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THE INSERTION OF THE UNIVERSITIES UFSC AND UDESC IN THE CONSOLIDATION OF THE REGIONAL INNOVATION SYSTEM IN THE BRAZILIAN STATE OF SANTA CATARINA

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Abstract

Purpose: We analyze the insertion of the Federal University of Santa Catarina (UFSC) and the State University of Santa Catarina (UDESC) in the consolidation process of the Regional Innovation System in the Brazilian state of Santa Catarina.
Design/methodology/approach: We adopt the documentary research method in the environments of the Federal University of Santa Catarina (UFSC) and the State University of Santa Catarina (UDESC). With regard to data analysis, we use the theoretical-analytical categorization, based on research and development (R&D) and skills-building indicators by innovative learning.
Findings: The study results show the mediation and knowledge production roles that both universities play in RIS to organizations. This allowed us to understand that the studied universities were included in this process, through the learning flows of innovative channels, which covered the areas of undergraduate and research.
Social Implications: This investigation reflects the social and economic relevance of the universities studied for the region in which they are inserted in the context of RIS.
Originality/value: The actions related to the analyzed indicators encompass interests from both the public and private spheres, thus enabling systemic results in the processes of generating innovative knowledge, which reinforces the capacity for innovation at the regional level.

Keywords: University, Regional Innovation System, Innovative Learning.

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A INSERÇÃO DAS UNIVERSIDADES UFSC E UDESC NA CONSOLIDAÇÃO DO SISTEMA REGIONAL DE INOVAÇÃO CATARINENSE

Resumo

Objetivo: Analisar a inserção da Universidade Federal de Santa Catarina (UFSC) e da Universidade Estadual de Santa Catarina (UDESC) no processo de consolidação do Sistema Regional de Inovação catarinense.
Desenho/Metodologia/Abordagem: Pesquisa documental nos ambientes da Universidade Federal de Santa Catarina (UFSC) e da Universidade do Estado de Santa Catarina (UDESC). Análise de dados via categorização teórico-analítica, com base nos indicadores de pesquisa e desenvolvimento (P&D) e de construção de competências, via aprendizado inovativo.
Resultados: Emergiram do estudo os papéis de mediação e de produção de conhecimentos que as duas universidades desempenham no SRI entre as organizações. Isto possibilitou a compreensão de que as universidades estudadas se inseriram no processo de consolidação do SRI via os fluxos de aprendizado dos canais inovativos, que abrangeram as áreas da graduação e da pesquisa.
Implicações sociais: A pesquisa reflete a relevância social e econômica das universidades estudadas para a região na qual estão inseridas no contexto dos SRI.
Originalidade/valor: As ações relacionadas aos indicadores analisados abarcam interesses provenientes tanto da esfera pública como privada, possibilitando resultados sistêmicos nos processos de geração de conhecimentos inovativos, que reforçam a capacidade de inovação no nível regional.

Palavras-chave: Universidade. Sistema Regional de Inovação. Aprendizado Inovativo.

LA INSERCIÓN DE LAS UNIVERSIDADES UFSC Y UDESC EN LA CONSOLIDACIÓN DEL SISTEMA REGIONAL DE INNOVACIÓN EN EL ESTADO BRASILEÑO DE SANTA CATARINA

Resumen

Objetivo: Analizar la inserción de la Universidad Federal de Santa Catarina (UFSC) y de la Universidad Estadual de Santa Catarina (UDESC) en el proceso de consolidación del Sistema Regional de Innovación en el estado brasileño de Santa Catarina.
Diseño/Metodología/Enfoque: Investigación documental en los ambientes de la Universidad Federal de Santa Catarina (UFSC) y de la Universidad Estatal de Santa Catarina (UDESC). Análisis de datos mediante categorización teórico-analítica, basada en indicadores de investigación y desarrollo (I+D) y desarrollo de competencias mediante aprendizaje innovador.
Resultados: Del estudio surgieron los roles de mediación y producción de conocimiento que ambas universidades juegan en el SRI entre organizaciones. Eso permitió comprender que las universidades estudiadas se insertaron en el proceso de consolidación del SRI a través de los flujos de aprendizaje de los canales innovadores, que abarcaron las áreas de graduación e investigación.
Implicaciones sociales: La investigación refleja la relevancia social y económica de las universidades estudiadas para la región en la que están insertas en el contexto del SRI.
Originalidad/valor: Las acciones relacionadas con los indicadores analizados abarcan intereses tanto del ámbito público como privado, posibilitando así resultados sistémicos en los procesos de generación de conocimiento innovador, que refuercen la capacidad de innovación a nivel regional.

Palabras clave: Universidad. Sistema Regional de Innovación. Aprendizaje innovador.

Introduction

The National and Regional Innovation Systems (NIS and RIS, respectively) enable the construction of organizational innovative knowledge networks (Edquist, 2006; Lundvall, 2004; Lundvall et al., 2002; Nelson, 1993). This is triggered in each type of system through cooperation with institutions focused on knowledge generation, such as universities (Cooke, 2001; Cooke, 1996; Dalmarco et al., 2019; Doloreux & Parto, 2005; Dosi, 1988). Higher education has assumed a strategic vector role in the process of technological evolution (catch-up) and has provided advances that have repercussions on the economic systems of peripheral and/or developing countries that seek to reduce technology asymmetries (Fischer, Schaeffer, & Vonortas, 2019).

Public and private universities operate under the regulation/promotion of the State in partnership with other organizations that integrate innovation systems (Caniëls & Van den Bosch, 2011; Niosi, 2002). The interaction between agents of innovation systems not only increases their collective innovative capacity but may also serve to neutralize technological lock-in within regional groups of organizations and have systemic repercussions on the economic and social process of nations (Asheim & Coenen, 2005).

Given this, we question how learning for innovation occurs in the regional context through access to information and competencies linked to the innovative processes that take place in the RIS (Cooke, 2013; Cooke et al., 1997; Lundvall et al., 2002). The RIS contemplates a set of interests arising from the public and private spheres, in which the interaction of agents, institutions, and organizations produces widespread and systemic effects (Cooke & Memedovic, 2003; Lau & Lo, 2015; Theeranattapong et al., 2021). In other words, the problem of this research contemplates the development of the organizations of the RIS through processes materialized in specific forms of capital derived from social relations, norms, values, and interactions between organizations and scientific institutions, such as universities (Cai & Liu, 2015; Fischer et al., 2019).

The subject is pertinent both theoretically and empirically because, in Brazil, a concerning picture of reduced investments in science and technology by the State is observed (Angelo, 2016; Senado Federal, 2019). This directly affects universities and, indirectly, the other organizations that interact in innovation systems, given that the State plays a crucial role as an agent of promotion and regulation of innovative processes between organizations, interconnecting them both at the regional and national levels (Fischer et al., 2019; Lundvall et

al., 2002; Niosi et al., 1993).

Therefore, in this study, we analyzed the insertion of the Federal University of Santa Catarina (UFSC) and the Santa Catarina State University (UDESC) in the consolidation process of the Regional Innovation System of Santa Catarina. These institutions figure as the largest universities of the state in terms of infrastructure, geographical reach, and number of students (Lemos & Cario, 2017; Universidade do Estado de Santa Catarina, 2018b; Universidade Federal de Santa Catarina, 2018b).

The study method was documentary research to investigate the phenomenon of the insertion of the university as a scientific institution driving the process of consolidation of the RIS. In terms of geographical delimitation and access to data for this research, we encompassed the two Higher Education Institutions (HEIs) in Santa Catarina already mentioned. From this, such HEIs were analyzed under the dimension of learning in the RIS.

The article contemplates, therefore, this introduction with the general lines of conduction of the research, the presentation of the regional system (RIS), the analyses and discussions of the empirical data collected, the final considerations of the study, and the references used.

Regional innovation system

The theory that addresses the systemic characteristics of innovation has expanded its dimensions and reached other levels beyond the national perspective of the nation-state that underlies the National Innovation Systems (NISs) (Edquist, 1997; Fischer et al., 2019; Lemos & Cario, 2017; Lundvall et al., 2002). An example is the regional level, at which the Regional Innovation Systems (RISs) emerge. The national approach to innovation systems is sometimes more appropriate, while sometimes a sectoral or regional approach is more useful (Cooke et al., 1998; Cooke, 1996; Cooke et al., 1997; Lau & Lo, 2015). However, the approaches are complementary (Edquist, 1997).

Cooke, Uranga, and Etxebarria (1997) theoretically explored the main organizational and institutional dimensions that related to regional realities with the purpose of rendering the concept of RISs more operational than theoretical. To the authors, this concept is based on two bodies of theory. The first addresses research systems on innovation, while the second is characterized by regional science. It is interested in explaining the local distribution and the political impact of regional high-tech industries, technology parks, networks, and innovation

programs. To Cooke (2001), this was a pioneering attempt to specify desirable criteria on which systemic innovation at the regional level may occur.

From the evolution of studies on the regional level of analysis in the context of innovation, Doloreux and Parto (2005) pointed out that the concept of RIS, despite not having a widely accepted definition, has received greater attention from both researchers and government policymakers. Thus, such a system came to be viewed as a promising analytical framework to enable the understanding of the innovation process in regional economies (Doloreux & Parto, 2005). The aim was also to strengthen regional innovative capacity and competitiveness through the dissemination of knowledge and learning (Doloreux & Parto, 2005).

Cooke, Uranga, and Etxebarria (1998) addressed RISs in terms of outsourced learning organizations. The authors explored elements addressed by evolutionary theory in order to support their argument that there were significant compatibilities between the processes of regional evolution around a new regional science and evolutionary economic theory applied to innovation. Cooke, Uranga, and Etxebarria (1998, p. 1580) also mentioned that, in institutional terms, immersion for learning would be guided "by the collective social order that evolves according to an informal microconstitution composed of conventions, habits, routines, and micro-regulatory rules of the game". To the authors, systemic innovation would be facilitated by the constructive interaction of the institutional order and the organizational infrastructure.

Asheim and Coenen (2005) argued that RISs may be conceived as institutional infrastructures supporting innovation in the production structure of a given region. Two subsystems of agents must be systematically involved with interactive learning for there actually to be a RIS, namely: a) regional production structure, which consists of secondary companies that often have grouping trends; b) a knowledge generation subsystem: public and private research laboratories, universities and schools, technology transfer agencies, and organizations focused on vocational training, among others (Asheim & Coenen, 2005).

In terms of the basic elements that compose RISs, there are four: a) firms/companies: economic agents that play an important role in innovation systems, assuming the responsibility of generating and disseminating knowledge; b) research and development institutions: universities, governments, and other institutions that can influence the creation, development, transfer, and use of technologies; c) knowledge infrastructure: means the

physical and organizational infrastructure necessary to support innovation; d) regional innovation-oriented policy: innovative policies that address the entire system, ensuring that a RIS increases learning and knowledge dissemination capacities (Doloreux, 2002).

Related to these elements are some internal mechanisms, among which, for this work, we highlight interactive learning (Doloreux, 2002). It is central to the concept of RISs and is related to the process that generates learning among the agents participating in the innovation process; it is interactive, given that the generation of knowledge is shared by agents characterized as innovators and because it is shaped by institutional routines, regulations, and social conventions (Doloreux, 2002). Interactive learning occurs in various ways depending on the context and the innovative process in question, so the interaction may be vertical and horizontal (Asheim & Gertler, 2007). It also covers the format of networks between agents. Regional networked innovation systems materialize as the result of political intervention to increase innovation capacity and collaboration (Asheim & Gertler, 2007). Therefore, from the theoretical framework exposed above, we synthesized the elements of interest to explore the study objective, as shown in Figure 1.

Figure 1

Theoretical-analytical elements stemming from the theoretical basis

Theoretical dimension	**Analytical categories (ACs)**	**Indicators related to the AC in the universities**
Learning in the Regional Innovation System (RIS) (Asheim & Coenen, 2005; Doloreux & Parto, 2005; Edquist, 2006; Lundvall, 2004; Lundvall et al., 2002; Niosi et al., 1993).	- Research and development (R&D) (AC1).	- agreements executed. - research projects.
	- Competency Building (AC2).	- scientific initiation scholarships (undergraduate studies). - researchers trained (*stricto sensu* graduate school).

Note. Prepared by the authors (2019).

In Figure 1, we present the form of operationalization of this study in terms of the theoretical dimension. From it emerge the basic analytical categories. In the same box, the "AC1" category covers the university-company relationship in terms of learning aimed at the studied institutions. This is operationalized by the indicators also described in that box. The "AC2" category addresses human capital and contemplates the training and capacity-building of people for innovative development in the region where the institutions operate. The

indicators relevant to this category are also included in that box. It is worth noting that the selection of elements for both categories was based on the feasibility of the study in terms of access to documentary data and the comprehensiveness of such elements relative to the links with the undergraduate, graduate, and research areas in the studied universities. Next, we highlight the methods adopted in this study.

Methods adopted

The research strategy used was documentary research (Saunders, Lewis, & Thornhill, 2009). The Federal University of Santa Catarina (UFSC) and the Santa Catarina State University (UDESC) were intentionally selected as study environments. Their choice was due to the recognized role of both nationally and, particularly, in the region of interest: the state of Santa Catarina (SC), located in southern Brazil.

In all, the two institutions have campuses in 13 municipalities of the state (Universidade do Estado de Santa Catarina, 2018a; Universidade Federal de Santa Catarina, 2018A). They are part of the higher education system of the state of Santa Catarina (SC). Considering their representativeness in the scientific-technological and graduate scenario of the state in question (Lemos & Cario, 2017), we contextualize the activity of both, which contemplates different governmental spheres and sizes, based on the role of each one in the RIS of Santa Catarina.

Data collection was based on secondary sources (Roesch, 2009). Among the data were management reports and other documents related to the transparency of public management, such as infographics ("UFSC in numbers", "UDESC in numbers"), specific reports, quantitative data sheets, and historical series of both institutions. The data were located on the websites of the studied universities and provided by sectors responsible for the management and institutional planning of the HEIs. The time frame of data collection comprised 2009 to 2018. For the choice of the selected period, we evaluated its relevance to facilitate the understanding of the study phenomenon in its innovative context, and the end mark (2018) expressed the currentness of the available data. This is because, in 2019, the data generation phase to be consolidated by the studied institutions for later disclosure was still in force. In the years that followed, access to data was hampered by the health crisis of the COVID-19 pandemic. Therefore, we chose to end the collection with 2018.

Data analysis occurred through the process of categorization of meanings (Saunders et

al., 2009). In this process, the categories were extracted from the theoretical basis (theoretical-analytical categorization), as shown in Figure 1. Subsequently, they were related to the secondary data adhering to the study objective so that the meanings associated with the theoretical dimension of learning in the RIS could be described concerning the organizations that interact in this System with the universities UFSC and UDESC.

Presentation of data

The Federal University of Santa Catarina (UFSC)

The Federal University of Santa Catarina (UFSC) was created in 1960 through Law No. 3849/1960 and Decree No. 64824/1969. It is an autonomous federal agency integrating the Federal Higher Education System (Universidade Federal de Santa Catarina, 2014). The UFSC has five campuses in five regions of the state of Santa Catarina: Florianópolis (seat), Blumenau, Araranguá, Curitibanos, and Joinville. The last three campuses contemplated the creation of new programs and are the result of the expansion of the university to the countryside that occurred in 2009 (Universidade Federal de Santa Catarina a). Shortly after, in 2013, the Blumenau campus was installed (Universidade Federal de Santa Catarina, 2016). The UFSC maintains its commitment to the demands that arise in its regional and national contexts of activity, so it increasingly seeks to achieve plurality and diversification, in line with the challenge of growing while maintaining high-quality levels to contribute to the society that maintains it (Universidade Federal de Santa Catarina, 2011).

The Santa Catarina State University Foundation (UDESC)

Founded in 1965 by Decree No. 2802 of May 20, the University for the Development of the State of Santa Catarina (UDESC) was recognized and renamed the Santa Catarina State University Foundation (UDESC) through Ministerial Ordinance No. 893/1985 (Universidade do Estado de Santa Catarina, 2017). The UDESC is present in nine cities that are part of six mesoregions of Santa Catarina. It has the following campuses: Campus I –Metropolitan Area of Florianópolis; Campus II – North of Santa Catarina; Campus III – Highlands; Campus IV – West of Santa Catarina; Campus V – Itajaí Valley; Campus VI – South of Santa Catarina. The UDESC "demonstrates the relevance of its activities as a promoter of mechanisms related to the social, cultural, and technological development of all regions of the state", with the

institution having contributed substantially to the development of the state of Santa Catarina (Universidade do Estado de Santa Catarina, 2018, p. 34).

Research and development (R&D)

In this subsection, we present the data and results inherent to the analytical category AC1 (Box 1). Elements present in the construction process of research and development actions were considered, according to Figures 2 to 5.

Figure 2

UFSC National Agreements Executed

Note. Research data (2019).

Figure 3

UFSC International Agreements Executed

Note. Research data (2019).

Figure 4

UDESC National Agreements Executed

Note. Research data (2019).

Figure 5

UDESC International Agreements Executed

Note. Research data (2019).

To understand the Agreements Executed, their selection occurred by type (national/international) in both institutions (Universidade do Estado de Santa Catarina, 2019;

Universidade Federal de Santa Catarina, 2018b, 2019a, 2019b). The documentary analysis process contemplated, in addition to the date of execution, the type of contract entered into from the reports made available by the two institutions. There was also the verification of the type of objective covered and whether there was a maximum execution time in the records. Thus, specific contracts set forth two to five years in most cases at both universities, although contracts with permanent validity were also located at the UDESC.

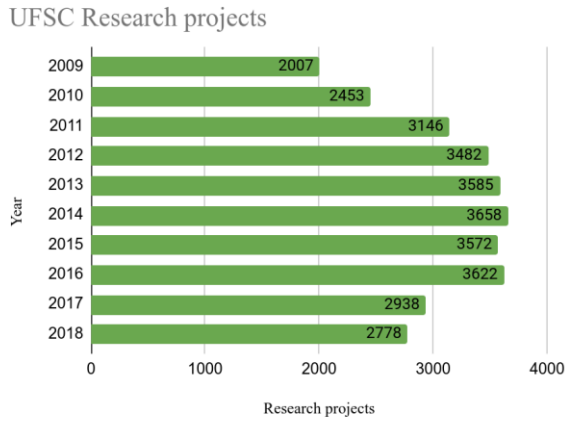
It was also possible to determine the evolution of each type of contract from 2009 to 2018. Among the 1,416 national agreements executed by the UFSC, the most representative year was 2009, and the annual average for the institution in the period was 142 national agreements. For the UDESC, which executed 1,107 national agreements in the period, 2013 was the most relevant year in this indicator (Figure 4). The average number of agreements of this nature at this university was 110 per year.

Regarding the characteristics of the national agreements in both institutions, we assessed that they were executed by partnerships of the universities both within the limits of the state of Santa Catarina and with other states of the federation. Among the participants were public agencies at the municipal, state, and federal levels and for-profit and not-for-profit organizations.

As for the International Agreements, the analysis process followed the same pattern as the national agreements. Figure 2 shows that 2014 was the year with the most significant repercussion for the UFSC, considering the 3,294 agreements executed in the period, with the average per year being 329 agreements. The UDESC executed 206 international agreements in the period. Among them, Figure 5 shows 2014 with the highest number, and the average for the period in this indicator was 20 agreements per year. Finally, among the participants in the international agreements in both institutions are countries from the following continents: Africa, Central America, North America, South America, Asia, Europe, and Oceania. The second indicator considered is that of "Research Projects", which appears with data in Figures 6 and 7 for the UFSC and UDESC (Universidade do Estado de Santa Catarina, 2019b; Universidade Federal de Santa Catarina, 2019c), respectively.

Figure 6

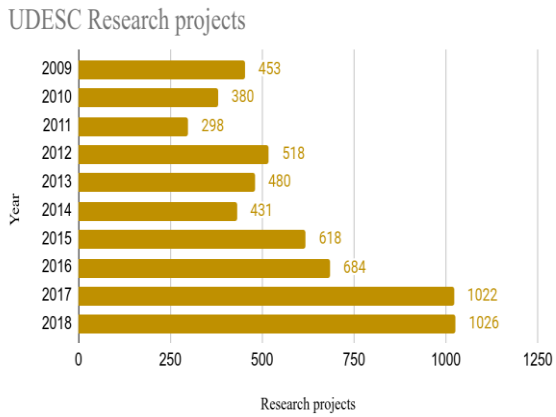
UFSC Research projects



Note. Research data (2019).

Figure 7

UDESC Research projects



Note. Research data (2019).

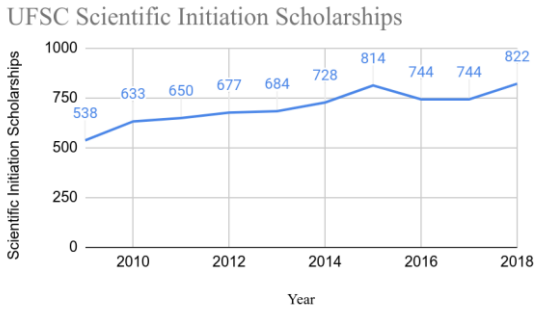
The data in Figure 6 show that the UFSC presented increasing performance in its projects until 2016, although there was a slight decrease in the total number of projects created in 2014. Later, in 2017 and 2018, a further reduction in the number of projects was presented; however, in terms of the annual average for this indicator, the institution maintained 3,124 projects in the period, demonstrating that its overall performance was satisfactory. For the UDESC, as per the data in Figure 7, the analyzed period showed that there was only growth in the indicator for research projects. The annual average for the UDESC was 591 projects created. We emphasize that, in addition to the research projects, the scientific production of the two institutions in the period was identified in the documentary database related to such projects, given that other scientific products were generated from them, such as publications in journals, annals of events, and book chapters, among others.

Competency Building

In this subsection, we address the elements inherent to the analytical category AC2 (Figure 1). The selected indicators demonstrate the evolution of human capital aimed at building competencies at the UFSC and UDESC. It starts with the indicator "Scientific Initiation Scholarships", as per Figure 8 (UFSC) and Figure 9 (UDESC).

Figure 8

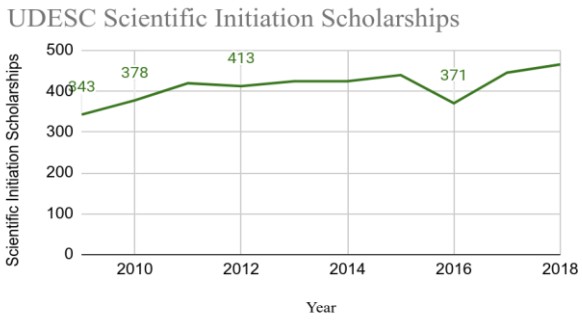
UFSC Scientific Initiation Scholarships



Note: Research Data

Figure 9

UDESC Scientific Initiation Scholarships

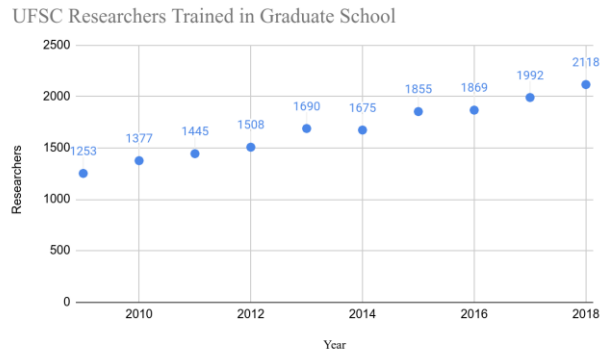


Note: Research Data

The data synthesized through Figures 8 and 9 were collected from the selection and organization of the data on scientific initiation scholarships, identified among the other types of scholarships granted by both institutions and inherent to the time frame of interest. The data in Figure 8 show that, in terms of training undergraduate students for the paths of scientific initiation, the UFSC has maintained a coherent performance, even with a slight drop in the indicator in 2015. The average of this indicator was 703 scholarships/year, an expressive number in the analyzed period. For the UDESC, Figure 9 shows that there was only a decrease in the number of scientific initiation scholarships in 2013 and 2016, so the investment continued with its regularity in the period of interest of the study. In terms of the annual average, the institution obtained 412 scholarships. In other words, the number corresponds to good results in this indicator. Next, we proceed to the "Researchers Trained in Graduate School" indicator. For such, the results for the UFSC and UDESC are presented in Figures 10 and 11, respectively.

Figure 10

UFSC Researchers Trained in Graduate School



Note. Research data (2019).

Figure 11

UDESC Researchers Trained in Graduate School

Note. Research data (2019).

As for the indicator of scientific initiation scholarships, the process of collecting and analyzing the data presented in Figures 10 and 11 was based on the records in the annual management reports of the UFSC and UDESC. Through Figure 10, one may observe that the UFSC showed a gradual increase in the number of researchers trained in graduate school during the time frame of the study. Moreover, among the 16,782 researchers trained in the period, the annual average of the indicator was 1,678/year. For the UDESC, Figure 11 shows that among the 3,109 researchers who completed their programs in the analyzed period, there were fluctuations in the number of this indicator from 2009 to 2014. After, from 2015 until the end of the period of interest of the research, the indicator began to increase, with an annual average of 311 researchers trained.

Discussion of results

We worked with two analytical categories: AC1) Research and Development (R&D), which unfolded in the indicators of Agreements Executed and Research Projects; AC2) Competency building, which encompassed Scientific initiation scholarships and Researchers trained in graduate school.

The results of category AC1 showed that for the data from the indicators "Agreements Executed" and "Research Projects", it was possible to understand that the two selected institutions act in the innovative scenario through actions aimed at the growth of the mesoregions in which they are present. The actions promoted and materialized in these indicators contemplate interests from both the public and private spheres, thus enabling

systemic results in the processes of generating innovative knowledge, which reinforce the innovation capacity at the regional level. Such agreements and projects have also made it possible to build links that include knowledge, financial, and human flows.

Among the subject matters of the analyzed projects were technical, scientific, technological, and cultural cooperation, which cover the Teaching, Research, and Extension areas of the studied universities. In specific projects, financial resources were also contemplated that led to the generation of knowledge in the relationship between the universities and other organizations, both in the academic units of the seats located in the capital of Santa Catarina as in the campuses of both institutions in the other regions of the state.

On another point, the results of the AC2 category demonstrated from the data of the indicators "Scientific Initiation Scholarships" and "Researchers Trained in Graduate School" the influence of the studied institutions on the generation of knowledge within the scope of the Santa Catarina RIS. Both the training of undergraduate students for scientific initiation actions through the incentive of scholarships granted by the analyzed institutions, which presented good results, and the constant training of researchers at the stricto sensu graduate level at the universities were identified. This enables the consolidation of means of regional development linked to innovation. The realization of this process occurs both by the possibility of insertion of undergraduate students with workload to work in the research projects of the two institutions and other activities of a scientific nature linked to them, as well as by the insertion of trained high-level researchers in public and private organizations in the region of coverage of the studied universities.

In short, we discovered through the analyzed indicators that the studied universities act to strengthen the learning pathways linked to human capital in the context of innovation insofar as their actions concerning the mentioned indicators influence the RIS in terms of generating knowledge for the training of innovative agents in the regional context. This made clear the crucial role that the UFSC and UDESC play in working together with public and private organizations and other members of the Santa Catarina RIS. There is also room for expanding existing partnerships of the universities in question with organizations in the RIS and creating new partnerships, routines, and actions aimed at creating, transferring, and using technology in the regional production sectors.

Given the evidence presented, we understand how the studied universities were

inserted in the consolidation process of the Santa Catarina RIS. Both play the roles of mediators and producers of knowledge in the RIS. The main mechanisms of their actions were the learning flows. These were materialized by their innovative channels related to the indicators covering undergraduate, research, and graduate studies. It is worth noting that these indicators may reflect impacts on university extension. Although this was not the focus of the study, we know that the innovation generated in universities promotes results for the local community as a whole and not only for the economic agents involved in the interactions of the RISs.

The learning among the organizational innovative agents, whether the researchers who create research projects or organizations participating in the agreements executed with both institutions, provides reflection and action from diversified objects that cover the solution of technological and social problems. This is also reflected in the various areas of management, with possibilities for interdisciplinary exchanges of knowledge in the RIS, given that the academic units of the seats of such institutions and their respective regional campuses are involved in projects that contemplate innovative elements and cover varied areas of knowledge.

Final considerations

In this work, we analyzed the insertion of the Federal University of Santa Catarina (UFSC) and the Santa Catarina State University (UDESC) in the consolidation process of the Regional Innovation System (RIS) of Santa Catarina, Brazil. The objective was achieved from the perspective of learning in innovation systems as a guide for analyzing the innovative elements listed in Figure 1, both at the UFSC and UDESC, from their interactions with the other agents that co-produce the Santa Catarina RIS.

Through the collected data, we analyzed the university-organization interactions in the innovative context inherent to research and development (R&D), as well as regarding the building of competencies for the consolidation of human capital in the innovative context. The analysis demonstrated the contribution of the studied universities in terms of creating partnerships through projects and agreements to promote the incentive to scientific initiation in undergraduate studies and the training of high-level researchers in their stricto sensu graduate programs, which makes clear their impact on the organizations and the region in which both are present.

The contribution of this study lies in the evidence that the two studied universities play the roles of mediators and producers of knowledge while interacting with organizations from the various governmental spheres and the private initiative in the Santa Catarina RIS. This is related to the process of building innovative dynamics in RISs (Edquist, 1997; Fischer et al., 2019; Lundvall, 2007).

The analysis performed also contributes to understanding how much university organizations can impact the innovative and management context of the organizations that compose a particular RIS. Their actions lead to benefits to society, such as the production of knowledge that generates solutions to problems that both organizations and governments face in terms of technologies and processes in the RISs.

Finally, the results of this study are limited to the universities analyzed, the region of interest, and the time frame studied. We suggest for future investigations the deepening of longitudinal studies in public and private universities to investigate how they act in the processes of innovative learning in the RIS from the perspective of the social agents that co-produce university-organization interactions in the RIS.

AUTHORS' CONTRIBUTIONS

Contribution	Rodrigues, L. M. A.	Cário, S. A. F.	Martins, C. B.	Marietto, C. B.	Cassol, A.
Contextualization	X	X	----	X	----
Methodology	X	X	----	X	----
Software	----	----	----	----	----
Validation	----	X	----	X	X
Formal analysis	X	----	----	----	----
Investigation	X	----	----	----	----
Resources	----	----	----	----	----
Data curation	X	----	----	----	----
Original	X	----	----	----	----
Revision and editing	X	X	X	X	X
Viewing	----	X	X	X	X
Supervision	----	X	X	X	----
Project management	X	----	----	----	----
Obtaining funding	----	----	----	----	----

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