

Research Article

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International Innovation Alliances: A Case Study of the Influence of Proximity in the Aviation Sector

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Abstract: Access to external sources of knowledge is a critical factor for the development of innovation and the absence of proximity between partners, which goes beyond the geographical aspect – being cognitive, social, organizational or institutional, can influence results. Despite this understanding, there is a lack of studies assessing the relationship between proximity and type of innovation. This study intended to discover what type of proximity compensates geographical distance for different innovation results in international alliances. Based on comparative case studies of international innovation alliances in the aviation sector, the results indicate that for exploration innovation, cognitive and institutional proximity stood out, and for exploitation innovation, cognitive and organizational proximity was highlighted. Based on these combinations, a series of proposals are made at the end of the study. It can be concluded that the success of alliances does not depend on developing all dimensions of proximity.

Keywords: Non-spatial proximities; International Alliances and Innovation

1 Introduction

External sources of knowledge become important complements to the company's internal knowledge base and thus become a critical factor for the development of innovation (Chesbrough, 2003; Hagedoorn & Duysters, 2002). Thus, open strategies enable organizations to access wide varieties of specialized knowledge in order to compete innovatively (Chesbrough, 2003). Accessing technological knowledge through R&D alliances can help companies reduce time to market, in addition to the development of innovations that would be impossible to achieve internally (Narula, 2002).

Tourism and hospitality supporting companies already recognize technological innovation as a way of activating Tourism 4.0. These companies are subject to rapid changes and strategic alliances, especially for resource sharing, which appears to be decisive for improving competitiveness and achieving competitive advantage (Parg & Chen, 2014). For these authors, the benefits of strategic alliances include conserving resources, sharing risks, reducing product development costs and, in particular, improving technological capabilities (Zhang & Lu, 2010; Guido & Franco, 2003).

Despite the benefits, R&D alliances carry risks. Therefore, it can be said that tension exists between sharing and protecting knowledge, leading to other paradoxes, such as a preference for geographically close or distant partners (Martínez-noya & Narula, 2018). However, would it not be a short-sighted view to analyze the relationship of the partners limited only to the spatial aspect? There are other aspects of proximity that also influence interorganizational relations, from knowledge exchange to innovation, such as cognitive, organizational, social and institutional proximity (Boschma, 2005; Knoblen & Oerlemans, 2006).

Nevertheless, little is known about the degree of proximity in alliances most likely to maximize innovation (Martínez-Noya & Narula, 2018); since in situations of low proximity between partners, there may be problems of coordination, communication, and even conflicts (Mattes, 2012). As a result, studies on the topic suggest the exist-

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ence of inter-relational offsetting effects between types of proximity (Boschma, 2005; Hansen, 2015; Huber, 2011). In other words, the different dimensions of proximity are interconnected in order to achieve innovation results, as distance in one type of proximity can be compensated by the existence of another in a different dimension.

Moreover, the desired proximity characteristics may depend on the intended motivations of the partnerships (Hansen, 2014). Exploitative innovation-oriented strategies reinforce existing knowledge and seek to respond to current market conditions by adapting technologies and meeting customer needs. Exploratory innovation challenges organizational learning and aims to respond to environmental trends, creating innovative technologies for new markets (Lubatkin, Simsek, Ling, & Veiga, 2006). Indeed, it is to be expected that there are persistent tensions between exploration and exploitation. This paradox leads us to reflect on whether the antecedents of innovations are neither totally different nor absolutely integrating—that is, the same antecedents can work differently for exploration and exploitation (Liu, Wang, & Li, 2019).

The conception of this research is based on innovations that have transformed the provision of tourism services through improving digital platforms and consumer travel experiences. We intend, therefore, to contribute to advancing the discussion of international innovation alliances, which are recurrent open strategy models (Eisenhardt & Martin, 2000) and characteristic approaches of geographically distant partners. Furthermore, this paper may contribute to the changes inherent to and imposed by the current Covid-19 pandemic. In a global context, in which everyone has been forced to remain physically distant, understanding proximity behaviour can encourage the maintenance of collaboration strategies.

Thus, we propose to answer the following question: **What type of proximity compensate geographical distance for different innovation results in international alliances?** As a way of looking at this, our specific objectives are to investigate: i) which types of proximity are related to exploration innovation; ii) which types of proximity are related to exploitation innovation and, finally; iii) how companies in the airline sector offset geographical distance to achieve innovation.

In order to achieve our objective, using an exploratory qualitative method, we selected two case studies that operate in the aviation market and implement open technological advancement strategies (Brossard & Gres, 2007). In addition, for the selection of the cases, the difference in innovation strategy was considered, which made it possible to analyze the proximity in the light of *explo-*

ration and *exploitation* orientation. Finally, we emphasize offsetting mechanisms for non-spatial proximity, which is missing from the literature, as the focus of most studies is geographical proximity (Steinmo & Rasmussen, 2016).

2 Proximities for Innovation

The typology proposed by Boschma (2005) has gained great importance among researchers and has been considered the most complete (Hansen, 2015). The model proposes that, in addition to the geographic aspect, cognitive, organizational, social and institutional proximity can impact exchange of knowledge and innovation (Boschma, 2005; Broekel & Boschma, 2012).

Cognitive proximity can be defined as similarities in the way the actors perceive, interpret, understand and evaluate the world (Nooteboom, 2000); in other words, they share the same knowledge and experience base and can learn from each other, facilitating communication and effective integration (Boschma, 2005). Furthermore, cognitive overlap is needed in order to transfer or create new knowledge between allies. In this sense, cognitive proximity is likely to increase knowledge transmission, in which the partners' knowledge base expands and overlaps (Balland, Boschma, & Frenken, 2015).

Oerlemans and Meeus (2005) define organizational proximity as actors who belong to the same space of relationships; Torre and Rallet (2005) define it as actors whose interactions are facilitated by rules, routines, and behaviour and who share the same system of representations or set of beliefs. Similarity of organizational purposes, functions and experience are also characteristics of this dimension (Steinmo & Rasmussen, 2016). According to Boschma (2005), organizational proximity is defined as the extension of relationships in an organizational arrangement, both intra and inter-organizational, thus involving the autonomy and degree of control that can be exercised in the arrangements.

Institutional proximity describes the extent of norms, habits, rules and laws between economic agents, involving both formal and informal institutional aspects (Knoben & Oerlemans, 2006). Thus, the notion of this dimension includes the idea of organizations which shares the same institutional rules and set of cultural habits and values (Boschma, 2005). Institutional proximity, therefore, is also considered as cultural proximity, which has two levels: the first level responsible for examining cultural differences between countries, nations or regions; the

second level focusing on differences in organizational culture (Knoben & Oerlemans, 2006).

In essence, economic relations are, in a way, always incorporated in a social context. Social proximity, in turn, is denoted as personal or relational proximity between peers (Schamp, Rentmeister, & Lo, 2004). Such a dimension exists when there is trust based on friendship, kinship and previous experience between the actors (Boschma, 2005). In the meantime, we emphasise that both organizational and social proximity are characterized by strong ties between partners, although different mechanisms are involved (hierarchy and trust, respectively).

Finally, geographical proximity, the most commonly discussed dimension in the literature, denotes territorial, spatial, local or physical proximity between agents (Knoben & Oerlemans, 2006). The geographical dimension can be measured by absolute distance, distance relative to the means of transport (travel times) or how these distances are perceived by the actors (Balland *et al.*, 2015; Knoben & Oerlemans, 2006; Torre & Rallet, 2005). Such a notion implies, therefore, that the actors do not need to be constantly geographically close, since meetings, short visits and temporary presence at the location may be sufficient for the actors to overcome this distance.

In general, as a way of understanding how each dimension impacts innovative performance, we can conclude that although the proximity is essential for agents to connect and exchange knowledge, too much proximity, in any dimension, can harm innovative performance (Boschma & Frenken, 2010). Such a paradox leads us to reflect whether there is an interrelation between dimensions, in which distance in one dimension can be compensated by proximity in another. The compensation mechanism occurs when the distance in one dimension is offset by at least one other dimension (Huber, 2011).

From this perspective, certain studies have been conducted looking for evidence of the interrelationship of types of proximity (Capaldo & Petruzzelli, 2014; Fitjar, Huber, & Rodríguez-Pose, 2016; Hansen, 2015; Huber, 2011). Preliminary results suggest the existence of interrelational effects of compensating between the types of proximity, although they are not specified. Subsequently, it was found that organizational proximity can compensate geographical distance (Capaldo & Petruzzelli, 2014) and cognitive, in turn, replaces geographical distance in collaborative projects for innovation in the clean technology industry (Hansen, 2015). The studies emphasize the relevance of proximity to the results of innovation in collaborative alliances; however, there is little literature that considers both dimensions of proximity and its results for

innovation (Hansen, 2015). Therefore, it is worth reflecting on this in more depth, which we do in the next topic.

3 Types of Proximity and Exploration and Exploitation Innovation

The literature on innovation is longstanding and organizations' capacity for innovation is recognized as a determining factor in survival and achieving business success (Wang & Ahmed, 2004). Generating innovative results depends critically on the ability to integrate, build, and reconfigure internal and external skills to deal with rapidly changing environments (Teece, Pisano, & Shuen, 1997), that is, the ability to manage differences.

We cannot speak of innovation without considering learning, since innovation is combining existing knowledge or creating something new (Mattes, 2012). Exploration and exploitation are distinct forms of learning (March, 1991).

In the ambit of innovation technology, Benner and Tushman (2003) argue that exploitative innovation involves improvements to components or architecture within an existing technological trajectory in the organization; exploratory innovation involves adopting a different technological trajectory. Exploration innovations are radical proposals requiring new knowledge, starting from a company's existing knowledge base and, therefore, offering fundamentally new products (Jansen, Vera, & Crossan, 2009; March, 1991). Exploitation innovations are incremental, based on existing knowledge, thus expanding the company's knowledge base and thereby improving established products without changing the basic nature of skills, processes, and structures (Jansen *et al.*, 2009; March, 1991).

It has been already recognized that collaborating with other institutions facilitates learning, as well as enabling access to new knowledge (exploration) and leveraging existing knowledge (exploitation) (Kauppila, 2010); however, they depend on different structures, processes, strategies, capacities and culture (He & Wong, 2004). Despite advances in this area of research, there are still no studies seeking to discover the influences of types of proximity between partners for the different exploration and exploitation alliances (Geerts, Leten, Belderbos, & Van Looy, 2018). Therefore, understanding the influence of types of proximity on types of innovation results can contribute to advancing the topic of proximity and innovation alliances, which this work does.

4 Method

The methodology used is qualitative exploratory, since analysis of the influence of the types of proximity on the different innovation results is a subject that has not been widely explored, enabling us to present a series of proposals for future investigations. To validate the study and ensure greater credibility, the method adopted was the case study. Following Yin's case study methodology (2010), a protocol was developed with sufficient conditions, mentions, and procedures for the study to be replicated. Data was collected through interviews, document analysis, and secondary sources of information (e.g., scientific articles conducted with companies, reports, public interviews and institutional websites).

The interview script was prepared based on a literature review and was divided into four parts: i) contextualization of the company: in which information on the organization's history was addressed and confirmed; ii) context of the alliance: based on the choice of the most significant innovation partner in the last three years, we investigated the history of the partner, main motivators, results, evolution of relationships and challenges; iii) proximity: in which the respondent's perception of each dimension of proximity and their interrelations was identified and, finally; iv) partnership innovation results.

To achieve the aim of this research, it was deemed necessary to look for cases of companies operating in sectors recognized for technological advances and for open strategies for access to knowledge. Thus, aircraft design and software technology companies were selected, which are sectors of high technological intensity, according to the OECD (2016). Moreover, in order to ensure comparative effect, one of the selected cases has a clear strategy for exploration innovation and the other one for exploitation innovation. Another criterion for choosing the cases was that they carried out alliances with partners from countries other than the countries of origin of the companies, that is, those that were geographically distant. Innovation alliances were analyzed as a research unit, rather than the company as a whole, as conducted by Steinmo and Rasmussen (2016). Regarding the technological competitiveness of companies in developing countries, such as Brazil, this will increasingly depend on companies' ability to access external knowledge, since the lack of an environment conducive to innovation in the country of origin motivates internationalization (Santos, 2006). In view of the above, it is valid to compare companies from countries with different stages of internationalization, market dimensions, and geographic

positioning, that, despite the differences, need to seek competitive strategies beyond their borders.

The data were collected between 2018 and 2020. Employees were interviewed from companies with direct knowledge of both geographically distant partners and the innovative results obtained. At the Portuguese company *AlmaDesign*, we interviewed the owner and the main collaborator, who owns a small part of the company. At the Brazilian company *Monitora Soluções*, two project managers and one of the owners were interviewed. Secondary data sources were also used, such as company websites, project performance reports, journalistic reports related to companies, institutional presentations, and academic articles.

Finally, the data processing started with transcription of the recorded interviews in full. Soon thereafter, the data were interpreted, aiming to find broader meanings contemplated in the responses obtained and to link them to other knowledge. Supported by Nvivo software, we codified the data. Twelve categories were created: proximity (cognitive, social, organizational, institutional and geographical); distancing (cognitive, social, organizational, institutional and geographical); innovation (exploration and exploitation). After defining the main categories, we started coding the interview transcripts, intending to identify the "units of thought," words, lines or passages that represented a fundamental idea or concept of the category. The data collected in the companies' dossiers were also categorized. Finally, the content analysis methodology was used, which, through the objective and systematic description of the content of the messages, aims to interpret communication and information (Bardin, 2011). We analyzed the contents of the data collected at two levels: first, we considered the content manifested in the text, which can be more easily captured and revealed; second, we sought to identify the latent content, which includes deeper embedded meaning. The results are presented in the next section.

5 Case Studies

5.1 AlmaDesign

AlmaDesign is a design and consultancy services company for all stages of the design process, including researching and defining concepts, project development, prototyping, production, and promotion of products and services. It works predominantly in design projects in the area of transport, furniture, and urban intervention. The

company is located in Paço de Arcos, Portugal, and has 12 employees.

Of the company's various innovation projects, the one chosen for the discussion was PASSME, which was an alliance involving 12 organizations from six different countries. The main objective was to reduce boarding time to a maximum of 60 minutes, from arrival at the airport to the departure of the aircraft, in European airports. The innovations resulting from this partnership include, for example, demand, luggage, and personalized passenger information forecasting system. The company was directly related to innovation in aircraft seats, redesign of the departure gate, check-in, and way finding. The project was funded by H2020 (Horizon 2020), which is the largest research and innovation program in the European Union and was conducted from 2015 to 2018.

Without a doubt, PASSME is, in essence, exploration innovation. These are long-term innovation proposals, seeking results from emerging demands and seeking new knowledge for the company. As a result, *AlmaDesign's* aim with this project was to learn and access knowledge and from there to explore future innovation opportunities. The type of innovation is even identified in the entrepreneur's speech "we started working on creating prospective projects, innovation, things that could turn out to be products in a more distant horizon." It is concluded, then, that the company understands the peculiarities and importance of innovating, investing and strongly encouraging alliances for innovation.

Regarding the established proximities, the social dimension was decisive for establishing the alliance. In particular, the invitation to participate in the PASSME project arose from the recognition in the form of the Crystal Cabin Award, which *AlmaDesign* received. The company has a strategy of participating in fairs and competitions in the sector to establish networks of contacts, to make technical presentations, and to participate in innovation competitions. Such strategies increase the organization's visibility and, therefore, provide opportunities for new alliances. We also observed a process of feedback of established relationships, since after the exploration innovation project concluded, the partners continue to relate with each other through the bonds created previously, characteristic of social proximity.

Regarding cognitive proximity, it can be seen that they are complementary and overlapping forms of knowledge. Complementary, companies from different technical areas were involved, such as IT, aeronautics, airports, research, and communication institutions, bringing different perspectives of the same subject to the project. In fact, there is no doubt that technical competence in innovation

projects is indispensable, and a high level of knowledge from participants is expected. However, what prevailed in the relationship is the high level of overlap in the companies' absorptive capacity, that is, a strong capacity to identify, interpret and explore the knowledge of their partners. Some points stand out as strategies maintaining the strengthening of this capacity: i) the members of this project are already used to participating in such open innovation projects, thus having involvement and skills ensuring exchange of knowledge; ii) a project management team was hired to coordinate and document technical and administrative activities, thus ensuring a greater degree of integration; iii) all project development documentation was made available on the platform; iv) there are certain key people, such as the Dutch partner, who had a systemic vision of the project and were able to bring together the companies' skills for knowledge sharing.

Regarding organizational proximity, we can say that there is clear distance between the partners. When asked about the differences between organizations, one of the interviewees used the following expression: "they are, in fact, completely different," as they are companies of very different sizes and of different natures of capital. As mentioned, this process involved the following: airports with more than 5,000 employees, airlines, research institutions and smaller software development, logistics, and design companies. Smaller companies contribute flexibility, ensuring greater agility in the development of the project. However, larger organizations are indispensable for testing the developed applicability. This organizational gap was minimized by the presence of the project manager, who required similar documentary submission from all companies, thus aligning the pace of the project.

Institutional proximity was highlighted in the analyses. More than once, the interviewees emphasized that the main point for success in an innovation project is that companies share the same values. Despite cultural differences at the country level, such as, for example, the rigidity of Nordic territories in following what was planned and the difficulty in dealing with the unusual, these differences are small in relation to the institutional proximity at company or individual level. Commitment, sharing the same values and experiences are critical factors for alignment among participants. It is observed here that social proximity plays an important role in strengthening institutional proximity. This occurs as bonds may become closer as people relate outside the context of work, for example, in more personal lunches or conversations; values are better understood, and commitment increases.

Although not a determining factor when it comes to innovation, the geographical distance between countries

is small, since they are all on the same continent. According to the data analysis, the most important thing is to be in contact with companies that can contribute to the development of knowledge in a given project, regardless of where these institutions are located. Moreover, throughout the development of the project, there are other ways to compensate for geographical distance, for example, holding monthly videoconference meetings and quarterly face-to-face meetings. For the project studied, ease of transit within the European Union contributed to keeping the partners more connected; however the company has other partnerships with companies from countries outside Europe and this has never been an impediment to achieving results.

5.2 *Monitora*

Monitora was founded in 2010 with a focus on operations in the aviation, health, education, and artificial intelligence sectors. It is a digital solutions company, entirely Brazilian and dependent on the international market. The company operates in the technology development process with requirements in engineering, design, implementation, quality control, and software maintenance. The company is located in São Carlos – São Paulo, Brazil, and has approximately 200 employees.

The international innovation alliance selected for the research consists of *Monitora* and three other companies, located in Bulgaria, Ukraine, and Pakistan. The purpose of the partnership is to find software solutions for a client and a private jet rental company with a high degree of customization. This is an exploitation innovation, due to several factors: i) the focus of the partnership is to meet the demand of existing customers, with short-term, clearly defined results for the business; ii) the alliance seeks, as a result, to improve existing products or processes; iii) the knowledge used is already consolidated in the sector, despite being innovative for the companies involved, namely: “we are always discussing technologies, and always discussing innovation. This allows our employees to be immersed in this. So, technologies that some companies in Brazil are discussing now, who started discussing them about a year ago, we’ve been working on for 2, 3 years.”

In relation to the types of proximity, once again, social proximity influenced the establishment of the alliance. An employee of the partner client had studied with one of *Monitora*’s partners, and it was through this contact that the partnership arose. We also observed that members of different teams made an effort to spend time together

and create closer ties. Thus, twice a year, some employees are selected to spend a few weeks with members of other teams and, through this, get to know their peers better. Once again, the businessmen highlighted the importance of participating in fairs and congresses to create a network of contacts.

Cognitive proximity was highlighted as the most important for achieving results. The companies have an overlapping technical knowledge base: “I think there is a unique core of IT companies, mainly large companies, companies that are internationalized. So, this core is the same for Brazil, Ukraine, Bulgaria, and Pakistan.” Such proximity even enables different stages of the same project to be carried out at different units, taking advantage of the time difference. In addition, there is an online platform in which all source codes, reports and project structures are made available.

Interestingly, complementarity of knowledge can be observed, for example, the Brazilian company specializes in test automation, while the Ukrainian company is a specialist in quality auditing. The interviewees declared that there are different technologies used among the partners and, therefore, there is a need for stay up to date to understand the new technologies adopted by the partner, as we can see in the following excerpt: “it is important that the partners are always attuned to the latest developments and thoroughly understand how a certain technology is being used by the partner.”

Thus, we noted concern in investing in programs that ensure exchange of knowledge between those involved. There is the Art of Flying program promoted by the client company, in which all partners meet and discuss the future of technology. One of the interviewees stated: “knowing how to teach and think together, and share things, and having good will, so that more people learn about that subject, is the most important.” As a result, training courses are offered to members of the different units, ensuring the dissemination and alignment of new knowledge.

Another significant proximity, from the very beginning of the cooperation, was organizational alignment. To align existing demands, there is a global software architect who is considered the project manager. He is responsible for managing and requesting the tasks from the different units and meeting the requirements made by the client, which can be allocated to any of the partners, considering the specificity of the knowledge. There is a logical organization of the business structure so that, at times, companies seem to be part of the same group.

The contract that the partners hold individually with the client company also corroborates the organizational

structure. This client, in turn, is primarily interested in the synergy between the parties to the point of articulating as a single organization. Organizational proximity is not only achieved through the chain of command, but also through the adoption of other practices, for example, the allies' role in preparing strategic planning. Moreover, the client acts as an authority within the partnership, guiding the relationships and managing the projects. The importance of the client's role is highlighted by one of the interviewees: "the heart of this whole process is the client [...] it did a great deal to really make the differences between the companies disappear within the outsourcing process." Given the above, we observed a low degree of autonomy for the allies, a centralized command structure supported by the business managers of each area, resulting in a high degree of organizational proximity.

Regarding the institutional dimension, it was observed that there is a certain distance between the partners. Some habits stood out, for example, more reserved behavior, way of expressing ideas, hesitation at working overtime, thinking more focused on innovation or processes, which are barriers that need to be overcome within the alliance, especially, cultural barriers at the country level, which can also create friction in the business. However, we note social proximity as a mitigator of institutional detachment. Partner companies encourage coexistence between members in order to resolve differences and thus create more personal ties of relationship, understanding the functioning of other teams and their cultural peculiarities.

Geographical distance does not seem to be a problem for partners. This distance is overcome by the project's documentation and management; furthermore, according to the interviewees, strategies such as videoconferences, sporadic personal meetings, appropriate knowledge management and the experience of the allies end up mitigating the significance of geographical proximity.

6 Discussion of the Results

Based on analysis of the case study, some propositions can be established. Firstly, the importance of social proximity for beginning the partnership is highlighted, regardless of the expected innovation result (exploit or explore). As already highlighted in the literature, the existence of previous collaborations (Balland, De Vaan, & Boschma, 2013; Steinmo & Rasmussen, 2016), previous work relationships (Broekel, 2015) or, social interactions with people who work at the partner company (Fitjar, Huber, & Rodríguez-Pose, 2015) are forms of social proximity.

Both companies analyzed highlighted that the partnership started from a previous social contact, and there, a certain degree of friendship was established between the owners and other decisive people for the partnership to be formalized. Thus, the first proposition highlights the importance of social proximity for establishing the alliance. It is also noteworthy that active participation in fairs, dissemination of innovation results and previous professional experience enable social bonds to be created and the alliance to emerge.

P1: Social proximity is associated with the creation of alliances.

We observed that the types of proximity change according to the purpose of the alliance, which is a little-explored gap in the literature according to Fitjar *et al.* (2016) and Steinmo and Rasmussen (2016). In exploration innovation alliances, cognitive and institutional proximity stood out. Cognitive proximity is known to have a strong influence on the performance of the alliance. The balance between similarity and overlap of knowledge between allies is decisive for achieving exploratory innovations. Cognitive proximity is strengthened by the high level of compatible technical knowledge, along with regarding the ability to identify, interpret, and explore the partners' knowledge. Furthermore, what stands out is the care taken with managing and disseminating knowledge for the smooth running of the project and, also, the experience of those involved in innovation alliances, which makes working together feasible.

Institutional proximity was highlighted as an essential point for achieving results. The same values and behavior of those directly related to the project were important to the project's success.

P2a: Exploration innovation is related to cognitive and institutional proximity.

The analyzed data suggest that cognitive and organizational proximity were the most relevant to the scope of exploitation innovation. Once again, cognitive proximity stood out. The companies have technical similarities, enabling understanding between the parties and, at the same time, they have complementary skills adding value to the relationship. We observed the adoption of practices that strengthen absorption capacity, that is, joint activities enabling the allies to learn and implement new knowledge.

Organizational proximity also played a role. Companies have similar organizational characteristics such as size, structure, strategies, and management. There is an organizational arrangement specific to the alliance, in

which there is a certain degree of hierarchy in relationships, which encourages cooperation between individuals and achievement of results.

P2b: Exploitation innovation is related to cognitive and organizational proximity.

From the results, geographical proximity definitely can play a facilitating role in relationships, but it is not enough (Boschma, 2005). Distance in one dimension can be compensated by some degree of proximity in another and, moreover, improve the company's innovative performance (Boschma & Frenken, 2010; Broekel & Boschma, 2012).

Cognitive proximity stood out as offsetting geographical distance, both for exploration innovation and exploitation innovation. Both cases highlighted that for innovation, it does not matter where the partner is located; the most important thing is access to knowledge and the possibility of creating together.

The success of an innovation alliance is related to the partners' desire to access and share new knowledge. Although cognitive proximity goes far beyond that, unquestionably, high technical proximity between those involved is necessary for communication and understanding. However, even more important is the allies' ability to access, interpret, and aggregate knowledge. There is evidence, then, that the most important thing to offset geographical distance is cognitive proximity, which will enable exchange of knowledge and help bridge not only geographical distance, but the others too.

P3: Cognitive proximity compensates geographical distance for exploration and exploitation innovation.

Finally, we sought to understand how companies compensate geographical distance, that is, what practices are adopted to overcome the barriers imposed by geographical distance, we highlight the following: i) choosing partners with experience in international innovation alliances, including the importance of knowledge exchange; ii) choosing partners with a high level of technical knowledge; iii) adopting platforms that assist in knowledge exchange; iv) joint training to align knowledge; v) assigning a project leader to align and manage expected results; vi) using technologies (e-mails, videoconferences and instant messages) to exchange knowledge; vii) clarity in the objectives sought from the partnership; viii) encouraging social proximity through meetings outside the business context; ix) organizational alignment, in which there is a certain hierarchy within the project depending on the theme in question; x) seeking partners with similar or

aligned values; and finally, xi) sporadic face-to-face meetings.

7 Conclusion

The results lead us to conclude that it is not necessary to be close in all dimensions to achieve innovation results, as distance in one dimension can be compensated by proximity in others. This study sought to investigate the influence of types of proximity on the different innovation results between international alliances of aviation companies, which are important to support tourism.

Based on the findings, we concluded that the proximities change depending on the type of innovation aimed at by partners. For exploration innovation, cognitive and institutional proximity stand out, while for exploitation innovation, it is cognitive and organizational proximity. We also highlighted that cognitive proximity is known to have a strong influence on the performance of any alliances. This is due to the technical similarities of the companies, which allow understandings between the parties, at the same time that it is possible to access complementary skills. Institutional proximity was essential for alignment between the values and behavior of those directly related to the project in exploration innovation alliances. On the other hand, in exploitation alliances, the organizational proximity played an important role. Additionally, when there is a certain degree of hierarchy in relationships, we noted an alignment which encourages cooperation between individuals and achievement of exploitation results.

Another result is regarding social proximity, which plays a fundamental role at the beginning of the alliance. Moreover, we identified cognitive proximity as a mechanism for offsetting geographical distance, seeking complementarity and overlapping to achieve different results. Finally, we observed that the strength of geographical proximity has minimized success in inter-organizational relations, due to advances in information technology facilitating contact and, also, due to the nature of the research, since for innovation in the high technology sector, the most important thing is to access cutting edge knowledge regardless of the partner's location.

These results are preliminary, and future research is needed to advance understanding of the topic and overcome research limitations. One of the limitations of the study is analysis of only one case per country, as it is an intentional sampling, not allowing generalization of the results; therefore additional investigation must consider

research methods that can expand our exploratory findings. Thus, we suggest that other cases should be analyzed in order to add to the results found in the present research. It is also suggested that longitudinal studies may be carried out in order to understand the dynamics of types of proximity over time.

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Bionotes

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