

FRAMEWORK CONCEPTUAL OF TERRITORIAL ABSORPTIVE CAPACITY AND SUSTAINABLE DEVELOPMENT

1 INTRODUCTION

The phenomenon of globalization in conjunction with the digital revolution has generated significant changes in society and organizations, where knowledge has become one of the most important elements of production (Schillaci et al., 2013). In this context, a territorial economy based on knowledge is one whose development is essentially based on “the capacities to create and use knowledge” (Viginier, 2002, p. 5). The news knowledge's serves to change products and processes, in addition to sustaining the distinctive character of territories, transforming information into different types of sustainable innovations.

New knowledge can take different forms through innovations. These innovations can corroborate the development process of companies, industries, educational institutions, public authorities, society, etc., and, in the long term, can bring competitive and differentiating advantage to the territory (Carlos, 2011). In this way, the specificities developed through the absorption of knowledge by the territories can result, for example, in new patterns of communication, teaching, research, knowledge sharing, innovation and strategies that end up enabling sustainable development (Caragliu & Nijkamp, 2012; Gallas et al., 2018).

Given the strong competitive dynamics imposed by globalization, it is important to analyze and enhance the sustainable competitive advantages of the territories. Bearing in mind that, in this macroeconomic context, several companies, higher education and research institutions and the government are related and interrelated in processes to create innovations and wealth in economies to leverage sustainable development. The absorptive capacity of the territory becomes an important dimension to analyze sustainable development, through its ability to acquire and explore external knowledge (Schillaci et al., 2013).

Absorption capacity was first defined by Cohen and Levinthal (1989, p. 569) as the ability of an organization to “identify, assimilate and explore knowledge of the external environment”. In summary, absorption capacity characterizes an organization's ability to recognize the value of new external knowledge, assimilate it and apply it for commercial purposes.

Although the greatest empirical evidence is related to the business level, the understanding of absorption capacity was also evidenced in more aggregate contexts, such as at the levels of regions and clusters (Mukherji & Silberman, 2013). It is highlighted that the literature on the absorption capacity at territorial level is still very recent and sparse. Abreu (2017) recommends that several studies used insights from the business-level literature to estimate the regional functions of knowledge production that incorporate determinants of organizational absorptive capacity at the territorial level.

In view of the above, we will seek to explore and deepen studies on territorial absorptive capacity in sustainable development. This study will seek to answer the following question: How to analyze the influence of territorial absorptive capacity and its antecedents on sustainable development? The objective of the study is to develop a conceptual framework and testable conceptual hypotheses for analyzing the influence of territorial absorptive capacity and its antecedents on sustainable development.

The theoretical basis of the study is presented below, which presents the contextualization of the relationship between the themes of territorial absorptive capacity and sustainable development. Following, the adopted method is presented. Following is an analysis of the results and the proposed conceptual framework. Finally, results and research contributions are highlighted.

2 TERRITORIAL ABSORPTIVE CAPACITY AND SUSTAINABLE DEVELOPMENT

Although the issue of absorptive capacity at the business level has been a subject that has been extensively explored in recent years (Zahra & George, 2002), the regional or territorial level has not yet been clarified theoretically and empirically. The concept of absorption capacity in clusters is explored for the first time by Giuliani (2005), who defined it as the ability to absorb, disseminate and creatively explore extra-cluster knowledge. Caragliu and Nijkamp (2012), further introduced the theory of regional innovation studies and defined the capacity for regional absorption as the ability to understand, decode and efficiently explore new knowledge and explained that the weak capacity for regional absorption aggravates knowledge leaks towards neighboring areas. The study by Miguélez and Moreno (2015) analyzed how absorption capacity moderates the role of external knowledge flows in regional innovation.

Contrary to what recent studies on this topic highlight, the capacity for territorial absorption is more than just the sum of the capacities of individual absorption companies located in a given territory, but also the interactions and interrelationships between them and several other institutions and public bodies (Abreu, 2017). Studies on territorial development can also benefit from this scenario of interactions and interrelationships of knowledge, with strategies and innovations that address the three dimensions of sustainability: environmental, economic and social (Elkington, 2012).

However, if stimulating territorial development is already considered a challenge, inserting the sustainability variable in this discussion makes this challenge even more complex. There is a need for a new way of thinking about the dynamics of sustainable development through the ability to absorb and explore external knowledge. The innovation (whether technical, social or institutional) generated through the exploration of new knowledge is the one that, possibly, can positively influence sustainable development.

The theoretical relevance of approaching the constructs of Territorial Absorptive Capacity and Sustainable Development is also highlighted. Considering that, even though it is not recent, the concept of territory, previously closely linked to the sense of physical demarcation of a given space, today assumes a multidimensional meaning (Gallas et al., 2018). In this context, the search for sustainable development is increasingly pressing, due to the environmental, social and economic challenges that pervade the territories. It is relevant to analyze and understand the integration, appropriation of intangible aspects and the interaction of local actors with public policies implemented by the State and with private organizations in favor of sustainable development.

In addition, Abreu (2017) clarifies that even realizing the importance of pre-existing conditions to facilitate the process of sustainable development, few studies focused on the topic of territorial absorptive capacity have focused on understanding and analyzing the antecedent factors in this process. In this way, this study is relevant when analyzing the theoretical-empirical gap on the understanding of pre-existing conditions for the development of territorial absorptive capacity, that is, the antecedent elements of the knowledge absorption process in the territory.

The concept of absorption capacity, already successfully applied in companies, can also be expanded and used for the territories. More specifically, the territorial absorption capacity has relevance in the search to understand how some territories develop sustainably through the anchoring, diffusion and exploitation of new capacities, knowledge and innovations generated through the interaction and interrelation of private, institutional and public actors. of a territory.

3 METHOD

The study is classified as qualitative and exploratory (Gil, 2007). The data collection technique was used through literature review. In order to carry out the study, it was decided to adopt the Web of Science database as it is one of the most complete databases, which includes a set of data from other journals, in addition to reliability, since the database covers more than 12,000 journals (Hassan, Haddawy & Zhu, 2014).

The first stage of bibliographic data collection comprised the search in the delimited base of articles that presented in the title or abstract or keywords the expressions: “absorptive capacity” and “territorial” or “regional”. There was no time limit for the search. Also, the Snowball technique was adopted to locate other search-related articles. The second stage of bibliographic data collection sought to analyze articles that were related to the objective of the study.

The selected articles were analyzed using the content analysis technique (Bardin, 2010) through the three stages: (a) pre-analysis; (b) exploration of the material; and (c) data processing, inference and interpretation. The analysis categories were previously delimited based on the theoretical framework (antecedent elements, territorial absorptive capacity and sustainable development).

4 PROPOSITION OF THE CONCEPTUAL FRAMEWORK

First, the antecedents of territorial absorptive capacity are presented. Afterwards, the component elements of the territorial absorptive capacity process are highlighted. Following, the main points of the sustainable development relationship are highlighted, and finally, the proposed conceptual framework is presented.

4.1 Antecedents of territorial absorptive capacity

Based on studies by Niosi and Bellon (2002), Caragliu and Nijkamp (2012), Schillaci et al. (2013), Miguélez and Moreno (2013) and Zeng et al. (2019) the antecedents of territorial absorptive capacity are defined:

a) Human Capital: One of the basic components of learning and innovation is human capital (Niosi & Bellon, 2002). Human capital is made up of the skills and knowledge incorporated into the workforce, in operational terms, it is generally defined as the aggregate number of years of education within a population. Without human capital, there may be no absorption capacity at the individual, organizational or territorial level. Training and higher education institutions, as well as the ability to attract human capital from other areas, are key elements of the territory's absorptive capacity (Niosi & Bellon, 2002).

Much of the existing work, both at macro and micro level, considers that the main determinant behind technological accumulation and absorptive capacity is human capital (Schillaci et al., 2013). In fact, the definition of human capital shares some similarities with the concept of absorptive capacity, as several empirical studies (Niosi & Bellon, 2002; Schillaci et al., 2013; Miguélez & Moreno, 2013; Zeng et al., 2019) have in fact used human capital measures as a variable that influences absorption capacity. Thus, qualified human resources are essential to monitor the evolution of external knowledge and evaluate its relevance for organizational and territorial development. Thus, we have proposition 1:

P1: Human capital positively influences the development of territorial absorptive capacity.

b) Institutional Capital: Institutional Capital can be defined as a set of capacities that influence decision making based on organizational flexibility and organizational intelligence and the importance of interorganizational and interinstitutional relations and cooperation for effective territorial development (Rocha, 2009). Therefore, it is understood that the support of institutional capital is supported by the integration between institutional actors and socioeconomic actors.

In this line of thought, institutional actors are constituted by local public administration, companies and industries and institutions of higher education. Thus, the greater the level of integration, the greater the density of institutional capital (Dallabria et al., 2006) and the possibility of absorbing knowledge from the territory. Thus, we have proposition 2:

P2: Institutional capital positively influences the development of territorial absorptive capacity.

d) Investments in R&D: Caragliu and Nijkamp (2012) highlight that a larger share of R&D employees is one of the important elements for the consolidation of the territorial innovation of the knowledge absorbed. Consequently, the territorial absorptive capacity depends on the knowledge base of companies and institutions based on the R&D activities carried out (Schillaci et al., 2012).

Investments in R&D are key elements for the development of territorial absorption capacity. Investments not only increase the learning capacities of the territory, but also increase the transformation and exploitation of useful knowledge for local companies and institutions (Niosi & Bellon, 2002). Investments in R&D enable the economies of the territory to technological innovation with a focus on competitiveness and sustainable development. Thus, we have proposition 3:

P3: Investments in R&D positively influence the development of territorial absorptive capacity.

d) Knowledge gatekeeper's: According to Morrison (2008), knowledge gatekeeper's identify external sources of knowledge, interpret, absorb and ultimately translate information and knowledge so that it can be useful for other partners in the territory. This influences the development of the absorption capacity so that they can perceive the external sources of knowledge and translate the reference information and so that they can disseminate it through various information channels (Schillaci et al., 2013).

Even for territories, the presence of "knowledge gatekeepers" plays an important role in determining absorption capacity, favoring collective learning processes (Schillaci et al., 2013). Gradwell (2003) emphasizes that knowledge gatekeepers are organizations that act both as a "frontier key" between actors in the territory and as an access interface between the local territory and national and international contexts.

Gatekeeper's can provide the necessary conditions for developing partnerships between companies, universities and public and private research institutions. This implies that not only are investments in R&D sufficient to absorb and transform knowledge, but supporting high-performing organizations capable of orchestrating and improving knowledge flows between actors is a strategic element for the sustainable growth of the territory. Thus, we have proposition 4:

P4: Knowledge gatekeepers positively influence the development of territorial absorptive capacity.

4.2 Elements of territorial absorptive capacity

The variables defined for the territorial absorptive capacity process were based on studies by Niosi and Bellon (2002), Crevoisier and Jeannerat (2009) and Abreu (2017). The

first process of territorial absorptive capacity is defined by the anchoring of knowledge. The notion of anchoring (Berset & Crevoisier, 2006) comes close to the notion of rooting by Granovetter (1985). Anchoring is different from rooting because it is a movement towards a new context. For example, knowledge departs from the context in which it is generated and incorporated into another context. Anchoring is the way in which new knowledge interacts with its new context (Berset & Crevoisier, 2006).

The anchoring modalities characterize the richness, diversity, intensity, duration, etc., of the relationships that occur. Depending on the intensity and the interrelation modalities between the dynamics of knowledge and its context, it is possible to imagine several ideal types of anchoring. The main theory is that various contexts of local knowledge will mobilize and integrate mobile knowledge generated elsewhere in different ways. When the anchorage is strong, learning allows an enrichment of knowledge of the location or the mobile element or both (Berset & Crevoisier, 2006).

The second process of territorial absorptive capacity is the diffusion of anchored knowledge. The main definition of diffusion was initially developed by Rogers (1962, p. 5), who established it as “the process by which an innovation is communicated through certain channels, over time, between the members of a social system”, being adopted by companies. Once the relevance of diffusion is understood, its determinants have been investigated by different currents of economic thought. From the pioneering epidemiological models to the most recent evolutionary models, a wide range of possible conditions for this process was listed: risks; uncertainties; media and interpersonal communication; usage experience; information asymmetries; among others (Lopes Ferreira et al., 2018).

Finally, the last process of territorial absorptive capacity is the exploration of knowledge anchored and disseminated in the territory. Exploration is configured to refine, extend and level existing skills or create new ones, incorporating the knowledge absorbed (Zahra & George, 2002) and transformed into practices by companies, the government or institutions belonging to the territory.

4.3 The influence on the sustainable development of the territory

Territorial development can be understood as a philosophy of participatory planning and management, taking into account the sustainable resources of each territory. To understand this philosophy, it is important to first understand the concept of “space-territory”. In the conception of Carrière and Gazella (2006), the space-territory is conceptualized by its construction based on the dynamism of individuals who live in it. The notion of territory designates the result of the confrontation of the individual spaces of the actors in their economic, social and environmental dimensions (Carrière & Gazella 2006; Andion, 2007).

In this context, the concept of sustainable development of the territory is a concept under construction, based on Ecodevelopment, the rational management of the environment and the postulates of Territorial Development (Pecqueur, 2009). This approach considered by the principles of sustainability is outlined as practices and policies that respect three fundamental criteria which are: social relevance (social viability), ecological prudence (environmental viability) and economic viability (Elkington, 2012). When complementing under these precepts, the United Nations (UN) (2003) emphasizes that the construction of territorial development from a sustainable perspective reflects a series of discussions regarding the economic, social and environmental dimensions.

As for their dynamism, in sustainable development, territories are shaped differently due to occurrences both in the endogenous environment (internal relations) and in the exogenous environment (external relations - competitive and market environment). In this

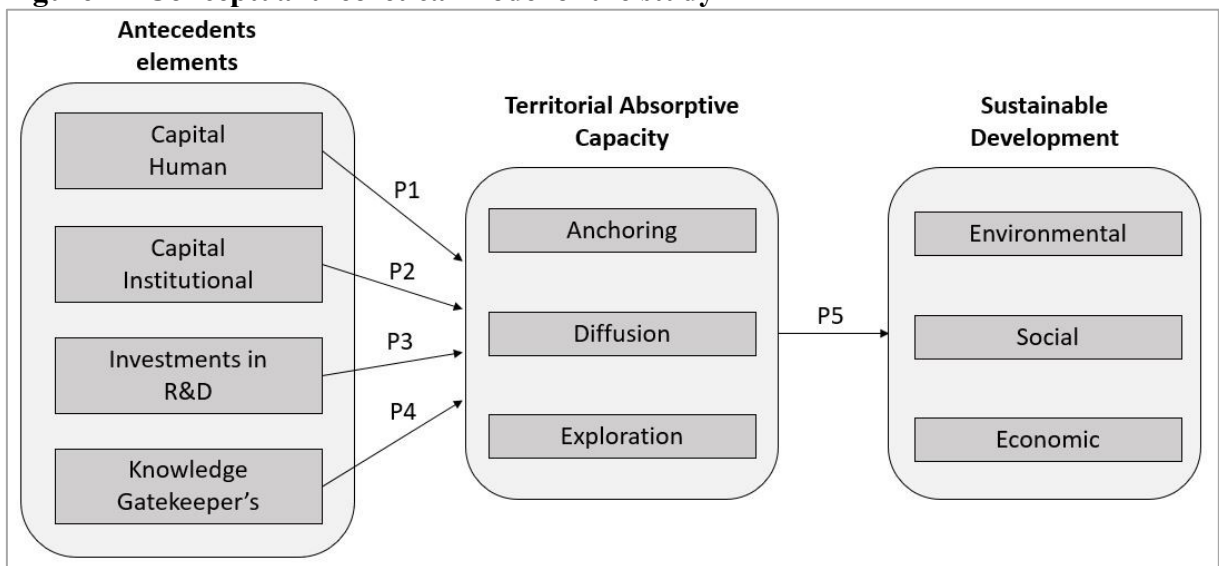
context, the relevance of the association of territorial absorption capacity with sustainable development is perceived (Coe et al., 2004). Thus, we have proposition 5:

P5: The territorial absorptive capacity positively influences sustainable development.

4.4 Final proposal of the conceptual framework

Based on the theoretical considerations exposed and the proposals listed, Figure 1 presents the proposed conceptual framework.

Figure 1 - Conceptual theoretical model of the study



Source: Authors (2020).

The proposed framework highlights that, in order to analyze the influence of territorial absorptive capacity on sustainable development, some antecedent elements are necessary to promote and develop the process of knowledge absorption at the territorial level. It is noteworthy that human capital, institutional capital, investments in R&D and knowledge gatekeepers can assist in this process, and therefore, they must be analyzed and measured in the proposed model.

It is also considered that the processes of anchoring, diffusion and exploration of knowledge are important elements for the process of territorial absorptive capacity. Finally, the influence of these processes on sustainable development is analyzed in the light of the environmental, social and economic dimensions.

The articulation between the antecedent elements and the processes of territorial absorptive capacity and the dimensions of sustainable development propose a conceptual framework where several aspects related to the territory's capacity to absorb knowledge and positively influence sustainable development.

5 CONCLUSIONS

It is clear that although some academic efforts have already been made to understand the capacity for territorial absorption from some dimensions, there was a lack of systematic assessment of its effects on sustainable development and the proposition and validation of

variables for the process of absorption of territorial knowledge, which is the major theoretical contribution of this study.

The contributions of the relationships proposed in the conceptual framework can serve as a theoretical basis for future studies on territorial absorptive capacity and sustainable development in the academic environment. It is also noteworthy that the study contributes by pointing out the importance of different aspects of different territorial actors to generate the capacity for absorbing knowledge and leverage sustainable development. Developing and aligning these antecedents is important for the growth of territorial knowledge.

The study has as a limitation the fact that it is based on a theoretical review of the literature. New studies can adopt the proposed conceptual relationships and analyze qualitatively or quantitatively the proposals listed in different territories in order to validate the presented framework.

REFERENCES

Abreu, M. (2017). *Absorptive capacity in a regional context. Handbook of regional innovation and growth*. Cheltenham: Edward Elgar Pub, 211-221.

Andion, C. (2007). *Atuação das ONGs nas dinâmicas de desenvolvimento territorial sustentável no meio rural de Santa Catarina*. Florianópolis: Thesis (Doctorate in Political Sociology), Federal University of Santa Catarina.

Berset, A., & Crevoisier, O. (2006). Circulation of competencies and dynamics of regional production systems. *International Journal on Multicultural Societies*, 8(1), 61–83.

Caragliu, A., & Nijkamp, P. (2012). The impact of regional absorptive capacity on spatial knowledge spillovers: the Cohen and Levinthal model revisited. *Applied Economics*, 44(11), 1363-1374.

Carlos, A. F. (2011). *A condição espacial*. São Paulo: Contexto.

Carrière, J. P., & Cazella, A. A. Abordagem introdutória ao desenvolvimento territorial sustentável. *Revista Eisforia*, 4(1), 23-48.

Coe, N. M. H., Martin, H., Wai-Chung, Y., & Dicken, P.; Henderson, J. (2004). Globalizing regional development: a global production networks perspective. *Transactions of the Institute of British Geographers*, 28(1), 468–484.

Cohen, W. M., & Levinthal, D. A. (1989). Innovation and Learning: The Two Faces of R&D. *The Economic Journal*, 99(397), 569-596.

Dallabrida, V. R. (2006). *Territórios*. In: Siedenberg, D. R. Dicionário de desenvolvimento regional. Santa Cruz do Sul: Edunisc, pp. 161-162.

Elkington, J. (2012). *Canibais com garfo e faca*. São Paulo: M. Books do Brasil Ltda.

Gallas, J., Ghedine, T., & Gonçalo, C.; Rossetto, A. (2018). O Papel dos Ativos Territoriais e da Inovação no Desenvolvimento de Cidades Criativas. *Desenvolvimento Em Questão*, 16(43), 113-146.

- Gil, A. C. (2017). *Como elaborar projetos de pesquisa*. 6 ed. São Paulo: Atlas.
- Giuliani, E. (2005). Cluster absorptive capacity - why do some clusters forge ahead and others lag behind? *European Urban and Regional Studies*, 12(3), 269–288.
- Gradwell, T. (2003). Outsourcing Knowledge Creation: Don't Give the Game Away. *Specialty Chemicals*, 23(8), 24–50.
- Granovetter, M. (1985). Economic action and social structure: The problem of embeddedness. *American Journal of Sociology*, 91(3), 481–510.
- Hassan, S., Haddawy, P., & Zhu, J. (2014). A bibliometric study of the world's research activity in sustainable development and its sub-areas using scientific literature. *Scientometrics*, 99(2), 549-579.
- Lopes Ferreira, J., Ruffoni, J., & Marian Carvalho, A. (2018). Dinâmica da difusão de inovações no contexto brasileiro. *Revista Brasileira de Inovação*, 17(1), 175-200.
- Miguélez, E., & Moreno, R. (2015). Knowledge flows and the absorptive capacity of regions. *Research Policy*, 44(4), 833-848.
- Miguélez, E., & Moreno, R. (2013). *Mobility, networks and innovation: The role of regions absorptive capacity*. IREA Working Papers 201316, University of Barcelona, Research Institute of Applied Economics.
- Morrison, A. (2008). "Gatekeepers of knowledge" within industrial districts: who they are, how they interact. *Regional Studies*, 42(6), 817-835.
- Mukherji N., & Silberman, J. (2013). Absorptive capacity, knowledge flows, and innovation in US metropolitan areas. *Journal of Regional Science*, 53(3), 392–417.
- Niosi, J., & Bellon, B. (2002). *The Absorptive Capacity of Regions*. Paper presented at Colloque Economie Mediterranee Monde Arabe GDRI CNRS EMMA.
- Crevoisier, O., & Jeannerat, H. (2009). Territorial Knowledge Dynamics: From the Proximity Paradigm to Multi-location Milieus. *European Planning Studies*, 17(8), 1223-1241.
- United Nations [UN]. (2003). *Ecossistemas e o bem-estar humano: estrutura para uma avaliação*. Washington: World Resources Institute.
- Pecqueur, B. (2009) A guinada territorial da economia global. *Política & Sociedade*, 8(14), 79-105.
- Rocha, J. D. (2009). A importância do capital institucional na sustentabilidade do desenvolvimento territorial. *Sustentabilidade e Negócio*, 1(1), 65-80.
- Rogers, E. M. (1962). *Diffusion of innovations*. 1. ed. New York: The Free Press.

Schillaci, C. E., Romano, M., & Nicotra, M. (2013). Territory's absorptive capacity. *Entrepreneurship. Research Journal*, 3(1), 109-126.

Viginier, P. (2002). *La France dans l'économie du savoir: pour une dynamique collective*. Paris: La Documentation Française.

Zahra, S. A., & George, G. (2002). Absorptive capacity: a review, reconceptualization, and extension. *Academy of Management Review*, 27(2), 185-203.

Zeng, J., Liu, Y., Wang, R., & Zhan, P. (2019). Absorptive Capacity and Regional Innovation in China: an Analysis of Patent Applications, 2000–2015. *Applied Spatial Analysis and Policy*, 1(1), 1-19.