. It poses its focus on the structures, the objects and their effects, the initiative capacity of the individuals, the organizations, the communities and their social movements. Those researches allow a new discussion about the process of innovation transfer and its role on the public policy institutions [57].

A sustainable, innovative organization "is not one that introduces novelty of any kind, but novelties that addresses the multiple dimensions of sustainability on a systematic basis and that reaches out positive results for society and the environment" [66, p. 105]. The current sustainability phenomenon generates an increasing capacity to differentiate products and services [24] and to aggregate the contexts of work and life environment [57]. Such differentiation search passes through the process of innovation [2, 57, 60, 67, 68]. Consequently, it only makes sense to postulate that entrepreneurs will begin to incorporate issue on sustainability for strategy arguments because of societal pressure as an alternative to develop growth through innovation. Based on this, it seems obvious to foresee a new perspective of research that integrates the theories of entrepreneurship, sustainability and innovation.

3. Method

The objective of this research is to highlight the relevance of sustainability for organizations as a way to trigger the integration of entrepreneurship toward innovation in the Brazilian context. Various exploratory and descriptive researches on the dynamics of entrepreneurship, innovation and sustainability in the main organizations of the Serra Gaúcha (RS), Brazil was carried out through the Multidisciplinary Research Group on Innovation and Competitiveness [7], in partnership with a research Nucleus on Innovation, Entrepreneurship and Sustainability [8]. Evidenced among the following concepts: entrepreneurship, sustainability and innovation, the approach of this research was qualitative and the method used was documentary research because it articulated subjects where the theoretical dimensions and bases are unknown [69]. That is, highlighted the relevance of sustainability for organizations as a way to make a solution of integration to entrepreneurship for innovation in the Brazilian context exemplifying one or more trends in the behavior of a given phenomenon.

In the first 12 years of activities of the research Group, 40 Master's and Doctoral dissertations were finalized, which offered a more concise and comprehensive look at the concepts of entrepreneurship, sustainability and innovation. The Group developed national and international academic and research activities, which have contributed to a clearer understanding of those themes. The object of the studies mainly focuses on leading sectors of the Brazilian economy, through the study of organizations situated in the southern region of Brazil. The researches refer to 11 sectors of the Brazilian economy (**Figure 2**).

The studies include the sectors of health, the metal-mechanic industry, technology, education, services, the furniture industry, the textile industry, the food and beverage industry (wine), the transportation and the energy industries and the MSE sectors. Most of the researches had a qualitative-exploratory character, with some key quantitative-descriptive ones. It generated

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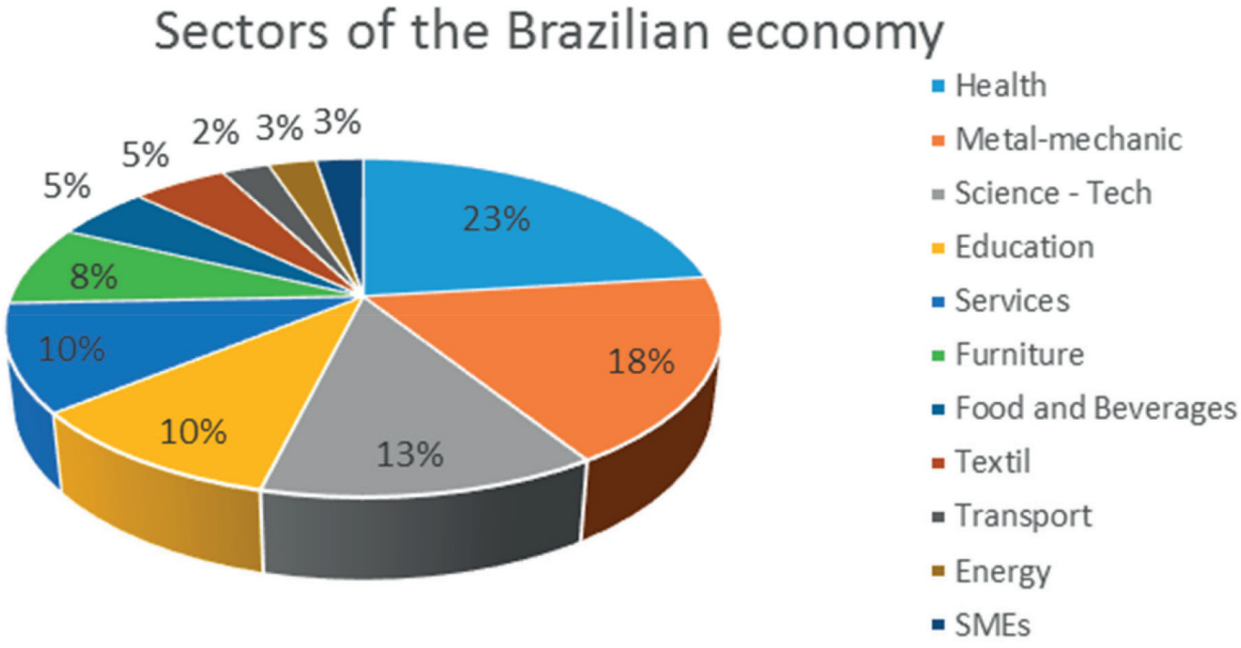


Figure 2. Distribution of the GMIC/NIES researches in the Brazilian economy. Source: The authors.

the production of numerous articles in indexed journals and conferences and books chapters from international publishers. In general, the recurrent research objectives focus on identifying, describing and analyzing the dimensions of the entrepreneurial reality and the characteristics of innovation and sustainability adopted by the leading organizations of the Serra Gaúcha, Brazil.

The Group's research activities were developed in three specific moments. The first period refers to the research activities related to the themes of entrepreneurship and innovation. The axiom of entrepreneurship was studied, based on Schumpeter's [9] concept of innovation and through three aspects: the profile, processes and systems, seen as reactive or proactive entrepreneurial realities. The second period, from 2010, coincides with the integration of the PhD course with the MSc program, where research on innovation has taken a different strand. In addition to studying innovation as a proactive entrepreneurial dimension, the Group has been researching innovation through its process, by integrating the causes and stages, indicators and process models, and finally the study of innovation as a system. During the third period, a concentration of internal innovations in the organizations, in a restricted scale, emerges from the research results in several areas of economic activity, but without demonstrating a sustainable effect. This lack of sustained diffusion of innovations, coupled with a high degree of entrepreneurial activity, has led to question the very essence of the concepts of entrepreneurship and sustainability as structuring elements for the generation of innovation. Porter [13] reports that business success is based on its economic environment, where innovation has assumed a fundamental role in all the economies of the world and is considered essential for the growth and development of companies and nations. Nevertheless, the author is lacking in explaining how to establish the link between entrepreneurship and innovation.

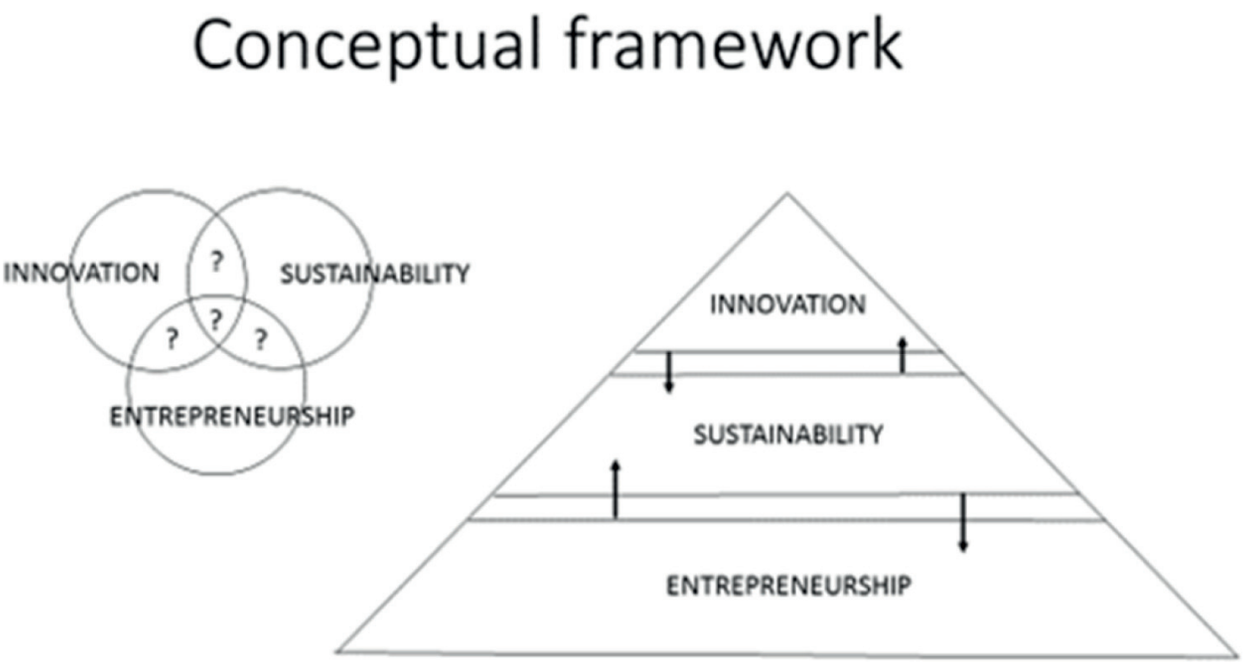


Figure 3. Representation of the axioms of entrepreneurship, sustainability and innovation. Source: The authors.

The conceptual framework brings an integration of the axioms of entrepreneurship, sustainability and innovation and is supported by its economic, environmental and social relevance. The concept figure must dimension the cause-effect connections that may exist from one dimension to the other [70]. **Figure 3** introduces the integrated context of the researches carried out.

The classification of the entrepreneurial axioms is contextualized in four dimensions: (1) economic [9, 61, 71], (2) social [72, 73], (3) organizational [2, 73] and (4) psychological [2, 27]. In order to study the question of sustainability, the (1) economic [74, 75], (2) environmental [13, 48] and (3) social [43, 54] dimensions were addressed. Finally, the study about innovations in the leading organizations of Serra Gaúcha uses the categories listed according to Oslo Manual [64]: (1) products (services) innovation; (2) process innovation; (3) organizational management innovation and (4) marketing innovation, considering that those categories have a greater proximity to the research objectives.

It is important to note that for the organizations, both sustainability and innovation can become critical to ensuring competitiveness in a global context. Not only to innovate constantly but also to innovate considering the social and economic dimensions of sustainability [37, 39]. The application to those dimensions makes the innovation process more sophisticated and demanding, which requires any organization to make a greater effort to meet such requirement. This leads to new perspectives in management of innovation.

4. Results

The identification, the description and the analysis of the dimensions of the entrepreneurial reality, the characteristics of innovation and sustainability adopted by the leading organizations of the Serra Gaúcha present an eclectic panorama in terms of results.

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In the health sector, studies demonstrate a structural shift from a technology-based economy to an "entrepreneurial health service" society. The results consider knowledge as a central resource, which is reflected by changes in the innovation process. Therefore, the innovation process is seen as a learning method to generate or to acquire new knowledge from the analysis of the local environment, where knowledge, skills and attitudes constitute the key elements in the identification and the execution of social and communicational actions. In a hospital context, the preponderant element for linking the dynamics of the innovations resides in the management of the environmental residues that constitute a stimulus to the improvement of the quality attributes of the health services. The surveys clearly show the presence of entrepreneurial activities, the employees' concerns and their relevant actions toward the application of sustainability standards and the application of strategies and the creation and implementation of innovations to improve the quality of services to the population [76].

Researches in the metal-mechanical sector have demonstrated a relationship between the concepts of entrepreneurship, innovation and sustainability, both in historical and cultural contexts. The results show that the actions of the entrepreneurs are a demonstration of the strength of the attributes of the individuals, through the enhancement of opportunities and the use of the conditions that promote the economic development of the region, making it become one of the most dynamic sectors of the Brazilian economy [33]. In the region of Caxias do Sul, all entrepreneurs act either in micro, small, medium or large companies. The region represents the second metal-mechanical pole of Brazil, precisely because of this entrepreneurial force in the Serra Gaúcha region. The results identified the implantation of product and process innovations, which were all of incremental type and internal to each company. Large companies have sophisticated organizational innovation schemes, but they do not even represent 1% of the organizational population. The research corroborated with such position, considering that innovation is a new product or service, a new structure or administrative system, a new technological production process, a new plan or a program related to the members of the organization [77]. The research also pointed out the presence of environmental sustainability schemes, but exclusively within the large companies of the region. In addition, by having the duty to comply with the Brazilian environmental and capitalization laws, larger companies have developed strategies with a sustainability scheme to maintain a continuous flow of innovation, from the generation of ideas to internal applied research schemes [6, 21].

In technology development environments, the main results reveal a series of elements that preceded and influenced the constitution of the innovation environments and gave rise to different models, with their own characteristics. One main aspect that arises from the results is the entrepreneurial nature of the people who study, research and create new companies within the reality of a technology environment [78]. In addition, the researchers identified and analyzed the roles played by the university, the government and the business sector, as proposed in Etzkowitz's [79] model. In that context, it was possible to evidence a new determinant in the constitution of the Brazilian science parks and technology incubators: leadership. It is considered as a new dimension of analysis to the triple helix model. Such concept emerges from empirical, spontaneous and endogenous movements of development and resides in any university management teams that generate a favorable environment for the promotion of entrepreneurship and innovation capable of creating and developing the necessary conditions for the implementation and the consolidation of scientific and technology environments [80].

The question of sustainability was identified as being present in the incubation and technology development environments in an incremental and discontinued way.

In the higher education sector, the researchers did not show an entrepreneurial specificity due to the nature of the economic branch and the rules and conditions that govern higher education institutions in Brazil [81, 82]. In terms of innovation, the dimension of innovation processes was evidenced through results that show antecedents for organizational learning, which impact as the outputs on the performance of the courses in the national education evaluation system [83, 84]. The most relevant aspects of the research show parity between the teaching practices and the practices of single and double learning cycles; through the informal relationships between the teachers and the outcomes of the course assessments and on the links between the companies, the non-academic professionals and student performance. Such reality is re-enforced through a pedagogical model that enhances such convergence [85]. From a sustainability perspective, the surveys did not present relevant data to identify a differentiated model.

In the service sector, the entrepreneurial issue occupied and demonstrated positive results with the proposed theories. Such convergence allowed verifying the presence of characteristics on the profile of the entrepreneurs, such as resilience [86]. The concept of innovation was identified in the study as a perspective for economic growth. The axiom of leadership appeared as a key element, considering the difficulties, the weaknesses and the socio-economic scarcities that Brazil encounters. The results showed the absence of a system of innovation in the creative industry in State of Rio Grande do Sul [87], which supports the idea that the entrepreneurial axiom is omnipresent in the Brazilian economic reality, but the concepts of innovation and sustainability for the services sector are almost inexistent. The research carried out in the Province of Quebec, Canada, in collaboration with the Ministry of Science, Innovation and Technology Development of the State of Rio Grande do Sul, shows a complete system of innovation and sustainability. The study allowed the Brazilian Ministry to confirm the absence of a system of innovation [10] and the necessity to have a structural perspective at the situation. The Canadian research has shown that the issue of sustainability is a key element in creating innovation environments and processes in a given region, through partnerships and by linking business creativity to the production of scientific knowledge and the economic development of the State [88].

In the furniture sector, research has demonstrated an entrepreneurial reality with industrial leaders and regionalism with this phenomenon. In terms of innovation, the results point out links between the use of specific resources (information system, people, knowledge management, alliance) and product innovation. It demonstrates that product innovation is the result of the use of specific resources, which constitutes the antecedents for innovation. The enterprises in the furniture industry have a joint research entity that look for information regarding the use of strategic resources, which extends their "innovative capabilities." Nevertheless, the business community has not yet consolidated integrated sustainability schemes for the advancement and the development of innovations [89]. Only the greater companies pretended to realize innovations, but only in an exclusive internal way. Such pattern shows that the companies do not use schemes capable of producing innovations that impact on global performance.

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In the food and beverages industry, more specifically in the Brazilian wine industry, researchers have shown the formulation of strategies from both entrepreneurial and innovative perspectives, involving processes and ecosystems. The wine production in the southern region of Brazil presents a high level of associative and family entrepreneurship, with a large number of wineries that were established and are operated as a family business or as the result of regional association schemes [90]. In such entrepreneurial ecosystem, the wineries create connections through their association and develop entrepreneurial and innovative strategies with the actors involved and with different intensities of the local society. The associations serve as bridges between wineries, institutes, class entities and with local governments [91]. The study allowed observing that the oldest wineries are developing a structuring entrepreneurial process, aiming at the certification for "Appellation d'origine contrôlée," in search of a quality brand based on the certification of Geographical Origin Indication. Such initiative corroborates with Schumpeter's [9] vision, where the entrepreneur innovates to differentiate itself and conquer new markets. The study of the ecosystems allowed the identification of the actors that compose and interact in the associations, by using the association as a link between the wineries and all the government actors. Through the association schemes, the wineries strengthen their positioning and competitiveness in terms of sustainability. Being small and limited, the group manages to innovate because it has achieved a certain degree of internal sustainability.

In the textile sector, research results show that the entire industrial activity is the result of entrepreneurial action. In this context, researchers establish that innovations include incremental changes in procedures, techniques, materials and dissemination, according to Oslo Manual [64]. It can be considered that the rectilinear knitting sector presents innovations that allow characterizing an environment of change, which aims at the improvement and the qualification of the products and services offered to the customers. The study of the process innovations shows significant changes in machinery, production layout, software that aid in production control, production scheduling and techniques were highlighted [92, 93]. Innovations in marketing showed that more and more companies are willing to disclose their products through direct dissemination to customers. The organizational innovations that happen are incremental and internal to an organization, confirming that this sector of the economy do not present perspectives of sustainability.

Research in the transportation sector refer to the port and logistics matters, which are recognized as global entrepreneurial activities, coped with the presence of process innovations [94, 95]. Considering the frequency of innovations occurring in the sector, the requirement of the Agência Nacional de Transportes Aquaviários do Brasil—ANTAQ, which regulates the implementation of the country's environmental agenda, generated a high number of innovations, mainly related to process innovations. This position confirms the presence of sustainability caused by the application of the National laws and regulations.

Research in the energy field presents opposing scenarios in terms of entrepreneurship and innovation. The omnipresence of laws and regulations does not allow room for creativity and change. The concern and position from the energy managers are to achieve a high degree of accuracy in their decision process. The research shows a greater determinant for the use of

forecasting model in their decision process, which contributes to companies that improve a forecasting strategy as a process innovation and consider the possibility of reaching forecast results that are closer to reality, to create an edge in such competitive market [96]. The behavior and trends that arise in the complex equation of the decision process and by predictive models presuppose a permanent search for sustainability to offer a permanent quality service to the community.

The MSE sector represents 93% of the private organizations in Brazil [97], being a crucial subject for studies. The Schumpeterian view argues that entrepreneurial action is the driving force behind the activities of all those companies and is the basis of the country's economy. In such context, research shows that most of the companies surveyed use performance indicators to monitor business management. The companies that had the highest sales increase are those that, in addition to the indicators have a clear definition of the business, have established goals and have information about the industry and the competition [98]. In terms of innovation and sustainability, research has shown the absence of both dimensions. Innovation is restricted to larger companies and is limited to an internal environment. The absence of sustainability demonstrates that there is a relationship between the two concepts.

5. Dilemmas

The researches on various sectors of the Brazilian Serra Gaúcha economy allow to point out the existence of a relationship between the concepts of entrepreneurship, innovation and sustainability through individual, social, cultural process and system perspectives. By using historical and cultural panoramas, it was possible to observe the manifestations of the entrepreneurs of the region of Serra Gaúcha and to assert that the attributes and the actions of those entrepreneurs constitute a demonstration of the strength for the potential of the opportunities and the use of the conditions that promoted the economic development of region. The presence of "entrepreneurship intensity" in this specific region and the concern for sustainability lead to a more "coherent" understanding of the innovation process, which is in fact still very poorly achieved in Brazil and little understood by the country's institutional leaders. The key elements of the researches also converged on the issues of the entrepreneurs' actions, considering that innovation represents the success of a business community that leads in terms of entrepreneurship and sustainability. In Brazil, innovation could generate new and differentiated organisations that could have a positive socio-economic impact in a fragmented and closed business society. Such results demonstrate the limitation of Chesbrough's [24] model to explain open innovation in the Brazilian reality. The identification, the description and the analysis of the conceptual trilogy are exposed through the region's own history, and the main results reveal a series of elements, events that preceded and influenced the constitution of the industrialization of the Serra Gaúcha region and gave rise to different models with their own specific particularities.

The positioning and the distribution of the results on entrepreneurship (**Figure 4** – on a scale 1–3–5) based on a "Etzkowitzian" perspective show peculiar private-public realities by sector of the Brazilian economy in relation to entrepreneurship intensity.

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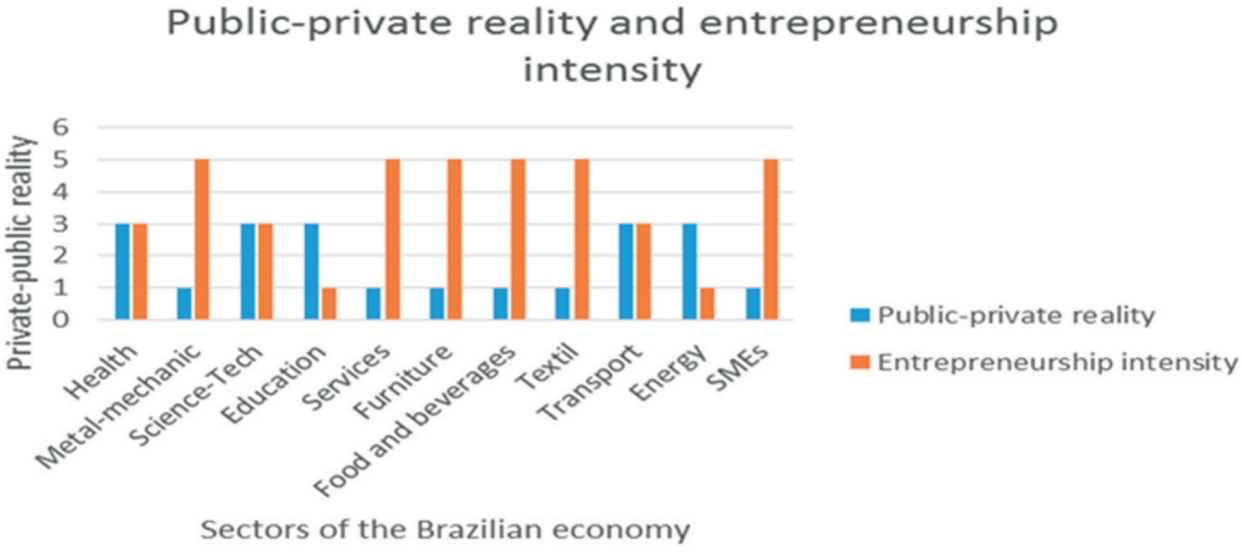


Figure 4. Public-private realities [79] and entrepreneurship intensities. Source: The authors.

Figure 4 presents two theoretically already known phenomena, but little considered in the Brazilian scientific community. First, the connection between the private-public nature of the organizations and the entrepreneurial intensity phenomenon. Second, the connection between the social nature of the organizations and the level of entrepreneurial intensity. The research confirms the link between entrepreneurial intensity and the private sector organizational nature, but does not exclude specific sectors of development, such as the health and transportation sectors. History may sustain the reasons why both these sectors show entrepreneurial intensity, whereas the education and energy sectors present other results. These issues are related to the Brazilian public sphere, where the management processes are highly bureaucratic and the methods of supervision do not encourage entrepreneurship intensity. Thus, their cases can be explained, not by the country's legislation but by the control on the governance and processes in the organizations of each sector, which reinforce the idea of including a fourth Helix to aggregate Dorion et al.'s [78] model.

To understand the matter of the organizations and sustainability, the practices of entrepreneurship adopted were pointed out in a historical perspective. According to the authors, many entrepreneurs from the industry have developed an entrepreneurial behavior because they were attentive to perceive the opportunities of the market. However, they did not know how to cooperate with each other, by sharing risks and learning from their mistakes. The results show their capacity to enhance skilful and firm behavior regarding issues involving their relationship with public power. This dimension raises the question of sustainability, considering that the actors did not go beyond business issues and became agents of economic development by their individual and collective actions that led to the development of the region in a peculiar way. The Brazilian Serra Gaúcha region managed to excel due to endogenous entrepreneurial intensity issues, nor for sustainability.

Figure 5 proposes a rationale between the issue of territorial coverage and sustainability intensity, on a scale 1–3–5. Researches in the health and energy sectors show the presence of

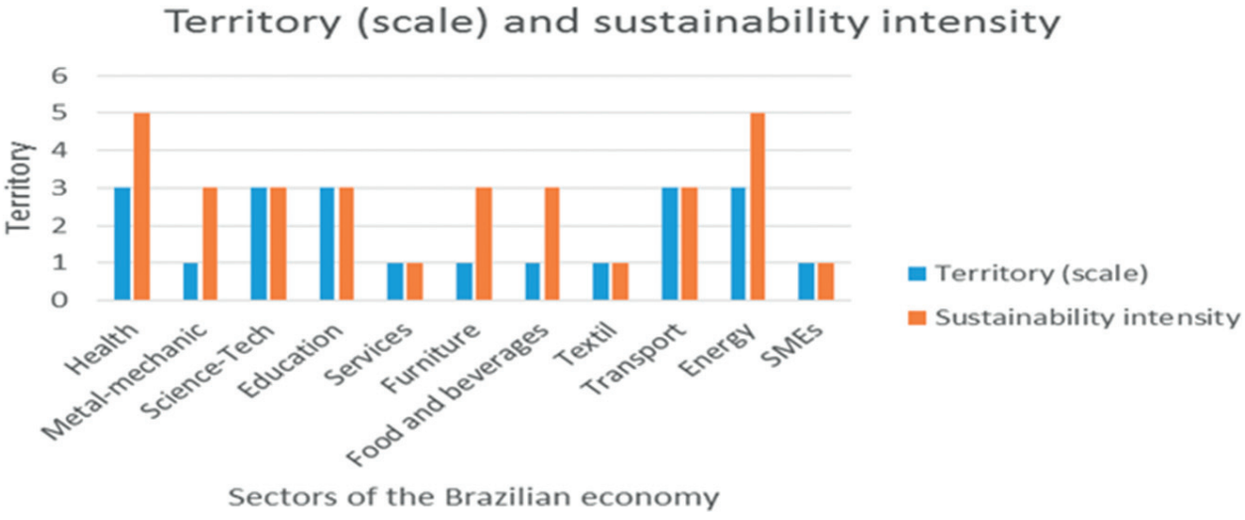


Figure 5. Territory (scale) and sustainability intensity. Source: The authors.

intra-organizational sustainability schemes at the regional level. The metal-mechanic industry, the technology development environments, the sectors of education, services, furniture, food and beverages, textile and transport point out the question of sustainability as an internal strategic element of the organizations. Researches in the metal-mechanic sector have demonstrated that cleaner production methods and environmental management practices are tools that aim at the efficiency of the production process, the use of its inputs and the generation of industrial waste. The furniture and textile sectors point out isolated process and product innovation actions and economic and environmental sustainability cases. Since entrepreneurship constitutes the engine of the sector, the creative industry sector did not show the presence of sustainability, but only some innovation actions in isolated initiatives.

There is consensus in the researches about the fact that entrepreneurship appears in all sectors of the studied activities, but with different intensities. Sustainability does contribute to the business innovations, but still it is not possible to explain to what extent and in what specific way. Each sector has its own rationale profile on entrepreneurship, sustainability and innovation. A trend radar shows opposite and convergent results among the sectors of the Brazilian economy.

The rationale between the concepts of entrepreneurship, sustainability and innovation, as presented in **Figure 6**, brings some reflections that can more clearly contextualize and explain those issues in Brazil. The sectors that most presented evidence of innovations refer to health, technology development and transportation environments, which all belong to the public sphere. Then, a higher degree of innovation intensity demonstrates a drive for economic, environmental and social improvements and growth. Based on a sustainable process of combining and recombining the capacities and preferences of the different agents integrated into a regional organizational reality; it is possible to design regional structural schemes on innovation that would give the necessary sustainability edge to make them survive through time. Such mobilization would allow a continuous development effort that produce regeneration

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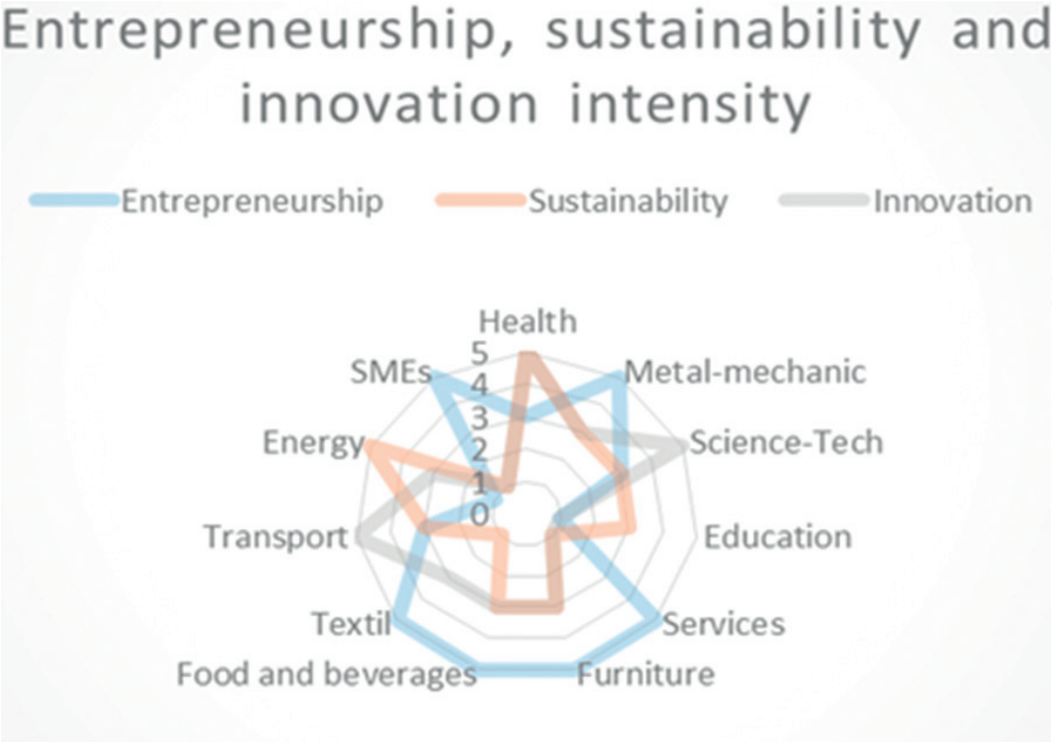


Figure 6. Entrepreneurship, sustainability and innovation intensities. Source: The authors.

patterns, necessary for regional long-term development schemes. Therefore, innovation becomes a learning process that generates or acquires new knowledge from the analysis of a specific sustainable environment.

The sectors of such Brazilian regional economy that presented less "innovation intensity" are characterized by internal organizational activities of innovation, preventing them to become "regional systems of innovation," which presupposes the lack of sustainability. Those limitations can be characterized as "innovation ghettos" in order to establish the intensity necessary to generate innovation activities within a specific territory. Ghettos, as explained by its etymology, refer to the conditions of survival of a population, in a limited and a highly concentrated scale. In that logic, the researchers have also demonstrated the presence of "ghettos of sustainability, ghettos of innovation, and therefore, ghettos of sustainability and innovation" in the sectors of this Brazilian regional economy, but in differentiated and restricted perspectives.

Finally and in a managerial perspective, considering the trilogy of entrepreneurship, sustainability and innovation, the organizations may seek a sustainable competitive advantage to generate monopoly through a regional logic. In turbulent organizational environments such as Brazil, a regional perspective may present some structural advantages for business activity. Nevertheless, only the generation of entrepreneurial initiatives with the aim for innovation through sustainability will favor regional development. In that regard, to better understand the logic of regional development and its organizational reality, more researches need to be accomplished.

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