

Network use in internationalization processes: a longitudinal study on the software industry

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ABSTRACT

This study, from a longitudinal perspective and through dense description, seeks to obtain an understanding of how Brazilian software firms access and use international partner networks over time in their internationalization processes. Four dyad relationships were analyzed of Brazilian software firms and international firms operating in various countries. Data collection considered both primary and secondary sources, allowing for triangulation. The use of interviews with more than one firm director over several years led to further triangulation. Data analysis followed the recommended protocol for case studies: description, theoretical coding, and identification of patterns and contrasts, including comparison between theory and cases. A description of the identified categorization process is completed. A longitudinal analysis of the relationships studied shows a sequence of steps that characterize their evolution. Two network relationship evolution processes were identified: between smaller firms with multinationals and between similar firms. The study provides important contributions to the understanding of how to initiate and develop international social networks over time, in particular, with regards to the role of personal relationships.

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1. Introduction

The development of networks to explore international opportunities has been explored in international business literature for almost three decades (Blankenburg & Johanson, 1992; Coviello and Munro, 1995; Johanson & Mattsson, 1987, 1988). In subsequent years, many studies have been published, covering various themes from the use of networks to identify international opportunities – through learning, resource mobilization, and choice of entry mode – to the influence of networks in expanding to other markets (Jones, Coviello, & Tang, 2011).

Few studies, however, consider a process approach when analyzing social networks (Hoang & Antončič, 2003). Despite being virtually uncontested in international business literature, the relevance of

networks to internationalization and the understanding of the impact of forms and content of networks on firm internationalization is still scarce (Yu, Gilbert, & Oviatt, 2011). Klyver and Grant (2010) argue that networks change along with firm trajectory and that it is necessary to better understand their use and benefits, which are accrued over time. In a review of international entrepreneurship studies in emerging economies, Kiss, Danis, and Cavusgil (2012) point to the need for more research on longitudinal processes as well as a greater focus on questions like "how" and "why," particularly in relation to "how entrepreneurs connect to alliances and domestic and international networks, what they learn from their partners during subsequent collaborations, and how they manage their networks" (Kiss, Danis & Cavusgil, 2012, p. 280).

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In order to fill this gap in the literature, this study investigated – from a longitudinal perspective using dense description – four dyad relationships between Brazilian software firms and international firms operating in various countries, seeking to obtain a deep understanding of how Brazilian firms access networks of international partner and use them over time in their internationalization processes. The following research questions guided the study: Over time, how do domestic software firms enter into international networks and develop relationships within networks for their internationalization process? The answer to this question can provide important clues about the process by which small- and medium-sized software firms from emerging countries operate and utilize international networks in order to access external markets.

2. Theoretical framework

The role of networks in promoting the internationalization of firms is uncontested in international business literature. A pioneering empirical study (Coviello & Munro, 1995) showed that 64% of the small software firms surveyed initiated international activities passively through contacts pertaining to personal or business networks. The authors proposed a broader view-based model of the internationalization process, combining the network concept with incremental internationalization. Another study, also with technology firms, showed how networks themselves or hired executives can serve as an incentive for internationalization (Crick & Spence, 2005).

The process of business network formation begins with social exchanges, generating reciprocal learning and gradually increasing mutual trust between participants, who in the end agree to make exchanges with each other (Anderson, Hakansson, & Johanson, 1994). When these exchanges are satisfactory, they generate interdependence with stronger ties, bringing the perception of reduced risk in future interactions. Such interdependence, while promoting mutual control, can also lead to a loss of autonomy. This view assumes that the process of creating a network of relationships results from the interaction between knowledge and commitment (Johanson & Vahlne, 2011).

Over time, relationships expand to other network points, since it is unlikely that the networks of partner firms are exactly the same, and clients and suppliers

belonging to a second tier of relationships become part of the firm's network (Johanson & Mattsson, 1987, 1993). This kind of new relationship can be strategic, bringing new opportunities in other countries (Felzensztein, Ciravegna, Robson, & Amorós, 2015).

Market activities cause firms to interact, accumulating knowledge, mutual trust, and commitment, which develops a network of relationships in which each firm establishes its position. This position, built during various interactions with other firms of the network, defines present and future opportunities and constraints of the firm. From this perspective, the internationalized firm is one that establishes and develops positions in foreign networks through extension (when the network is present in a new country), penetration (when the firm develops and increases its commitment to foreign networks that it is already part of), or integration (when increasing coordination in networks of different nationalities) (Johanson & Mattsson, 1993).

Networks can be more or less structured in terms of the strength of ties, more or less stable, or dynamic. As it is difficult for firms outside the network to know how the actors interact, or even who the actors are, members have an advantage over those who do not participate in it. Another advantage relates to positions in the network, that is, the problems of a firm that internationalizes is less related to issues arising from the liability of foreignness than issues arising from being an outsider to the network (liability of outsidership) (Johanson & Vahlne, 2009, 2011).

The use of social networks in the process of internationalization facilitates the acquisition of knowledge for competitive advantage (Yli-Renko, Autio & Sapienza, 2001), affects learning in terms of entry modes and market selection, and provides new relationships during the process (Holmlund & Kock, 1998). Furthermore, experience accumulated through the use of networks facilitates the development of new connections – making the firm central – increasing its visibility and reputation and allowing access to renowned partners and new opportunities (Tang, 2011). Another important effect that a network can provide to a firm that internationalizes is reputation development, establishing legitimacy and credibility, generating

competitive advantage for the firm in its international trajectory (Zhou, Wu, & Luo, 2007).

Some research shows that new enterprises form and use networks intentionally and proactively (Coviello, 2006; Schwens & Kabst, 2011); however, the literature also points to fortuitous situations that serve the internationalization of small- and medium-sized enterprises. Such situations of "fluke" are often the result of a network of relationships, or being in the right place at the right time (Crick & Spence, 2005; Sigmund, Semrau, & Wegner, 2015). Internationalization processes through networks may not have a pattern, occurring through occasional contacts, which shows the importance of considering random and unpredictable factors as potential influencers in using networks (Vasilchenko & Morrish, 2011).

There is also controversy regarding the use of networks in the course internationalization. Schwens and Kabst (2011) recognized the importance of networks for technology firms in the pre-entry stage

in the first countries where the firm starts business. New networks facilitate not only new entries, but success in new markets as well (Coeurderoy, Cowling, Licht, & Murray, 2012). However, Sepulveda and Gabriellsson (2013) argue that networks can be a resource throughout the internationalization process, but, with maturity, firms reduce the use of networks. Thus, how networks are used throughout internationalization and the underlying processes remain an open question in the literature.

3. Methodology

A case study was used to understand the network development process in the course of internationalization. It is longitudinal study, given the requirement that the data are "picked for each analysis unit at two or more distinct points in time" (Hassett & Paavilainen-Mäntymäki, 2013, p.5).

The unit of analysis is the relationship between a dyad formed by two firms in an international context

Firms	Year	Interviewed	Office	Interview
CI&T	2013	Bruno Guiçardi	Partner	Skype
	2013	Leonardo Mattiazzi	Vice president	Skype
	2016	Bruno Guiçardi	Partner	Skype
Fujitec	2002	Danilo Reis	Partner	In-person
	2004	Danilo Reis and Wicca Neves	partners	In-person
	2008	Danilo Reis	Partner	In-person
	2015	Danilo Reis	Partner	Phone
Ivia	2004	Alexandre Menezes	Partner	In-person
	2006	Marcio Braga	Partner	In-person
	2006	Alexandre Menezes	Partner	In-person
	2015	Alexandre Menezes	Partner	Phone
	2016	Alexandre Menezes	Partner	Skype
MidiaVox	2007	Alcides Pires	Partner	In-person
	2008	Alcides Pires	Partner	In-person
	2015	Alcides Pires	Partner	Phone
	2016	Alcides Pires	Partner	Skype

Fig. 1
Relationships from interviews

– that is, before entry into foreign markets. Other studies have shown the role of maintaining and even expanding networks in successful firms internationally (Buciuni & Spring, 2014). The very process of internationalization expands the scope of firm networks, leading to relations with certain actors

– a Brazilian firm belonging to the software industry, and another international firm operating in several countries. It is assumed that the international firm already has an international network consisting of suppliers, customers, vendors, suppliers, and etc., spread throughout different markets. Thus, we

investigated how the Brazilian software firm accesses the network of the international partner and how it uses it in its internationalization process.

Four dyads were selected for analysis, using data from a larger project, which seeks to understand the internationalization of service firms. Data collection considered both primary and secondary sources, allowing for triangulation. Among the secondary sources – that is, published case studies – information collected on firm websites, articles published in newspapers, business magazines, and information from the internet are highlighted. Interviews used in this study were performed by the authors and other researchers who participated in different stages of the project over the years. The previous interviews before 2015 had been undertaken in order to understand the process of firm internationalization, while the interviews in 2015 and 2016 had the specific purpose of studying the relationships identified in networks. For each firm, we developed a custom script in order to complement information already available on the network relationships through previous interviews and the use of secondary data. The executives selected for interview were, for the most part, entrepreneurs who founded the firms, or those who joined at the beginning of their development. Figure 1 shows a list of interviews, relevant dates, and other information. The use of interviews with more than one director from three of the four firms over several years also served the purpose of triangulation. Therefore, data collected in several interviews over the years were compared among themselves as well as with material obtained from the consulted secondary sources.

Data analysis followed the recommended protocol for case studies: case description, theoretical coding, and identification of patterns and contrasts, including comparison between theory and cases (Ghauri, 2004; Pauwels & Matthyssens, 2004). The description of the cases entailed the drawing up of a report for each case, seeking to organize the narratives of internationalization processes in selected networks, as well as developing a timeline with key events for each studied relationship. The theoretical coding initially started from broad categories in order to analyze networks during internationalization: pre-relationship activities, internationalization network triggers, initial contacts, formalization, and expansion. Next, the researchers put events into categories, with debate and consensus on what would be pertinent to each category.

The events in each category were detailed and sub-categories were created that emerged from the cases themselves. The third step was to compare the patterns identified in the cases and with the theory. The evidence obtained in the previous steps have identified two distinct models of network relationship due to the size of the firms involved. Both identified models mainly emanated from the analysis and comparison of patterns by the researchers.

4. Results

The evolution over time of four dyad relationships serving the internationalization processes of four Brazilian software firms are presented. Two of these relationships are characterized as strictly business, while the other two are also based on personal relationships between actors belonging to different organizations.

4.1. Initiative – CI&T and J&J: building an international business network

The first analyzed international initiative shows the construction of a lasting relationship between the multinational Johnson & Johnson (J&J) and the Brazilian firm CI&T. The two firms differ greatly in size and age.

J&J is a large multinational corporation, operating in the segments of health-related consumer products, nutrition and cosmetics, medical devices, and pharmaceuticals. Founded in 1886 in New Jersey, USA, the firm has pioneered many products related to health, aimed at the growing consumption in US market. In 1924, it opened its first overseas subsidiary in the United Kingdom, expanding then to South Africa in 1930 and Australia in 1931. In 1937, it established subsidiaries in Brazil and Argentina. In 2015, it had become a huge multinational conglomerate, formed by more than 250 companies operating in 60 countries.

CI&T was founded in 1995 by young graduates from a university in Campinas, Brazil, and acts in the outsourcing service segment. It works on the development and integration of applications and gained IBM Brazil as a client at the start of its existence. The firm started its internationalization process in 2004 in response to a request from a US client to perform services in Brazil. In the same year, it signed a contract with Johnson & Johnson for American services from Brazil. In 2006, it opened its

first branch in Philadelphia. In 2013, it occupied 72nd place of the top global outsourcing service providers from the International Association of Outsourcing Professionals. In 2015, CI&T had its own facilities in Brazil and three other countries: USA, China, and Japan. Approximately 2,000 employees worked in the firm, with 200 located abroad. In the same year, the firm generated R\$ 330 million in revenues, with about 40% coming from international operations.

Figure 2 shows the evolution of the relationship between CI&T and J&J.

Steps	Description	Results
1. Pre-relationship	CI&T proposes to carry out a project for J&J in Brazil	Proposal is not accepted, but makes a favorable impression
2. Trigger	J&J US wants to mount a development center in Brazil in partnership and consults its subsidiary	J&J Brazil recommends CI&T
3. initial contacts	Visits to the CI&T by J&J US officials	Decision in favor of CI&T
4. Contract formalization (2004)	Initial contract signing for the project development	Allocation of 2.5 employees by CI&T Contract executed successfully
5. Relationship expansion from Brazil	New contracts between CI&T and J&J US to run in Brazil.	300 CI&T employees involved (2013)
6. International expansion (USA, 2006)	Opening CI&T branch (office) in Philadelphia	Assistance to US J&J and prospecting new customers
7. International expansion to Europe	CI&T becomes a vendor for J&J Global	Services with J&J in the US and Europe and gaining new customers
8. International expansion (Japan, 2009)	Joint venture of CI&T in Japan with a Japanese firm (Rococo) and establishing a development center in China	Services with J&J in Asia and attracting new clients

Fig. 2
Evolution of the relationship between CI&T and J&J

The relationship between CI&T and J&J began in 2004. CI&T had previously competed for a project in the Brazilian subsidiary of J&J and, despite not having been awarded the contract, it generated a favorable impression in terms of technical qualifications. The partners of CI&T nurtured relationships with executives at J&J through participation in events and sending newsletters. Thus, when the parent company of J&J in the US sought a partner in Brazil to diversify its centers of competence in systems development, CI&T was indicated. After a series of visits from officials of J&J US and many negotiations, there was the signing of a first contract that was small but became a future business embryo. In 2015, about 300 employees of CI&T found themselves allocated exclusively to J&J. The evolving relationship with J&J reflects a slow and careful process, on both sides, of relationship strengthening through progressive movements of greater commitment, allowing CI&T to "win the position of preferred vendor" in order to

"qualify for other global ventures" (Bruno Guiçardi, partner of CI&T).

The relationship with J&J was not of a passive character, or simply reactive. CI&T prospected clients within firm networks and the subsidiaries that comprised the J&J conglomerate, as reported by the partner Bruno Guiçardi:

We closed te first [contract] and then a chain [of them]. Johnson was a set of 84 different companies, and we were sailing between them . . . As we grew with Johnson and saw potential opportunities, we made some important moves. We sent our best salesman to the United States.

We opened a branch here in the United States. Until then we were operating from Brazil, I had not one human being here.

Entry into the US in 2006 intended to deepen the relationship with J&J and win new clients. Thus, physical presence in the US market allowed CI&T not only expand its operations to other organizations of J&J, but also to other firms, mainly from pharmaceuticals industry. The agreement with J&J, in addition to strengthening relationships and networking, established the reputation of CI&T as a trusted provider. The vice president Leonardo Mattiazzi reported:

When we started there [in the US], they [J&J] were quite decentralized. So, basically, what I did was travel . . . to see these sister companies and sell our services there. VisionCare is in Jacksonville, Florida. I went to Jacksonville and we signed the first contract with Vistakon. As well, there are LifeScan and Neutrogena in California. I went there and we started the contract with them. And then we did it. With LifeScan, we started a contract in Europe in 2007.

Still using the legitimacy arising from the relationship with J&J, the firm expanded to Japan, another developed market, in order to "meet current clients, especially J&J . . . in new geographical areas." Thus, in 2009, CI&T made a joint venture with a Japanese IT firm and established a joint operation, a Tokyo office, and development center in China. The entry was previously validated with J&J: "we validated the idea with executives at J&J and they assured us that they were interested – we were already a global vendor for them" (Bruno Guiçardi).

The opening of new offices in the US and subsidiaries in Canada and the UK sought to serve current clients, including J&J, and prospect new clients. The strategy of joining the network of a large multinational was replicated and the firm provided services in Europe and Asia, mostly for multinationals.

In short, the relationship between CI&T and J&J clearly goes through a process of expansion and consolidation from a small service provider to a global vendor. It was possible to generate lasting relationships of trust by providing good services, resulting mainly in the benefit of legitimacy in foreign markets, particularly developed countries.

3.2. Initiative B. MidiaVox and Avaya: becoming international through a multinational's subsidiary network

Relationships, such as those established with the multinationals MidiaVox and Avaya, appear in the international business literature but have received little attention. In this type of relationship, the firm achieved a degree of international importance geographically and in terms of revenue percentages, with only one form of entry into markets where it operates – that is, piggybacking, also known as symbiotic relationship.

Avaya is an original multinational conglomerate of Lucent Technologies, having previously belonged to AT&T. The firm was formed in 2000 as a spin-off of Lucent Technologies in order to provide communication integration services. In 2007, it was acquired by Silver Lake and TPG Capital, becoming a privately held firm. In 2015, its revenues exceeded US\$4 billion, occupying at least third place in world rankings in its main fields of activity (Avaya, 2016).

MidiaVox is a small firm based in Recife, Pernambuco, founded in 1994. It provides software integration services related to telephony and computing technologies. The international

steps	Description	Results
1. Pre-relationship	MidiaVox and Avaya provided to the same client in Recife	Avaya manager liked working with MidiaVox
2. Initial contact	Avaya manager invitation to perform projects in São Paulo	
3. Formalization of contract	Contract with Avaya in Sao Paulo	Successful project
4. Relationship expansion in Brazil	Referral by the manager for project replication in other locations in Brazil	Successful projects
5. International expansion (Chile, 2000)	Referral by the manager for project replication in Chile	Successful project
6. Relationship formalization	Broader partnership agreement	Avaya executive promoted to regional position (Latin America).
7. International expansion (Latin America, beginning in 2001)	Projects carried out by Vox Media for Avaya in Latin America (Argentina, Mexico, Colombia, Venezuela, Costa Rica, Puerto Rico, Bahamas, Bermuda)	Successful projects. Executive promoted to global director of Avaya
8. International expansion (global, beginning in 2004)	Projects carried out by Vox Media for Avaya in Asia (Japan, 2004); in Europe (Russia, 2004; Italy and Germany, 2006); North America (USA, in 2007; Canada, in 2012)	MidiaVox is a global supplier of Avaya and unique in terms of this type of service
9. Services outside the network of Avaya, but generated by the network (2008)	Bid made in Chile with an Avaya executive who went to work in another firm	Loses bid
10. Services to other firms via the Avaya network	Projects for Avaya clients in Canada and Guatemala	Projects carried out

Fig. 3

Evolution of the relationship between Avaya and MidiaVox

businesses, starting in 2000 in Chile, were kept throughout the life of the firm due to a unique partnership with Avaya, working with its network of subsidiaries in more than 150 locations. With 25 employees, MidiaVox earned R\$ 3 million in 2015 with one third being from international operations.

Figure 3 shows the evolution of the relationship between MidiaVox and Avaya.

The relationship between Vox Media and Avaya occurred fortuitously when providing services to a third party client. Then, MidiaVox provided services for Avaya in Brazil after thorough evaluation by the hiring manager. Having been transferred to Chile, the same manager asked MidiaVox about a firm that could perform a similar service. Faced with another successful project and reaching a high rank in Avaya's Latin American operations, the executive decided to use the partnership model in many countries in the region. The working model was implemented by Avaya with MidiaVox and some competitors that, over time, increased trust between the firms: "In the beginning, there were two or three competitors who provided services to Avaya [but now] the other two finished and now it is just us" (Alcides Pires).

From there, MidiaVox became part of a network of relationships formed by executives around the world, generating business in different countries, such as Germany, Argentina, Bahamas, Bermuda, Canada, Colombia, Costa Rica, USA, Guatemala, Italy, Japan, Mexico, Puerto Rico, Russia, and Venezuela. With each new successful project, and as executives were transferred to Avaya's branches in other countries, indications and references to MidiaVox were propagated, as illustrated Alcides Pires in relation to the operation of the network:

In the case of Russia, the Avaya web services manager is a Brazilian who already knew us here This model worked very well in Colombia. So the Colombian executives of Avaya are taking important positions in other countries and have confidence in our work Avaya has units that work autonomously. So this is like a new market for us, that is, jobs done causes others to come to know each other. And we gain new markets as a new Avaya unit becomes our contractor.

Opportunities have also emerged out of the partnership with Avaya, due to executives that went to work in other firms. In one situation, an egress of an Avaya client invited MidiaVox to participate in bidding in Chile that, in the end, was not won. Still, the partnership of Avaya with MidiaVox was

restricted by the difficulty of working with firms that compete with each other. The partners accepted this restriction, understanding that MidiaVox had become part of a large network of relationships that generated international business:

We have a more or less constant flow of projects abroad We created a network of contacts, which is more difficult to do internationally than nationally. People you know in another countries call the company. We managed to create this (Garibaldi Rocha, a partner at MidiaVox).

The relationship between MidiaVox and Avaya is characterized as being typically business, with no personal involvement, since the contacts in Avaya change depending on the country where the services are performed. According to the partners, nourishing Avaya network relationships is important and therefore they sought to maintain frequent contact with leaders of the regional units of Avaya. Over time, some of these relationships have been strengthened, but it would not last, in his view, since there were two crucial components: competence and ethics. Thus, in 2011 and in 2015, MidiaVox received the Avaya Key Supplier Award in the category of professional services, a recognition given to few partners.

3.3. Initiative C. Fujitec and VFJ/Chris Adams: building a personal relationship from an international partnership

Through an initiative to find an international partner, Fujitec gained an associate who involved the firm in a number of initiatives abroad. The international partner was the Australian firm VFJ Technology and the executive, Chris Adams. Both firms participated in bids in Brazil, establishing a strong partnership that culminated in the establishment of personal ties between leaders of Fujitec and Chris Adams, leading Fujitec to the international market.

VFJ Technology, founded in 1992, is a medium-sized firm based in Sydney, Australia, that manufactures equipment for reading smartcards for application in traffic, toll, and security controls. In 1996, he opened a branch in Hong Kong to service emerging markets. In 2015, the firm had installed systems in Hong Kong, China, Taiwan, Singapore, India, Italy, and Brazil (VFJ, 2016).

Fujitec is a small IT firm based in Fortaleza, Ceará, founded in 1991, that primarily offers specialized services in electronic ticketing, embedded electronic video surveillance, smartcard management, and sign

and speed control systems. In 2015, Fujitec, with ten employees, was physically present in Brazil and provided services for clients in the United States, Italy, Colombia, and Nigeria.

Figure 4 shows the evolution of the relationship between Fujitec and VFJ/Chris Adams, divided into stages, and indicates the results of each stage.

Step	Description	Results
1. Pre-relationship	none	
2. Trigger	Government of Rio de Janeiro opens bidding	
3. Initial contacts (1996)	Fujitec search for VFJ partnership	bidding canceled
4. Relationship formalization	Fujitec signs partnership with VFJ	VFJ closes office in Brazil and is now represented by Fujitec
5. Building personal relationships	Friendly relations between leaders of Fujitec and Chris Adams	
6. Relationship expansion in Brazil	New bids in the cities of Natal and Brasilia, generating contracts.	Successfully executed projects
7. International expansion (Italy, 2001)	Project carried out in Italy	Project completed
8. International expansion (Hawaii, USA, 2004)	Project in Hawaii, generated by Chris Adams, with participation of Booz-Allen consulting	Project carried out, but with a loss to Fujitec
9. International expansion (Colorado, 2004)	Booz-Allen's invitation to participate in a project in Colorado	limited participation of Fujitec

Fig. 4. Evolution of the Relationship between Fujitec and VFJ/Chris Adams

Fujitec's relationship with VFJ started in an unplanned manner. In 1996, an international bid opened for bus ticketing in Rio de Janeiro that Fujitec did not participate in. However, the Australian firm VFJ sought Fujitec for the purpose of forming a partnership to run for bidding. The bid was canceled in Brazil, but the short interaction between an executive of the Australian firm and the members of Fujitec brought another unexpected benefit: the executive became a friend of the partners and promoter of Fujitec services. As explained by a partner, Danilo Reis:

So we started this partnership with the Australian firm, and their marketing director, Chris Adams, who has fantastic experience and is a citizen of the world . . . It is fantastic in terms of networking and experience. And I believe that when we built this tie, he liked much of our expertise, agility, flexibility, and software . . . Then he was impressed and wanted to bring this solution to add to his equipment . . . He said: 'Now I want you as partners in the rest of the world.'

The Australian firm was interested in entering the Brazilian market, especially considering that the smartcard segment had developed significantly in Australia with over 30 firms offering this technology

(APSCF, 2000). The international market therefore became imperative for the growth of Australian firms. VFJ even opened an office in Rio de Janeiro, which closed in a year due to lack of business due to bureaucratic obstacles. The exit of VFJ from Brazil turned out to speed up Fujitec's process of internationalization, largely due to the strong ties created between the members of Fujitec and Chris

Adams, who went on to involve them in opportunities that arose in other markets.

Two businesses emerged from this partnership: the consulting and sale of software licenses to a transportation firm in Italy and a project in Hawaii. The project in Hawaii also involved an international consulting firm, which, in turn, indicated Fujitec for another opportunity in Denver. The projects in the United States, however, did not meet the initial expectations of the members of Fujitec. The Denver project did not continue because of warranty and insurance required to cover the risk of failure, which was incompatible with the size of the firm. In Hawaii, the firm was able to deploy its system, but had to go to court against a Chinese partner who failed to pay US\$ 400,000 after service delivery.

Thus, the partnership between firms evolved into a personal relationship between executives, which Danilo Reis described as "a very strong friendship" and "true friendship" based on "great confidence . . . opening the way to his contacts and network." Wicca Neves, another partner, also described a "true friendship" with someone who is "fighting for the company." Later, Chris Adams left the Australian firm

but continued to serve as a reference for Fujitec internationally, including acting as a consultant. However, Fujitec business in the United States started to fade, with the partners realizing that it would be necessary to make huge investments to operate there.

firm turned its attention to the North American market. Ivia was among the 200 fastest growing firms in Brazil in the last four years, according to the magazine PME Exame. Its turnover grew from R\$1.5 million to R\$35 million between 2004 and 2015 and the number of employees rose from 35 to 450.

Steps	Description	Results
1. Pre-relationship	Ivia leaders and director of Noesis worked together at IBM Brazil	
2. Initial contacts (2002)	Noesis makes contact to conduct training in Portugal	Successfully completed training
3. Trigger	Partner search in Europe (Portugal) by Ivia	Choice of Noesis by Ivia
4. Relationship formalization (2003)	Partnership agreement signed between Ivia and Noesis	Ivia sends an employee to Portugal
5. New member entry in Ivia (2005)	Márcio Braga leaves Noesis and enters as a partner in Ivia	
6. International expansion (Portugal, 2006)	Branch opening Ivia in Portugal	Profitability of operations in Portugal greater than in Brazil
7. Noesis's operations in Brazil (2008 onwards)	Breakdown of sales in Portugal; Noesis search for business in Brazil and Ivia in the US.	Partnership continues in Brazil

Fig. 5.
Relationship evolution between Noesis and Ivia

3.4. Initiative D. Ivia and Noesis/Marcio Braga: building a business network from a personal relationship

Another initiative that was developed through the network occurred between Ivia and Noesis, a Portuguese firm. This relationship led to a partnership in the Portuguese market by 2008, when the economic crisis had hit the country, and later in Brazil, up until the time of the study.

Noesis is a medium-size Portuguese firm, founded in 1995, offering services and information technology solutions for business management. It has about 470 employees and revenues in 2015 are estimated to be €24 million. In addition to Portugal, the firm has its own facilities in Angola, Brazil, Belgium, and Ireland, having implemented projects in over 20 countries. Between 2005 and 2015, the firm grew at a compound annual rate of over 12% (Noesis, 2015).

The Ivia is a medium-size Brazilian firm, located in Fortaleza, Ceará, founded in 1996 by two members from IBM Brazil. The firm's main products relate to application development, management systems, and configuration of networks and databases. The first international movement occurred in Portugal, which became its biggest market by 2008. Since then, the

Figure 5 shows the evolution of this relationship.

The beginning of Ivia's internationalization process occurred in 2002 unintentionally. A former colleague of IBM Brazil, Márcio Braga – at the time director of Noesis – who called Ivia to hold service training in Portugal. After that experience, the partners of Ivia decided to expand to the Portuguese market and chose Noesis as a partner. The reasons for the choice, which occurred after a structured search for alternatives, involved the kind of service that the firm provided, a client base, and relationships with Márcio Braga. As reported by the partner Alexandre Menezes:

In 2003 we signed a partnership and started a part of the operation. As this partner was complementary, he did different things, and we even had to maintain a commercial structure with our employees there.

By choosing Noesis as partner, Ivia happened to belong to an extensive network of suppliers and clients, not only in Portugal, but in other European countries too:

Because Noesis worked with large accounts, only large companies [...] We made several trips to Spain and Belgium. So, it was very good in terms of networking [...] Of course this stayed with me because I held the network, knew the culture and the way to speak, they were different... (Márcio Braga).

After some time, the partners realized the need to hire a territory manager to act in its own subsidiary, while using the partner to ensure the continuity of prospects that hitherto required several comings and goings of the manager of the international area as well as to develop network partnerships.

The partnership between the firms continued, but the relationship with Márcio Braga strengthened to the point that the executive left Noesis and became a partner of Ivia in 2005, returning to Brazil. The entry of Márcio Braga allowed Ivia to use network relationships that the new partner made in Europe and, in particular, in Portugal, adding features such as market knowledge and legitimacy. In this regard, Márcio Braga noted:

The network provides local referrals. It's like a professional certification. Since you are good, you have some kind of respect from local references. What is most difficult is to break the barrier of distrust and make it to the right people. So it helps if you have worked there, if you know the people.

From 2008, with the European economic crisis, business opportunities in the Iberian Peninsula disappeared, forcing Noesis to seek business in Brazil. However, despite the weakening of the Portuguese market, the partnership between Ivia and Noesis remained.

5. Two Generic Processes of International Relationship Evolution

A longitudinal analysis of the four studied relationships shows a sequence of steps that characterize its evolution. Some steps follow, or are simultaneous, and some do not; but it is possible to speak of two generic processes of relationship evolution: relationships with multinationals and relationships between similar firms. Relationships can also be interrupted for reasons beyond the desire of the parties, even if it was successful.

4.1. Generic relationship evolution process with multinationals

The first generic process identified corresponds to cases A (CI&T and J&J) and B (MidiaVox and Avaya). The two Brazilian firms were small at the beginning of the relationship, although CI&T later became a large firm. However, even when considering its current size, it is small compared to the multinational

conglomerate J&J. Thus, the type of relationship in both dyads is characterized by strong inequalities in terms of power and resources. As a result, one of the risks involved is excessive partner dependence (Roberts & Child, 2008), a situation which affects MidiaVox more, as it worked in a more market niche than CI&T, which was bigger and able to serve clients from different sectors. Figure 6 shows one of the generic processes identified.

Figure 6. Generic relationship evolution process with the multinational



Fig. 6.

Generic relationship evolution process with the multinational

The process of building an international relationship through insertion in a multinational network may start at the pre-relationship stage, which is characterized by weak ties, or even contacts that do not generate any kind of bond. This pre-relationship can lay dormant until one of the players recovers it due to some "trigger" event or situation. For example, Avaya had preliminary contact with MidiaVox because both had been supplying a third firm and CI&T had submitted an earlier proposal to J&J in Brazil before starting the relationship with the parent company.

Initial contact may vary in terms of time required for the next step. In the case of the relationship between CI&T and J&J, contacts took some time, involving visits from employees that evolved into a first contract. It was an early experience in relationship building, whose success depends on its continuity. There was also mutual trust that led to the establishment of the partnership. This is striking in both dyads examined as the relationship between the firms is very uneven in terms of size, power, and

resources, and considering that there were no personal ties between the relevant actors.

Once the first contract was completed, other contracts were concluded between the firms, usually of greater geographic reach, but also of an arm's length nature. Partnership formalization tends to be associated with the transition from domestic to the international market. Sufficient time elapsed to build mutual trust and mutual learning with partners (Anderson, Hakansson, & Johanson, 1994) on their respective ways of operating, which showed to be in tune. The satisfactory results of projects carried out progressively strengthen ties between partners.

The passage to the international market marked expansion to other points in the network (Johansson & Mattsson, 1987, 1993), often revealing new opportunities with clients, suppliers, or partners of partners (as in the case of MidiaVox in Chile), or even access to opportunities arising solely from being present in new geographies (as in the case of CI&T in the US), as mentioned by Felzensztein et al. (2015).

Note that this process occurred in the situations examined through the penetration of the partner network and not through coordination between the networks of the two firms (Johansson & Mattsson, 1987, 1993). In relationships that evolve into networks of multinationals, status progression within the network was passed from domestic suppliers to regional suppliers (in this case, Latin America) and in a second movement for global supplier. The expansion to associated overseas networks occurred in two relationships, but at different times of their evolution. Some of these developments were random, as suggested Vasilchenko and Morris (2011).

4.2. Generic relationship evolution process between similar-sized firms

The second generic process of international relationship building occurs between similar-sized firms, as in C (between Fujitec and VFJ Technology) and D relationships (between Ivia and Noesis). Although, this study is about small- and medium-sized enterprises – not relationships between large firms or multinationals. The relationship between dyads of smaller firms has its own specificities (Figure 7).

When firms are of a similar size – typically small- and medium-sized – stages are more flexible and demarcated over time through the strengthening of



Fig. 7. Generic relationship process between similar-sized firms

pre-existing personal ties that form between the executives of the dyad firms. This happens naturally because interaction between them is constant, which no longer occurs when a small business is included in the network of a multinational due to unit services being in different countries with different management teams.

The pre-relationship stage and the occurrence of a trigger, leading to initial contacts, appear to occur in a similar way to the previous process. In the case of Ivia, there was a weak link between former colleagues from IBM, but in Fujitec there was no pre-relationship. It is possible, therefore, for initial contacts between Ivia and Noesis to be made faster, progressing directly to the partnership stage. In both cases, when the relationship of the dyad had strengthened, international partners made use of the relationship when operating directly in Brazil.

In both dyads, however, the relationship evolved *pari passu* with the strengthening of pre-existing personal relationships (Ivia) or through the establishment and development of new personal relationships (Fujitec). It is curious to note that the international entrepreneurship literature has stressed the importance of personal ties in internationalization in emerging markets (Sharma & Blomstermo, 2003), but the subject is still controversial (Masango & Marinova, 2014).

4.3. Common relationship aspects

Finally, it should be noted some common aspects of the four analyzed relationships. First, they all begin

and remain in the form of dyads: while firms can use partner networks, focus is on the relationship that was established initially. Second, all pre-examined relationships occurred at home, which is due to the fact that entrepreneurs do not have international contacts, possibly due to the absence of prior international experience.

6. Final considerations

This study examined, using a longitudinal perspective, four dyad relationships between Brazilian software firms and international partners. Although it is not possible to reach empirical generalizations (relative to the frequency of occurrence of the investigated phenomena) for qualitative studies, theoretical generalizations may be proposed. It is therefore possible to state that there are two generic processes identified from the four relationships analyzed. Two identified processes occur between smaller and multinational firms as well as among similarly sized businesses.

The study has several limitations that should be considered. First, we analyzed only four Brazilian software firms, suggesting the possibility that the results – particularly those relating to the second process – are specific to Brazil, or even to firms from emerging countries or countries of related culture. Second, from the four firms analyzed, three are located in the northeastern region of Brazil, providing the possibility that regional characteristics have influenced the results. Finally, there may be other models of processes beyond those identified.

The study provides important contributions in understanding how to initiate and develop international social networks over time, particularly in relation to the role of personal relationships in similar-sized firms in networks. More research of a qualitative nature is necessary in order to shed light on the phenomena studied.

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Uso de redes no decorrer do processo de internacionalização: Estudo longitudinal no setor de software

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RESUMO

Este estudo, a partir de perspectiva longitudinal e por meio de descrição densa, busca obter entendimento de como empresas brasileiras de software acessam as redes de parceiros internacionais e as utilizam ao longo do tempo em seu processo de internacionalização. Foram analisados quatro relacionamentos em díade entre empresas brasileiras de software e empresas internacionais, atuantes em vários países. A coleta de dados considerou tanto fontes primárias quanto secundárias, permitindo a triangulação. O uso de entrevistas com mais de um dirigente da empresa ao longo de vários anos também serviu ao propósito de triangulação. A análise de dados seguiu o protocolo recomendado para estudos de caso: descrição, codificação teórica e identificação de padrões e contrastes, incluindo comparação com a teoria e entre casos. É feita uma descrição e categorização dos processos identificados. A análise longitudinal dos relacionamentos estudados mostra uma sequência de etapas que caracterizam sua evolução. Foram identificados dois processos de evolução dos relacionamentos nas redes: entre empresas menores com multinacionais e entre empresas de porte similar. O estudo traz contribuições relevantes ao entendimento de como se iniciam e evoluem redes de relacionamento internacionais ao longo do tempo, em particular no que se refere ao papel das relações pessoais.

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