Governance of interorganizational relationships: The case of science and technology parks

Gobernanza de las relaciones interorganizacionales:
El caso de los parques científicos y tecnológicos

Gouvernance des Relations interorganisationnelles:
Le cas des parcs scientifiques et technologiques

Claudionor Guedes Laimer[1]
Associate Professor, IMED Business School, Passo Fundo, Brazil.
e-mail: laimer@imed.edu.br

Abstract

This article aims to identify the forms of governance that are present in interorganizational relationships in the context of science and technology parks. Therefore, this study presents a comparative analysis of the governance of science and technology parks. Thus, multiple case studies were used as a research strategy, including a park in Brazil and another one in Portugal. One of the parks was created by the private sector because of the companies' need to share resources and search for growth alternatives. The other one was created by the government as a result of public policies for economic development, employment generation and profit. The results show that the studied cases are characterized by the administrative organization as the form of governance in interorganizational relationships. However, the form of governance and the formal and informal mechanisms of governance are the main conclusions. There are other elements (e.g., people's behavior) that may influence interorganizational relationships in the context of science and technology parks. Finally, this article offers a discussion on the theoretical and practical implications of this research.

Keywords: Forms of governance, Mechanisms of governance, Administrative organization, Science and technology park, Interorganizational relationships.

Resumen

Este artículo tiene como objetivo identificar las formas de gobernanza que están presentes en las relaciones interorganizacionales en el contexto de parques científicos y tecnológicos. Por lo tanto, el estudio presenta un análisis comparativo de la gobernanza de parques científicos y tecnológicos. Así, se utilizó el estudio de casos múltiples como una estrategia de investigación, incluyendo un parque en Brasil y otro en Portugal. Uno de los parques fue creado por el sector privado por la necesidad de las empresas en compartir recursos y buscar alternativas de crecimiento. El otro fue creado por el gobierno como consecuencia de las políticas públicas para el desarrollo económico y la generación de empleo y renta. Los resultados muestran que los casos estudiados se caracterizan por la organización administrativa, como la forma de gobernanza de las relaciones interorganizacionales. Sin embargo, la forma de gobernanza y los mecanismos formales e informales de gobernanza son las principales conclusiones. Hay otros elementos (e.g., el comportamiento de la gente) que pueden influir en las relaciones interorganizacionales en el contexto del parque científico y tecnológico. Por último, el artículo ofrece una discusión de las implicaciones teóricas y prácticas del estudio.

1   B.Sc. in Accounting, Universidade de Passo Fundo, Brazil, PhD in Management, Universidade do Vale do Rio dos Sinos, Brazil. Group of research on Strategic and Market Relations, IMED Business School, Brazil.

Palabras clave: Formas de gobernanza, Mecanismos de gobernanza, Organización administrativa, Parque científico y tecnológico, Relaciones interorganizacionales.

Résumé

Cet article a pour objectif d´identifier les types de gouvernance présents dans les relations interorganisationnelles dans le contexte des parcs scientifiques et technologiques. L´étude présente une analyse comparative de la gouvernance des parcs scientifiques et technologiques, comprenant un parc au Brésil et un autre au Portugal. L´un de ces parcs a été établi par le secteur privé vue le besoin des entreprises de partager les ressources et trouver des options de croissance. L´autre a été établi par le gouvernement en relation avec les politiques publiques pour le développement économique et la création d'emplois et de revenus. Les résultats montrent que les cas étudiés se caractérisent par l´organisation administrative en tant que type de gouvernance des relations interorganisationnelles. Cependant, le type de gouvernance et les mécanismes formels et informels de gouvernance constituent les principales conclusions. Il y a d´autres éléments (le comportement des personnes) qui peuvent influencer les relations interorganisationnelles dans le contexte des parcs scientifiques et technologiques. En dernier lieu, l´article propose une discussion sur les implications pratiques et théoriques de l´étude.

Mots Clés: Formes de gouvernance, Mécanismes de gouvernance, Organisation administrative, Parc scientifique et technologique, Relations interorganisationnelles.

1. Introduction

Interorganizational relationships have been an issue of special interest to scholars (Oliver, 1990, Oliver & Ebers, 1998, Cropper, Ebers, Huxham & Ring, 2008) of different backgrounds, in particular organizational theory, economics and sociology. This attention has generated a significant increase in the literature, especially in studies of new organizational forms (Thorelli, 1986), the reasons why organizations interact (Oliver, 1990) and the types of interorganizational relationships (Grandori & Soda, 1995).

However, the interorganizational relationships between universities, businesses and government, especially those that are present in science and technology parks, have not been adequately addressed in the research; the majority of the studies, mainly from the 1990s -when there was a significant increase in interest in the topic (Van Dierdonck, Debackere & Rappa, 1991; Quintas, Wield & Massey, 1992; Amirahmadi & Saff, 1993; Felsenstein, 1994; Westhead & Storey, 1995) never discussed the governance modes and/or mechanisms of interorganizational relationships.

Although interorganizational relationships in the context of science and technology parks have grown, it is still observed a of research on the governance of interactions between the organizations. In this sense, stu- dies on university-industry interactions have predominated (Vedovello, 1997; Bakouros, Mardas & Varsakelis, 2002), including those that compare the performance of companies located inside and outside the park (Quintas *et al.,* 1992; Löfsten & Lindelof, 2002, 2003, 2005) and those that analyze the park role in economic development (Phan, Siegel & Wright, 2005). Thus, it is expected that the governance of interorganizational relationships can promote improvement of interaction processes and strengthen mutual interests of those involved in the park, providing interdependence for the achievement of collective gains.

The interorganizational relationships are formed by organizations that have social interactions and that have coherence between the individual and collective goals, made possible by the existence of a structure that needs a governance to obtain the collective gains (Balestrin & Verschoore, 2016). Besides that, the relevance of the study of the governance of interorganizational relationships in the context of science and technology parks should be observed based on the growing interest of developed countries in Europe, Asia and America according to the theme. Similarly, through their governments and their teaching and research institutions, more peripheral countries have undertaken efforts to understand the success of science and technology parks around the world.

Thus, this study focuses on researching the question: What are the governance modes of interorganizational relationships in science and technology parks? Based on this research question, this study aims to identify the governance modes that are present in interorganizational relationships in the context of science and technology parks.

Therefore, this study involves theoretical implications and also contributes to the literature with empirical evidence on the governance modes of interorganizational relationships in science and technology parks. Similarly, the practical implications represent a contribution to government policies and private initiatives in terms of the implementation and development of science and technology parks, as they highlight the importance of governance and its mechanisms for the management and projects continuity.

2. Theoretical background

Interorganizational relationships are relations between dualistic and pluralistic organizations. These relationships have also been characterized as dyadic interactive relationships (between two organizations) or multilateral (between three or more organizations) and non-interactive relationships. Interactive relationships involve cooperation on the basis of coherence of the objectives, interaction and governance, while non-interactive relationships involve only sharing attribute (specific) and common attributes (identity), and there are no interactions with other organizations (Cropper *et al.,* 2008).

In this sense, the interactive interorganizational relationships are also understood as new organizational forms or intermediate or hybrid forms (Thorelli, 1986, Jarillo, 1988, Powell, 1990) within *a continuum* between markets and hierarchies (Williamson, 1991a). These new organizational forms are identified in the literature of interorganizational relationships using expressions such as: alliance, joint venture, network, cluster, science and technology park (Marcon & Moinet, 2001; Cropper *et al.,* 2008).

The science and technology park consists of a concentration of organizations in a given place, which create an environment favorable to technological innovation (Castells & Hall, 1994). In addition, the park stimulates the exchange of information and knowledge between organizations, facilitating the creation and growth of companies, through incubation mechanisms and spin-offs (Ratinho & Henriques, 2010).

In this way, the science and technology park can be considered an innovation environment that has infrastructure and services and allows the development of interorganizational relationships (Chan & Lau, 2005). Thus, the companies installed in the scientific and technological park share a great diversity of resources, which provide collective gains (Vásquez-Urriago, Barge-Gil & Rico, 2016). Therefore, the park provides physical structure, support services and provides interactions between organizations and resources exchange (Sun, Lin & Tzeng, 2009).

According to Castells and Hall (1994), the science and technology park offers a proper environment to the interactions between companies and institutions. Thus, interorganizational relationships between stakeholders, such as university, business and government, create an innovation environment (Van Geenhuizen & Soetanto, 2008).

Studies in the literature have presented a wide range of topics and sought to understand the essential attributes of interorganizational relationships, such as governance modes (Balestrin & Verschoore, 2016). Thus, although there is no unanimity in the definition of modes of governance, the literature realized long ago its relevance to interorganizational relationships (Litwak & Hylton, 1962; Van De Ven, 1976; Whetten, 1981; Grandori & Soda, 1995; Provan & Kenis, 2008).

On the other hand, the vast literature on governance theories has been developed in many fields such as political science, sociology, economics, and organizational theory. Organizational theory has been directed toward corporate governance and, in general, involving studies of the agency problem. Thus, agency theory has been the basis for several studies in which the corporate governance system becomes an alternative to ensure that the agent's behavior is aligned with maximizing shareholder return (Jensen & Meckling, 1976).

Generally, interorganizational relations-

hips are composed of independent, autonomous organizations, and perhaps this may be the main reason for the literature involved in the company's governance study and not of interorganizational relationships (Provan & Kenis, 2008). However, it is necessary to consider some form of governance (Whetten, 1981; Grandori & Soda, 1995) to ensure collective gains, which typically could not be achieved by organizations individually and acting independently.

The advantages of governance are considerable, including more efficient use of resources, better access to services, improved competitiveness, increased ability to solve problems and innovation capacity (Human & Provan, 2000; Provan & Kenis, 2008). Thus, the results or the collective gains from interorganizational relationships depend on how the governance addresses the tensions and conflicts of interest, which are inherent.

In the literature of political science, one can observe a broad discussion about the interactions governance (Rhodes, 1997; Pierre & Peters, 2000; Kooiman, 2003), and from the perspective of the actor it can be ordered as main categories: Collaborative and political (Kooiman, Bavinck, Chuenpagdee, Mahon & Pullin, 2008). Thus, at the structural level of the interactions three governance modes are identified as self-governance, hierarchical governance and co-governance (Kooiman, 2003).

In this context, discussions in the literature allow the adaptation of governance modes to interorganizational relationships. Like this, Provan and Kenis (2008) examined the governance of interorganizational relationships from theoretical perspectives involving relational networks (Granovetter, 1973) and hierarchical coordination (Williamson, 1991b) and defined a typology based on three modes of governance (Figure 1):

Self-governed -consisting of a set of organizations that have a shared governance among all but do not have an independent administrative entity. The coordination of group activities is carried out by the organizations themselves; that is, governance is shared between organizations symmetrically and can be formal (regular meetings) or informal (in the course of activities).

Lead organization -formed by a group of organizations that are coordinated by one of the organizations because of its resources or its leadership. The lead organization has a central position because it keeps as many ties as possible with other organizations, indicating a greater influence on interorganizational relationships (Human & Provan, 1997). The existence of asymmetry between organizations means that all major decisions and activities are coordinated by the lead organization.

Administrative organization -consists of a set of organizations that are coordinated by an independent administrative entity, created especially and exclusively for managing relationships and group activities. The administrative authority may or may not be profitable (Human & Provan, 2000) and can be under the management of a single person or a formal authority structure. A more formalized and complex administrative entity provides greater legitimacy to the interorganizational relationships (Whetten, 1981), especially, to cooperation networks (Kooiman, 2003).

Thus, what factors should determine the best governance mode (Doz & Hamel, 2000) Each governance mode presented depends on a set of conditions that determine their choice. In such a way, Provan and Kenis (2008) propose four determinant conditions to identify the governance mode for each type of interorganizational relationship (Table 1).

The trust level between organizations can determine the most appropriate governance mode (Ring & Van De Ven, 1994) because a lack of trust can result in self-interested or opportunistic behavior (Williamson, 1991b). Governance for self-governed or shared occurs when the organizations involved have strong ties based on a high trust density (Human & Provan, 2000), whereas governance by an administrative organization or by a lead organization occurs when the organizations involved have ties based on a low or moderate density of trust (Ring & Van De Ven, 1992).

A greater number of participants also hinders the governance of relations (Doz & Hamel, 2000). When the number of participants in the interorganizational relationships in-

Figure 1. Network governance modes

Self-governed	Lead organization	Administrative organization
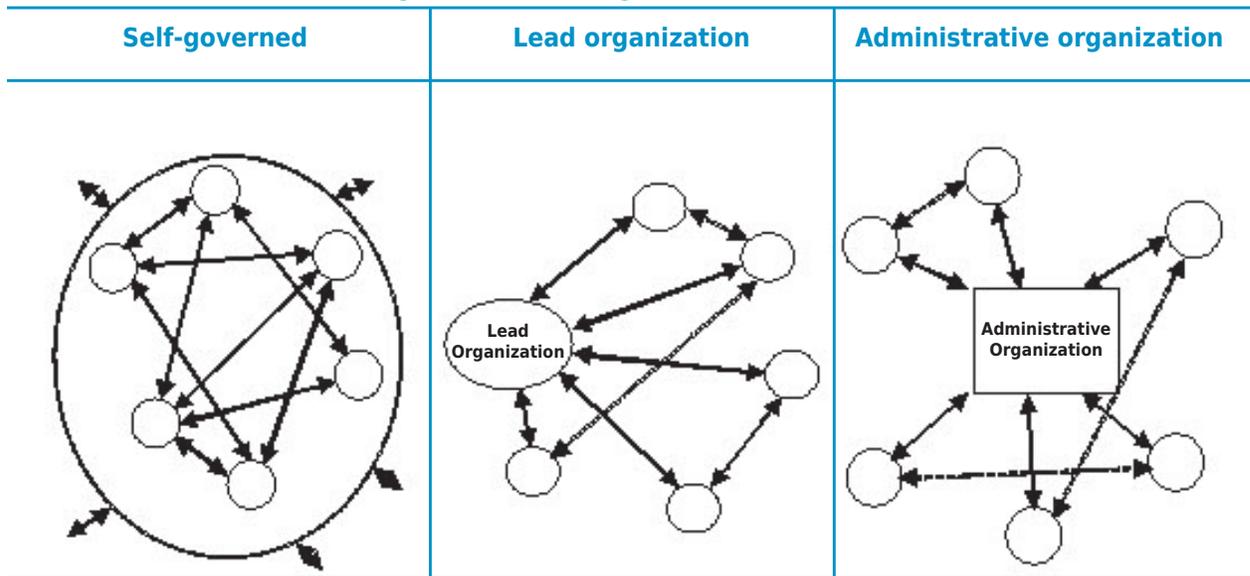
Source: Provan and Kenis (2005, 2008).

Table 1. Determinants of governance

Determinants	Self-governed	Lead organization	Administrative organization
Trust	High density	Low density, highly centralized	Moderate density, notmonitored by members
Number of participants	Few	Moderate number	Moderate to many
Goal consensus	High	Moderately low	Moderately high
Need for network level competencies	Low	Moderate	High

Source: Provan and Kenis (2008).

creases, it becomes extremely complex and difficult to control. Interorganizational relationships that have geographic proximity (concentrated) become self-governed more easily, whereas when the interorganizational relationships are geographically dispersed, governance becomes difficult; one can resort to governance through an organization lead or an administrative organization.

The existence of consensus between individual and collective goals is directly implicated in the governance mode. A timely issue that involves consistency between individual and collective goals can be lifted. In this sense, Provan and Kenis (2008) ponder to what extent the organizational objectives are achieved by participating in interorganizational relationships. The management of multilateral relations should be effective and balanced to produce value for each of its members (Doz & Hamel, 2000). When there is consensus between individual goals and collective objectives, organizations can be more involved and engaged (Van De Ven, 1976). Thus, the choice of governance for the self-governed is more likely when organizations are more involved and engaged, whereas when there is an average consensus between the objectives, governance by an organization lead or by an administrative organization prevails.

In general, the organizational competencies needed to perform the activities in interorganizational relationships are held together by the organizations involved. Thus, governance by the self-governed meets the needs of organizations and their interdependencies. However, in some cases, organizational competencies are different from those required by the interorganizational relationships to obtain collective gains, which requires governance through an organization lead or administrative organization. The organization may not have competencies or may not want to undertake certain activities that are required for successful interorganizational relationships, such as engaging with other organizations to create legitimacy or political lobbying (Provan & Kenis, 2008).

In this context, the distinction of the three governance modes is essential to understand how organizations have developed interorganizational relationships. In this way, governance constitutes one of the main attributes of interorganizational relationships, and therefore, the consideration of the basic characteristics and determinants of each of the modes supports its understanding.

3. Research method

For this study, it was used the multiple case study as a research strategy, selecting a science and technology park located in Brazil and one in Portugal. When defining the cases to be studied, science and technology parks with relevance to the Brazilian and Portuguese contexts are used as selection criteria.

In this sense, the cases selected were: the Tecnosinos - Technological Park of São Leopoldo (Brazil), located in São Leopoldo in the metropolitan region of Porto Alegre and it was awarded the best technology park in 2014 by ANPROTEC; and the Taguspark - Science & Technology Park (Portugal), located in the municipality of Oeiras, a metropolitan region of Lisbon, and it is considered the largest science and technology park in Portugal.

The two selected case studies emerged in the 1990s and have some differences and similarities. The differences between the cases are discussed in terms of the incorporation of the management company and the intensity

of the involvement of the universities, businesses and government in governance.

The similarities between the cases are evident in the participation of the universities, businesses and government, as well as the social goal of developing an enabling environment for innovation and relevance in the local and regional contexts. These differences and similarities contribute to the analysis of the cases and to understanding the governance modes of interorganizational relationships in the context of science and technology parks.

When collecting the data, used multiple sources of evidence and gathering techniques were used such as interviews, observations and documents. Thus, the development of converging lines of research is characterized as the main objective in using multiple evidence sources, enabling a data triangulation process and increasing the reliability and validity of those surveyed data (Yin, 2005).

The data collection procedure occurred in two phases; the first involved secondary data (documents), while the second involved primary data (interviews and direct observations). The article then proceeds to address external documents such as thesis, dissertations, sectoral studies, legislation, magazines and newspapers to help understand the cases. Then, the records were found in files on the sites of their own science and technology parks, and public agencies involved institutions at the same time they were consulting internal documents available on websites and libraries, such as statutes, regulations, resolutions, regulations, manuals and reports.

To terminate the secondary data collection, the process of selecting the institutions to share the interviews was begun, considering the involvement of actors in each case and the willingness to participate in the interviews. Similarly, the company's selection was carried out with the existing database on the websites for the parks. This selection was conducted at random and determined those who were willing to participate in the interviews.

The second phase aimed to collect primary data through interviews and direct observations. Thus, the interview was the main evidence source of the surveyed cases (Yin,

2005). For the interviews, an interview guide was prepared as well as a questionnaire, while for the realization of direct observations a visit guide was elaborated.

The primary data collection instruments were validated by three experts to assess the understanding of the questionnaire and to identify and eliminate potential problems. Only the validation of the instruments was possible to detect some flaws that had been passed unnoticed in their preparation. Information received on the instruments aimed at the suitability of their content for further effective implementation.

The interviews were scheduled by email and confirmed by phone, and the data collection instruments (interview guide, visit guide and questionnaire) were sent in advance to the respondents to take note of the information and data that would be communicated and/or available to the researcher. The interview was conducted by the researcher based on the interview guide and questionnaire and recorded with the consent of the interviewee. In closing the interview, the researcher conducted an *in loco* visit at the premises, making direct observations through the visit itinerary.

Thus, the interviews were conducted with the managers of the companies and institutions previously selected and who agreed to participate in the research. In Tecnosinos (Brazil) 11 interviews were carried out and in Taguspark (Portugal) 8 interviews were carried out. Respondents answered questions related to the governance of inter-organizational relationships such as: What is the governance structure of the park? Depending on the answers, the purpose of the question was deepened with other issues to understand more specific aspects, like: What are the existing governance mechanisms in the park? Thus, each interview was conducted through direct contact with the respondent and was oriented around the chain of evidence, allowing the possibility to formulate new questions from the interviewee answers.

In the data analysis, interviews transcripts were stored electronically in a database, and then the interviews were subjected to content analysis (Bardin, 2006). The analysis of the secondary data served as a support to corroborate the evidence obtained in the

primary data, providing subsidies to perform the triangulation of data.

Content analysis was the organization of primary and secondary data collected; there was also the data categorization and the consequent data interpretation. Thus, the cases were analyzed individually, considering the reports of the various interviewees and other sources of evidence (direct observation and documents), which were corroborated to prepare the description of each of the surveyed cases. Thus, the data triangulation was the convergence of evidence from several sources to explain a certain fact.

4. Case Tecnosinos

Tecnosinos was created in October 1996 by a group of companies in the information technology area interested in setting up near the university. At that moment, an interaction process began between the companies and the Associação Comercial, Industrial e de Serviços de São Leopoldo (ACIS), the purpose of which was to establish a partnership between São Leopoldo City Hall and Universidade do Vale do Rio dos Sinos (UNISINOS).

In May 1997, we defined the project's partner organizations and started the first meetings and studies of the feasibility of the so-called Polo de Informática de São Leopoldo. The municipal government approved the Law N° 4368, extending the period of tax incentives, while UNISINOS announced the implementation of the Incubadora de Empresas de Base Tecnológica and a technological condominium in an acquired area of 5.5 hectares attached to the university campus.

The municipality expropriated 36,589.29 m^2 of land attached to UNISINOS to deploy Polo de Informática de São Leopoldo according to the master plan, reserving the area for special use of technology activities. The Polo de Informática de São Leopoldo was officially established with the enactment of Law N° 4,420 on October 31st, 1997, consisting of a technology incubator, a technological condominium and a science and technology park. The local government was allowed to donate the land so that ACIS could make a donation in the form of modules to companies in the information technology area associated with the Associação das Empresas de Software

e Serviços de Informática do Rio Grande do Sul (ASSESPRO) for the purpose of deploying Polo de Informática de São Leopoldo. In addition, the Polo Council, which comprised representatives of partner organizations involved in the project, was created.

In May 1998, the construction of the technological complex UNITEC (then called the Technology Development Unit) began to house the technology incubator, technological institute and technological condominium, as well as the executive management of the park. Thus, the Polo de Informática de São Leopoldo only opened one year later, on 06/30/1999. On 11/13/2009, the technological arrangement was renamed Tecnosinos - Technological Park of São Leopoldo; the housing, the Polo de Informática de São Leopoldo, Condomínio Padre Rick and technological complex UNITEC.

Tecnosinos is located in the municipality of São Leopoldo, in the metropolitan region of Porto Alegre. The municipality of São Leopoldo has a population of 214,210 inhabitants, and the region has a population of 4,011,224 inhabitants. The Tecnosinos - Technological Park of São Leopoldo is a technological environment to foster new technology area economies driven by innovative entrepreneurship and assist in the sustainable development of the region. Therefore, the park aims to create the necessary environment for the deployment of technology-based companies, enabling the emergence, growth and generation of added value and encouraging Brazilian socio-economic and environmental development.

Tecnosinos is installed in the municipality of São Leopoldo, in the metropolitan region of Porto Alegre, and has a total area of 250,000 m^2, in which there are 75 companies operating in several market segments. These segments are organized into five business areas involving a multi-sector configuration. Most of the companies are engaged in the information technology area.

In Tecnosinos "there is a governance as indicated in figure [...], which is represented by the university, the companies and the local government" (Interview: ACIS's president), i.e., a governance that takes effect at the intersection between the universities, businesses and government. "The system is divided into two levels, a strategic level formed by the mayor, the dean and ACIS's president and the Associação do Polo de Informática de São Leopoldo (formed by companies), which are responsible for the Master Plan deliberation, and another level is formed by the executive board [...]" (Interview: president of ACIS). Thus, at the strategic level, governance is composed of the following organizations:

a. University: Universidade do Vale do Rio dos Sinos;

b. Business: ACIS -Associação Comercial, Industrial e de Serviços de São Leopoldo and Associação do Polo de Informática de São Leopoldo;

c. Government: São Leopoldo City Hall.

The "[...] meetings take place in the presence of the Dean, who represents the university, the mayor, who represents the municipality, the president of the ACIS and the president of the association of companies" of the Polo de Informática de São Leopoldo (Interview: ACIS'S President). Representatives of organizations that form the Tecnosinos governance, "periodically gather [...] to address the strategic issues", from the "needs assessment and [...] within the competencies; each one decides what is asked for us to develop the park" (Interview: municipal secretary from economic development and technology). Similarly, ACIS has "the role of representing the companies [...] the strategies and actions [...] since it participates in the Tecnosinos governance" (Interview: director of ACIS), while the Associação do Polo de Informática de São Leopoldo "[...] has made an effort to attract other companies to the park" (Interview: President from Associação do Polo de Informática de São Leopoldo).

The executive level is "lead by an executive director and one more set of technicians and experts who perform the [...] day-to-day management of the entire technology park as well as the implementation of the Master Plan [...]" (Interview: Tecnosinos' CEO). Tecnosinos does not have a formal structure that allows its administrative and financial independence, i.e., "[...] the model is informal" (Interview: Tecnosinos' CEO). In addition, "Tecnosinos is not a legal entity [...]; the management is performed within the UNISINOS by UNITEC" (Interview: municipal secretary

of economic development and technology), i.e., "[...] executive action is provided by the university" (Interview: ACIS's President). The executive board comprises seven employees, including the executive director and the incubator coordinator, all of whom are employed by UNISINOS.

"It is important that a statute be drafted (perhaps something simpler) to institutionalize the company's participation" (Interview ACIS's Director). Given that the thesis is in a certain area of the park a condominium management under the corporate status of the Associação do Polo de Informática de São Leopoldo, which fosters the management of the demands of the pioneer companies set up in that place Thus, companies associated with Polo de Informática de São Leopoldo are physically separated from other Tecnosinos organizations by a fence.

On the other hand, it is possible to observe the existence or absence of governance mechanisms in Tecnosinos such as statutory bodies, selection systems, planning and control (Table 2). These governance mechanisms are apparent in the instruments used in the park management process, for example, the two levels of the direction, selection and planning system. However, there has been a lack of control, which must be implemented with transparency and accountability to the stakeholders. The use of such appropriate governance mechanisms can increase the level of trust and the participation of organizations involved in Tecnosinos.

In the view of one respondent, "there is a lack of a strategic plan with annual targets. Tecnosinos indicates that there is a Master Plan, but this is not shared with those involved in the Park" (Interview: ACIS's Director). In the interviews, several actions are identified that are performed at Tecnosinos, but it is observed that a formal mechanism for accountability has not been implemented. According to one of the companies, "the management has the authority [...] and has overseen many actions. However, I cannot remember any formal time dedicated to accountability" (Interview: Company's CEO). Another company observesthat "there is no reporting or incubator accounts provided for the incubated companies" (Interview: Company's CEO).

Table 2. Tecnosinos' evidence of governance mechanisms

Mechanisms	Evidence of governance mechanisms
Governance bodies	Strategic direction
	Executive board
Selection system	Incubator regiment
Planning	Master plan
	(no disclosure)
Control	Institutional presentation
	(no disclosure)
	Annual report
	(no disclosure)

Source: Author's own elaboration.

Similarly, the Tecnosinos' governance realizes that there is "no public annual report" (Interview: Tecnosinos' CEO), so sometimes there may be difficulties with communication "[...] in particular in the interaction between companies [...], which could decrease the noise regarding deadlines and projects and allow the communication of what is being planned for the year" (Interview: Company's CEO).

Transparency instruments and accountability can therefore be used to facilitate access to information by interested parties. Thus, the purpose of transparency is to disseminate information through the publication of annual reports for institutional sites, while the purpose of accountability is to present the operating results at a specific event (General meeting) in the auditorium of the park.

5. Case Taguspark

Taguspark was created in 1991 by an initiative of the Portuguese government, through Resolution of the Council of Ministers N° 26/91, which outlined the creation of science parks and technology in the metropolitan areas of Lisbon and Oporto. At that time, the private legal-institutional model was set up with the help from private funding, which should gradually take on a more important role, as well as public resources for scientific and technological infrastructure.

In this sense, the Portuguese government authorized the participation of public institutions and public institutions of higher education. Thus, an installing commission was instituted for the realization of the project feasibility study, a group that in July 1991 presented the statement of the installation at the boundary line of the municipalities of Oeiras, Cascais and Sintra.

On July 30th, 1992 Tagusparque was incorporated -Sociedade de Promoção e Desenvolvimento do Parque de Ciência e Tecnologia da Área de Lisboa SA, a corporation whose main activity is the installation, development, promotion and management of a science and technology park, in addition to the provision of the support services necessary for their activity. At that time, the City Councils of Oeiras, Cascais and Sintra approved the land granting for the installation of Taguspark, and the area used is approximately 130 hectares out of a total area of 350 hectares.

The Tagusparque company was formed with the participation of the founding shareholders, including the Instituto Superior Técnico (IST), Câmara Municipal de Oeiras, Banco Comercial Português (BCP), Caixa Geral de Depósitos (CGD), Instituto de Engenharia de Sistemas e Computadores (INESC), Eletricidade de Portugal (EDP), Portugal Telecom (PT), Sociedade Interbancárias de Serviços (SIBS), Universidade Técnica de Lisboa, Instituto de Apoio às Pequenas e Médias Empresas e ao Investimento (IAPMEI), Banco Português de Investimento (BIP), Fundação para a Ciência e Tecnologia (FCT), Fundação Luso -Americana para o Desenvolvimento, Instituto de Soldadura e Qualidade (ISQ) and EDIFER. Some of the major shareholders instituted their own authorities in Taguspark, in particular SIBS, CGD, BCP, ISQ, IST and PT.

Taguspark consisted of "[...] a set of actors from different types; there is a representative of the local government, [...] the university system, [...] and the central government, [...] and there are banks and companies" (Interview: Taguspark's chairman). Thus, after recognizing the legal makeup of the company in 1992, it began building the infrastructure that makes up the Taguspark in 1993. The official opening of the park took place on July 30, 1995, with the possession of the Board, which succeeded the Installation Committee,

although some organizations were already in operation, such as the Instituto de Soldadura e Qualidade (ISQ).

Taguspark is installed in the municipality of Oeiras, located in the metropolitan area of Lisbon, and has a total area of 3,500,000 m^2, in which there are 110 companies operating in various market segments. The municipality of Oeiras has a population of 172,120 and is located in a region with a population of 2,819,433. Taguspark -Parque de Ciência e Tecnologia is a project that brings together companies and public and private institutions, has no specific vocation, and is focused on information technology, telecommunications, electronics industry, materials, production, energy, environment, biotechnology and fine chemicals.

Thus, the Taguspark was established as the result of public policy regarding science and technology of the Portuguese government, which was legally allocated large amounts of public funds. Although the park has favorable infrastructure and specialized services for an innovation environment, we faced various difficulties in recent years keeping the park as a reference, considering that there were already approximately 160 companies, which has fallen to 110. Thus, the managing body of the park has performed actions to complete the Taguspark consolidation phase through investments in infrastructure and services, creating conditions that favor cooperation between companies and institutions.

Therefore, "the challenge of this management was clearly to give a new direction to the Taguspark because from 2008 to 2010, there was a very strong misalignment, and the management lost the sense of a science and technology park" (Interview: Taguspark's chairman). Thus, actions are concentrated in "[...] the incubator restructuring, [...] the construction of a central square [...] and a student residence to bring life to the park [...]", as in Silicon Valley, "[...] there are community centers, bars, restaurants, and people interacting and exchanging information" (Interview: Taguspark's chairman). This aspect has been observed by companies, as in the following comment of one respondent: "This building for the incubator already existed, but they remodeled everything for the incubator" (Interview: company's CEO).

The park's governance is held by the company Tagusparque -Sociedade de Promoção e Desenvolvimento do Parque de Ciência e Tecnologia da Área de Lisboa SA, which was created to institutionalize the science and technology park. "The adopted legal model is a corporation, with the participation of shareholders with interests in regional development and science and technology [...]" (Interview: municipal director economy and innovation).

Thus, park's governance is carried out "in an autonomous manner and under the responsibility of the respective management bodies that are accountable to their shareholders and stakeholders" (Interview: FCT's President). "The current management took over in 2010 and decided to draw up a strategic plan with actions to make the Taguspark a reference park, [...] the plan was presented to the shareholders at an Extraordinary General Meeting" (Interview: chairman of Taguspark).

The Taguspark governance structure is based on the standards of corporations, which have a management and control system composed of several governance bodies. Thus, "the adopted model is distinguished from a simple industrial park because of the ability to engage in a significant aspect of creation and scientific and technological diffusion" (Interview: municipal director economy and innovation).

"At first the Taguspark had a strategic direction to create within the municipality of Oeiras an information technology center [...], but at this point, the strategic direction is changing to the life sciences" (Interview: Company's CEO). The operator of the park has held shares through investments in infrastructure and services for the purpose of creating the conditions to facilitate cooperation between companies and institutions. In this sense, the purpose of the company's management "is to reorganize the park and attract companies in the areas of the life sciences (biotechnology) [...] it will be interesting because we can create synergy between the companies in information technology and life sciences" (Interview: Company's CEO).

On the other hand, the Taguspark's governance is structured by a society statute and by a set of regulations (available at the Taguspark site), which regulates the activities of the governance bodies. In addition, the governance structure is composed of various mechanisms such as the governance bodies, selection system, planning and control (Table 3). The governance bodies are elected by shareholders at the Annual General Meeting for a term of three years. "Three governance bodies in three years are elected, and these are proposed by the shareholders in the form of lists, which are voted in the General Meeting" (Interview: Taguspark's chairman).

Table 3. Evidence of governance mechanisms of Taguspark

Mechanisms	Evidence of governance mechanisms
Governance bodies	General meeting
	Board of directors
	Fiscal council
	Scientific and technological council
	Executive ommittee
Selection system	Guide of incubator
	Incubator's regiment
Planning	Strategic planning (no disclosure)
Control	Institutional presen tation (no disclosure)
	Annual report

Source: Author's own elaboration.

The elected bodies are vested and are meant to exercise their targeted activities through regulations. The Executive committee, in addition to other duties, serves to make the accountability annual. "Every year, management prepares a report of accounts that is presented to shareholders for approval at the General meeting and also presents the business plan proposal for the next year" (Interview: Taguspark's Chairman).

Although the planning and control mechanisms are presented in the General meeting, it is clear that there could be more transparency, such as the annual report that is avai-

lable at the Taguspark site. One company is observed to have said "I do not know if the park engages in strategic planning; there is no good account of their actions; I do not know [...] the hierarchical structure of the park, although there may be a lack of information on my part, but I think there is a lack of communication here" (Interview: Company's CEO). Another company notes that "we do not have access to information" (Interview: Company's CEO).

In the annual report of the year 2011 of the Taguspark it is observed the shareholder's opinion showing dissatisfaction with a document that stated the following: "[...] I do not understand, explicitly and in all of its extensions, the range of activities included in the 'Plan of Activities and Budgets / 2011' and Strategic Program" (Document: Taguspark). Moreover, it is observed "there was no significant activity in technological development, thus preventing the Taguspark from evolving into a true technology park or an office park [...]" (Document: Taguspark).

6. Results and discussion

The two cases analyzed originated in the 1990s and are installed in municipalities located in metropolitan areas with similar population (Table 4).

Table 4. Parks' characteristics

Characteristics	Tecnosinos	Taguspark
Origin	1996	1991
City	São Leopoldo	Oeiras
City population	214,210	172,120
Metropolitan region	Porto Alegre	Lisbon
Country	Brazil	Portugal
Number of companies	75	110
Total area (m²)	250,000	3,500,000
Field	Multi-sectorial	Multi-sectorial

Source: Author's own elaboration.

Although there is a slight difference in the parks' lifespan, Tecnosinos has grown steadily over the past four years, while the Taguspark experienced a small drop in the number of companies but has made efforts to improve performance with the intensification of incubator activities and the entry of a large company into the park.

On the other hand, most companies in the parks are in the information technology area, still the most common area in both parks; it was possible to identify areas such as biotechnology, energy and functional foods as gaining ground. As regards the areas, it became clear that Tecnosinos has five areas of expertise, while the Taguspark has eight.

In both parks, there is an 'administrative organization' that constitutes the governance, although the Tecnosinos' governance structure has a more informal character. The conditions that determine the governance mode are similar to the governance by 'administrative organization' as defined by Provan and Kenis (2008).

Thus, the governance of both parks is characterized by pre-established conditions, with a medium-level trust between organizations, while the number of participants is medium to high (75 and 110). Likewise, there is an average level in the consensus between individual and collective goals, while there is a high level of competence among organizations for the execution of activities. Thus, the two parks analyzed fulfill the pre-established conditions, identifying the governance mode of the interorganizational relationships exercised through an 'administrative organization'.

Besides that, the parks' governance is evidenced by the various governance mechanisms such as the governance bodies, selection system, planning and control (Table 5). Thus, it appears that the Taguspark has all the governance bodies provided for a legally constituted 'administrative organization' in the form of a corporation, while the Tecnosinos has only two governance bodies constituted informally because it has a formally constituted 'administrative organization'.

In addition, there is a difference in the parks' management: While Tecnosinos' Executive Board is linked to the university, the

Table 5. Evidence of governance mechanisms in the parks

Mechanisms	Tecnosinos	Taguspark
Governance bodies	Does not have	General meeting
	Strategic direction	Board of directors
	Does not have	Fiscal ouncil
	Does not have	Scientific and technological council
	Executive board	Executive committee
Selection system	Does not have	Guide of incubator
	Incubator regiment	Incubator regiment
Planning	Master plan (no disclosure)	Strategic planning (no disclosure)
Control	Institutional presentation (no disclosure)	Institutional presentation (no disclosure)
	Annual report (no disclosure)	Annual report

Source: Author's own elaboration.

Taguspark's Executive Committee is elected by the shareholders for a term of three years. This situation is a consequence of the fact that Tecnosinos has not made a formal 'administrative organization'.

Similarly, governance mechanisms such as the selection system and the Tecnosinos' planning and control are not disclosed, while in Taguspark, only the strategic planning and institutional presentation are not disclosed. Transparency and the provision of planning and control mechanism accounts are important to increase the trust and participation of the park organizations.

7. Conclusion

The evidence provides empirical support for the theoretical evidence put forward by Provan and Kenis (2008) corroborating that governance modes of interorganizational relationships are explained by pre-established conditions and governance mechanisms that can be formal and/or informal. The pre-established conditions are the level of trust, the number of participants, the consensus between the individual and collective goals and the level of competence, while the governan-ce mechanisms can be summarized in the following four terms: governance bodies, selection system, planning, and control.

In this sense, the results show that the case studies are characterized by administrative organizations, such as the governance mode of interorganizational relationships. Although, the governance mode and its mechanisms match the main evidence noted, there are other elements (agent behavior) that can influence the interorganizational relationships in the context of science and technology parks.

Then, in the surveyed cases, governance takes the form of an administrative entity that is formally constituted in Taguspark and informally constituted in Tecnosinos. Thus, it is evident that the governance mode in the studied cases exhibits a difference in the parks' management, as the Tecnosinos' Executive Board is linked to the university, while the Taguspark's Executive Committee is elected by the shareholders. This situation is a result of the fact that Tecnosinos has not made a formal 'administrative organization'.

The empirical evidence shows that there is a gap between the parks' governance and

companies, with claims in both cases reporting a lack of transparency and accountability. However, in both cases, the governance is developing actions to enhance interactions in the park. Thus, the use of these appropriate governance mechanisms can increase confidence levels and the participation of the organizations involved.

Therefore, this study assists in understanding an important aspect in the literature of interorganizational relationships, in particular modes and/or the mechanisms of governance of interorganizational relationships. Still, the literature on interorganizational relationships has received important contributions in recent decades; a few studies have explored the governance modes of these relationships (Milward, Provan, Fish, Isett, & Huang, 2009).

The theoretical implications involve the search for modes and the governance mechanisms of interorganizational relationships in the context of science and technology parks and in emerging countries (Brazil) and peripheral countries of the European community (Portugal). Thus, this study corroborates the literature with the investigation of another type of interorganizational relationship -science and technology parks- as studies indicate (Balestrin & Verschoore, 2007) in terms of subsidies compared to other countries.

Regarding the practical implications, understanding the governance modes can facilitate or hinder interorganizational relationships. Thus, managers can gather some insight into how this empirical evidence can benefit their practice, strategically using the information to shape the structure, governance and resource allocation of collaborative relationships.

In terms of research limitations, the results of this study are limited in their generalizability to other contexts, considering that the case studies are included in a single type of context. This aspect reduces the possibility of using the evidence to explain the phenomenon in other contexts, although it may serve as empirical support.

However, future studies suggest the application of other methods and research techniques to show new results or complementary results. It would also be timely to have a longitudinal analysis to understand how the development of the governance of interorganizational relationships occurs (Milward *et al.,* 2009). The results indicate the need for a more robust definition of appropriate governance mechanisms. In other words, the governance of interorganizational relationships (Litwak & Hylton, 1962; Whetten, 1981) can provide benefits such as an efficient use of resources, better access to resources, greater competitiveness, increased ability to solve problems and the capacity for innovation (Grandori & Soda, 1995; Provan & Kenis, 2008).

8. Acknowledgements

9. References

Amirahmadi, H., & Saff, G. (1993). Science parks: a critical assessment. *Journal of Planning Literature*, *8*(2), 107-123.

Bakouros, Y. L., Mardas, D. C., & Varsakelis, N. C. (2002). Science park, a high tech fantasy? An analysis of the science parks of Greece. *Technovation, 22*(2), 123-128.

Balestrin, A., & Verschoore, J. R. (2007). Relações interorganizacionais e complementaridade de conhecimentos: proposição de um esquema conceitual. *Revista de Administração Mackenzie*, *8*(4), 153-177.

Balestrin, A., & Verschoore, J. (2016). *Redes de cooperação empresarial: estratégia de gestão na nova economia* (2ª edi.). Porto Alegre, Brasil: Bookman.

Bardin, L. (2006). *Análise de conteúdo*. Lisboa, Portugal: Edições 70.

Castells, M., & Hall, P. (1994). *Technopoles of the world: the making of twenty-first-century industrial complexes*. London, UK: Routledge.

Chan, K. F., & Lau, T. (2005). Assessing technology incubator programs in the science park: the good, the bad and the ugly. *Technovation*, *25*(10), 1215-1228.

Cropper, S., Ebers, M., Huxham, C., & Ring, P. S. (2008). *The Oxford handbook of inter-organiza-*

tional relations. Oxford, UK: Oxford University Press.

Doz, Y. L., & Hamel, G. (2000). *A vantagem das alianças: a arte de criar valor através de parcerias*. Rio de Janeiro, Brasil: Qualitymark.

Felsenstein, D. (1994). University-related science parks - 'seedbeds' or 'enclaves' of innovation? *Technovation*, *14*(2), 93-110.

Grandori, A., & Soda, G. (1995). Inter-firm networks: antecedents, mechanisms and forms. *Organizations Studies*, *16*(2), 183-214.

Granovetter, M. (1973). The strength of weak ties. *American Journal of Sociology*, 1360-1380.

Human, S. E., & Provan, K. G. (2000). Legitimacy building in the evolution of small-firm multilateral networks: a comparative study of success and demise. *Administrative Science Quarterly*, *45*(2), 327-365.

Human, S. E., & Provan, K. G. (1997). An emergent theory of structure and outcomes in small-firm strategic manufacturing networks. *Academy of Management Journal*, *40*(2), 368-403.

Jarillo, J. C. (1988). On strategic networks. *Strategic Management Journal*, *9*(1), 31-41.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305-360.

Kooiman, J. (2003). *Governing as governance*. London, UK: Sage.

Kooiman, J., Bavinck, M., Chuenpagdee, R., Mahon, R., & Pullin, R. (2008). Interactive governance and governability: an introduction. *Journal of Transdisciplinary environmental studies*, *7*(1), 1-11.

Litwak, E., & Hylton, L. F. (1962). Interorganizational analysis: a hypothesis on co-ordinating agencies. *Administrative Science Quarterly*, *6*(4), 395-420.

Löfsten, H., & Lindelöf, P. (2003). Determinants for an entrepreneurial milieu: science parks and business policy in growing firms. *Technovation*, *23*(1), 51-64.

Löfsten, H., & Lindelöf, P. (2005). R&D networks and product innovation patterns - academic and non-academic new technology-based firms on science parks. *Technovation*, *25*(9), 1025-1037.

Löfsten, H., & Lindelöf, P. (2002). Science parks and the growth of new technology-based firms

- academic-industry links, innovation and markets. *Research Policy*, *31*(6), 859-876.

Marcon, C., & Moinet, N. (2001). *Estratégia-rede: ensaio de estratégia*. Caxias do Sul, Brasil: EDUCS.

Milward, H. B., Provan, K. G., Fish, A., Isett, K. R., & Huang, K. (2009). Governance and collaboration: An evolutionary study of two mental health networks. *Journal of Public Administration Research and Theory*, *20*(suppl 1), i125-i141.

Oliver, A. L., & Ebers, M. (1998). Networking network studies: an analysis of conceptual configurations in the study of inter-organizational relationships. *Organization Studies*, *19*(4), 549-583.

Oliver, C. (1990). Determinants of interorganizational relationships: integration and future directions. *Academy of Management Review*, *15*(2), 241-265.

Phan, P. H., Siegel, D. S., & Wright, M. (2005). Science parks and incubators: observations, synthesis and future research. *Journal of Business Venturing*, *20*(2), 165-182.

Pierre, J., & Peters, B. G. (2000). *Governance, politics and the State*. Houndmills, UK: MacMillan Press.

Powell, W. W. (1990). Neither market nor hierarchy: networks forms of organization. *Research in Organizational Behavior*, *12*, 295-336.

Provan, K. G., & Kenis, P. (2005, Sep-Oct). *Modes of network governance and implications for network management and effectiveness.* Paper presented at the *Public Management research Conference*. The University of Southern California, Los Angeles, USA.

Provan, K. G., & Kenis, P. (2008). Modes of network governance: structure, management, and effectiveness. *Journal of Public Administration Research and Theory*, *18*(2), 229-252.

Quintas, P., Wield, D., & Massey, D. (1992). Academic-industry links and innovation: questioning the science park model. *Technovation*, *12*(3), 161-175.

Ratinho, T., & Henriques, E. (2010). The role of science parks and business incubators in converging countries: evidence from Portugal. Technovation, 30(4), 278-290.

Ring, P. S., & Van De Ven, A. H. (1994). Development processes of cooperative interorganizational relationships. *Academy of Manangement Review*, *19*(1), 90-118.

Ring, P. S., & Van De Ven, A. H. (1992). Structu-

ring cooperative relationships between organizations. *Strategic Management Journal*, *13*(7), 483-498.

Rhodes, R. A. W. (1997). *Understanding governance: policy networks, governance, reflexivity and accountability* (1ª edi.). Maidenhead,UK: Open University Press.

Sun, C., Lin, G. T. R., & Tzeng, G. (2009). The evaluation of cluster policy by fuzzy MCDM: empirical evidence from HsinChu Science Park. *Expert Systems with Applications*, *36*(9), 11895-11906.

Thorelli, H. B. (1986). Networks: between markets and hierarchies. *Strategic Management Journal*, *7*(1), 37-51.

Van De Ven, A. H. (1976). On the nature, formation, and maintenance do relations among organizations. *Academy of Management Review*, *1*(4), 24-36.

Van Dierdonck, R., Debackere, K., & Rappa, M. A. (1991). An assessment of science parks: towards a better understanding of their role in the diffusion of technological knowledge. *R&D Management*, *21*(2), 109-124.

Van Geenhuizen, M., Soetanto, D. P. (2008). Science parks: what they are and how they need to be evaluated. *International Journal of Foresight and Innovation Policy*, *4*(1-2), 90-111.

Vásquez-Urriago, Á. R., Barge-Gil, A., & Rico, A. M. (2016). Science and technology parks and cooperation for innovation: Empirical evidence from Spain. *Research Policy*, *45*(1), 137-147.

Vedovello, C. (1997). Science parks and university-industry interaction: geographical proximity between the agents as a driving force. *Technovation*, *17*(9), 491-531.

Westhead, P., & Storey, D. J. (1995). Links between higher education institutions and high technology firms. *Omega*, *23*(4), 345-360.

Whetten, D. A. (1981). Interorganizational relations: a review of the Field. *Journal of Higher Education*, *52*(1), 1-28.

Williamson, O. E. (1991a). Comparative economic organization: the analysis of discrete structural alternatives. *Administrative Science Quarterly*, *36*(2), 269-296.

Williamson, O. E. (1991b). *Mercados y jerarquias: su análisis y sus implicaciones antitrust*. Ciudad de México, México: Fondo de Cultura Económica.

Yin, R. K. (2005). *Estudo de caso: planejamento e métodos* (3ª edi.). Porto Alegre,Brasil: Bookman.