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Entrepreneurial ventures, institutional voids, and business group affiliation: the case of two Brazilian start-ups, 2002-2009

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Abstract

Purpose – Institutional voids – the lack of institutions that can facilitate the functioning of markets – are ubiquitous in emerging markets. Because of their newness, entrepreneurial ventures are especially susceptible to institutional vacuums. This research seeks to shed light on the role that business groups can play in the development of entrepreneurial ventures in emerging markets.

Design/methodology/approach – Based on detailed fieldwork, the study describes and analyzes the creation and evolution of two biotechnology start-ups that were affiliated to a major Latin American business group. The research covers the period between their foundation and later acquisition by a multinational company.

Findings – The article discusses the role that the business group affiliation had in terms of helping the start-ups to interact with multiple institutional voids. The analysis shows that the start-ups benefited from the group's reputation and connections, experience and know-how in managing different types of businesses in the country, strong resource base, long-term vision, and strong organizational culture.

Originality/value – The main contribution of this work is to show that business group affiliation can be an interesting solution that facilitates the development of entrepreneurial ventures in emerging markets.

Keywords Entrepreneurship, Institutions, Business groups, Emerging economies, Venture capital, Latin America, Emerging markets

Paper type Research paper

Resumen

Propósito – La presencia de vacíos institucionales – la carencia de instituciones que facilitan el funcionamiento de los mercados – es muy común en las economías emergentes. Debido a su novedad, los nuevos emprendimientos son especialmente susceptibles a los vacíos institucionales. Esta investigación trata de entender el papel que pueden desempeñar los grupos económicos en el desarrollo de nuevas empresas en economías emergentes.

Diseño/Metodología – Basado en trabajo de campo, el estudio describe y analiza la creación y evolución de dos *start-ups* biotecnológicos que estuvieron afiliados a un importante grupo económico latinoamericano. La investigación cubre el período comprendido entre la fundación de las dos empresas y su posterior adquisición por parte de una empresa multinacional.

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Resultados – El artículo analiza cómo la afiliación a un grupo económico ayudó a las *start-ups* a lidiar con múltiples vacíos institucionales. El análisis muestra que las empresas se beneficiaron de la reputación y conexiones del grupo, su experiencia y conocimiento en la gestión de diferentes tipos de negocios en el país, su sólida base de recursos, su visión de largo plazo y su fuerte cultura organizacional.

Originalidad/Valor – La contribución más importante de este artículo es mostrar que la afiliación a un grupo económico puede ser una solución interesante que facilita el desarrollo de nuevos emprendimientos en economías emergentes.

Palabras clave Emprendimiento, instituciones, grupos empresariales, economías emergentes, capital de riesgo, América Latina, mercados emergentes

Tipo de documento artículo de investigación

1. Introduction[1]

Emerging markets have been increasing their participation in the generation of technological innovations around the world (Khanna and Palepu, 2010). However, their contribution is still low when compared to advanced economies (World Economic Forum, 2011). Creating and capturing value from technological innovation in emerging economies continues to be a challenge. In emerging markets, entrepreneurial ventures have to operate in environments where institutional voids – the lack of institutions that can facilitate the functioning of markets – are ubiquitous (Bruton *et al.*, 2009; Bruton and Ahlstrom, 2003; Bruton *et al.*, 2008; Mair and Marti, 2009). Meanwhile, business groups – confederations of legally independent firms that are bound together by economic and social ties – can effectively navigate through some of these voids (Khanna and Rivkin, 2001; Khanna, 2000; Guillen, 2000).

This study tries to understand the role that business groups can play in the development of entrepreneurial ventures in emerging markets. The study is based on a description and analysis of the creation and evolution of two biotechnology start-ups that were affiliated to a major Latin American business group. I focus on the role that the business group played in mediating the interaction of the ventures with their business, institutional, and political environments. The study is based on detailed fieldwork, including interviews and public and proprietary information. More specifically, my research setting consists of two Brazilian agricultural biotechnology start-ups – Alellyx and CanaVialis – that were founded in 2002 and 2003. These companies were supported during their early life by the venture capital (VC) arm of an important business group in Brazil: Votorantim. I analyze the period starting with the creation of the start-ups and ending with the acquisition of the ventures by a leading multinational corporation (MNC). The story is particularly enlightening because it shows many of the difficulties experienced by entrepreneurial ventures in a large emerging market such as Brazil.

2. Research setting, data, and methods

In 2009, Votorantim was one of the biggest private business groups in Latin America (Aldrighi and Postali, 2010). With over 60,000 employees, the group had operations in cement and concrete, mining and metallurgy (aluminum, steel, nickel, and zinc), pulp and paper, concentrated orange juice, chemical products, energy, and the financial sector. Together, these businesses produced net revenues of $17.2 billion and a net profit of $2.7 billion in 2007.

Votorantim Novos Negócios (VNN) – the VC and private equity arm of Votorantim – was created as a new business area in the year 2000. In 2009, the $300 million VC fund

invested in technology ventures with high potential for value creation, focussing on agricultural biotechnology, mineral exploration, and information technology services. At that time, it was one of the largest VC funds in Brazil and it was 100 percent owned by the Votorantim Group. In 2008, eight companies were part of VNN's portfolio.

Initially, the fund followed a more traditional VC model, acquiring minority stakes in IT companies. These first investments occurred during the internet boom. Later on, the investment model changed significantly. VNN decided to have only majority stakes in its portfolio companies, adopting a more hands-on approach and monitoring the companies very closely. They started focusing the investments only on early stage companies and on business areas where they could leverage the group's competitive advantages. VNN facilitated the access of its portfolio companies to the group's know-how, business philosophy, and network of businesses. The biologist Fernando Reinach – a prominent Brazilian scientist and entrepreneur[2] – became the Executive Director of VNN in 2001. During the period covered by this research, the two start-ups that are the focus of this study – Alellyx and CanaVialis – were located next to each other in the Techno Park Campinas in the city of Campinas (state of São Paulo, Brazil). Campinas, located 88 km from São Paulo, is home to many domestic and international high-tech companies, including IBM, Dell, Motorola, Samsung, and 3M. The region is also home to many research centers and universities. Techno Park Campinas is home to more than 60 high-tech companies.

Alellyx was founded in 2002 with an initial investment of $11 million from Votorantim. The group invested a similar amount in 2003 and 2004. Alellyx carried out transgenic research to fight disease and increase the productivity and quality of three agricultural crops: sugarcane, orange, and eucalyptus. Alellyx's strategy was to focus on these "specialty" crops instead of more traditional ones like soybean, corn, and wheat. In 2009, the company had 140 employees and one of the most advanced biotechnology labs in Latin America. The idea of creating Alellyx came from VNN. A group of five scientists – three specialized in genetics and two in bioinformatics – were invited by Dr Reinach to participate in the creation of the new venture. They later became minority owners of the company. Dr Reinach was Alellyx's first CEO.

CanaVialis was founded in 2003 with an initial investment of $7 million from Votorantim, reaching a total of $25 million in the first three years. In 2009, the company was the largest privately owned sugarcane biotech company in the world. With more than 100 employees in 2009, the start-up developed new sugarcane varieties through crossbreeding. The core of the business was to provide services to help farmers manage and improve the performance of their sugarcane varieties. At that time, CanaVialis had a very distinctive business model: the technologies developed by the company were sold as part of a "tailored solution" that included a variety of services to manage sugarcane plantations. The company's strategy was to offer services and technologies to its customers through long-term contracts. The origin of CanaVialis was somewhat similar to the case of Alellyx. In 2002, VNN invited five geneticists from the University of São Carlos to participate in the creation of the company. With more than 30 years of experience, these scientists had developed 60 percent of the sugarcane varieties that were planted in Brazil at that time. As in Alellyx, the founding scientists were minority owners.

The histories of the two start-ups were closely connected and the companies had even shared the same CEO on a couple of occasions. Dr Reinach assumed the top management position at CanaVialis when the company was founded, while he was still CEO at Alellyx. In 2009, Ricardo Madureira was the CEO of both companies – before assuming that position he was part of VNN's team. It is important to note that, despite

these commonalities, the two companies remained legally independent. An important milestone in the life of the two companies occurred in 2007, when Alellyx and CanaVialis formed a technology partnership with Monsanto. The objective of the partnership was to collaborate in the development of new sugarcane varieties with a higher tolerance to herbicides and more resistance to insect pests. Finally, Monsanto announced the acquisition of the two start-ups for $290 million in November 2008.

I use the case study method to perform the empirical analysis (Eisenhardt, 1989; Eisenhardt and Graebner, 2007; Miles and Huberman, 1994; Siggelkow, 2007; Yin, 2008). The data gathering process involved several sources. Interview data, combined with public and proprietary information, were obtained from the business group, the start-ups, and industry experts. The author personally collected the data and conducted all the interviews. The study involved three separate trips to Brazil: July 2007, December 2007, and January 2008. Interviews were open ended, but based on a list of topics and some general questions in order to guide the discussion. These questions were tailored to the particular role of the interviewee, taking into consideration the purpose of the interview and the phase of the study. The interviews lasted one to two hours and were all conducted in person. Because of the open-ended and grounded nature of this research, I deliberately tried to give the interviewees enough space to openly talk about the different "stories" that are the foundation of this study. I took extensive notes at each of the interviews and a research assistant was also present in most of them.

The study was divided into three phases. The aim of the first phase was to obtain a general understanding of Brazil's business, institutional, and political environments, focusing on the agribusiness sector. I interviewed ten Brazilian experts on these topics, including specialists on high-technology entrepreneurship, new business creation, VC, intellectual property (IP), government-related issues, and the agribusiness industry. The data coming from the interviews were complemented with public and proprietary information. I accessed numerous reports and articles about Brazil's competitiveness and science and technology (S&T) production, in addition to information on the agribusiness sector from news databases and analyst reports.

In the second phase, I studied the history of the start-ups, trying to identify the main issues and obstacles faced by the companies during their creation, development, and evolution. I reviewed company documents and interviewed ten individuals affiliated to Alellyx and CanaVialis, including founders, top executives, and senior and junior scientists.

Finally, a third phase was centered on VNN. The aim was to investigate how the business group influenced the creation, development, and evolution of the start-ups, beginning with the creation of the companies and ending with their acquisition by Monsanto. The findings obtained during the first and second phases guided the data collection during the third stage. I interviewed five top executives in charge of VNN, including its executive director. Some of these executives were interviewed multiple times. Additionally, I was granted access to some internal company documents related to the investments. During this phase, I also conducted multiple follow-up interviews with the ventures' executives to complement VNN's perspective.

The data collection and analysis were iterative. This process led to the emergence of themes, constructs, and categories (Edmondson and McManus, 2007; Glaser and Strauss, 1967). First, I developed a detailed narrative account of all the data and information, including quotes from interviews, documents, reports, and field notes. Based on the narrative account, I organized the qualitative data into a set of categories

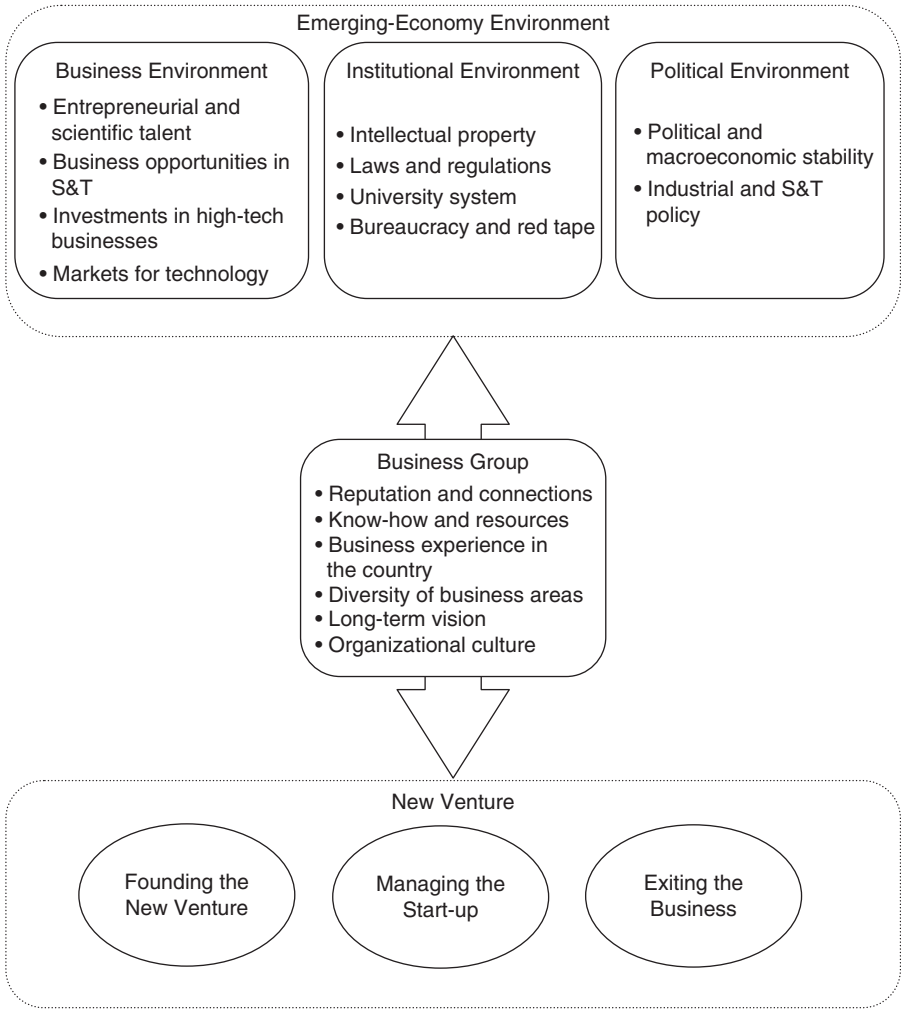

Figure 1.
Theoretical framework

using a simplified content analysis approach (Auerbach and Silverstein, 2003). Finally, I developed the theoretical framework discussed in the following section.

3. The role of a business group in the foundation and management of high-technology businesses

In this section, I discuss the main environmental factors affecting the creation and evolution of the start-ups and how the business group played an important role in addressing some of these problems. The structure of the discussion is organized around the theoretical framework presented in Figure 1. The analysis is divided into three main categories: business environment, institutional environment, and political environment.

3.1 Business environment

The business environment encompasses different business-related aspects that affect the foundation and management of a new venture. I focus the discussion on four major

themes: first, entrepreneurial and scientific talent; second, business opportunities in S&T; third, investments in high-tech businesses; and finally, markets for technology.

Inadequate access to entrepreneurial and scientific talent is a major obstacle to the development of high-tech ventures in developing countries (Porter, 1990). The cases of Alellyx and CanaVialis were no exception. In Brazil, it is not easy to find the appropriate entrepreneurial talent to develop high-tech start-ups. Generally, management education is focussed on training people to work in big corporations. The most common type of entrepreneur in Brazil is the one managing small family businesses instead of ventures with high-growth potential. Most of these small businesses operate in the informal economy. Usually, the entrepreneurs managing this type of company lack any formal management training or familiarity with technology ventures. Also, they are not used to the oversight of a board of directors.

Another problem that interviewees mentioned was the lack of successful high-tech entrepreneurial stories in Brazil that could inspire aspiring entrepreneurs. In the USA, stories of entrepreneurs are frequently celebrated in the media and many of these individuals are almost considered heroes (McCormick and Folsom, 2003). These stories also legitimate individual entrepreneurs when they have to deal with investors (Lounsbury and Glynn, 2001). Moreover, if an entrepreneur failed in Brazil, the job market and the opportunities to create other start-ups were limited and, in many economic sectors, there was still a stigma attached to having owned a business that went bankrupt, keeping would be entrepreneurs at bay (Landier, 2006).

VNN's initial strategy was to use their own executives to manage the companies. Dr Reinach, the first CEO of both Alellyx and CanaVialis, was part of VNN's executive team. Later on, external managers were hired. The case of CanaVialis was especially problematic. An executive from the Brazilian subsidiary of a large agricultural multinational assumed the top management position of the company a few years after its foundation. While this executive was at CanaVialis, she suffered many setbacks in terms of managing the small venture and ended up leaving the company fairly soon. After this failed attempt to bring in outside managerial talent, VNN decided to use one of its own executives again.

Another strategy that VNN implemented to substitute for the lack of appropriate managerial talent was to use the founding scientists as managers. The business group trained and mentored them so they could assume managerial positions successfully. At the time, in Brazil, scientists with entrepreneurial and managerial training were difficult to find and they rarely took management courses or got MBA degrees. Moreover, the availability of courses offered by business schools on entrepreneurship and managing new ventures was a recent phenomenon.

In addition to the lack of appropriate entrepreneurial talent, the access to scientific talent was also problematic. According to interviewees, Brazilian scientists with the technical expertise to join high-tech firms like Alellyx and CanaVialis were available. Brazilian public universities provided adequate scientific training. In 2008, Brazil had the highest per capita rate of PhD graduates in S&T among Latin American nations (RICYT, 2008). However, scientists were mostly academics that were reluctant to join a start-up. Scientists in Alellyx and CanaVialis pointed out that many Brazilian scientists were scared of working for risky businesses because there was no job market for them if the company failed and returning to academia after working in the private sector was difficult. The affiliation of the start-ups with the Votorantim Group ameliorated some of these problems. The prominence and reputation of the business group made scientists less

reluctant to join Alellyx and CanaVialis. This was confirmed by the fact that VNN was able to attract top scientists to join the new ventures as founders. The founding scientists had previously participated in successful scientific initiatives in Brazil. The business group backing also alleviated concerns about the potential failure of the companies. As VNN executives mentioned, they had a longer-term approach to handle their portfolio companies compared to a traditional VC firm, and they transmitted this vision to the start-ups' employees. Many of the scientists told me that the affiliation with Votorantim made them less concerned about losing their jobs due to an unexpected closing of the company.

Leaving aside the problem of attracting scientific talent, managing scientists in a country like Brazil was also a challenge. Brazilian scientists typically had trouble changing their academic mentality to a commercial approach as they were not used to dynamic organizational environments. All these issues were compounded by the fact that there were very few scientists in the private sector that they could relate to. This problem was experienced by the two start-ups. Between its foundation and 2009, three of CanaVialis' founding scientists left; one left from Alellyx. According to the start-ups' executives, they left because they had trouble adapting to a business culture. Retaining scientific talent was always a challenge for the two companies. After losing those founding scientists, executives at VNN were very careful about transmitting the group's vision, values, culture, and long business tradition. Votorantim's strong organizational culture helped to accelerate the scientists' assimilation of a business perspective. Votorantim's values were an integral part of the start-ups, influencing their organizational culture immensely. This ubiquitous business culture emanating from the group is something that a small and inexperienced domestic VC firm would not be able to provide.

The availability of business opportunities in S&T is another important component of the business environment. In emerging markets, there is usually a lack of information about these kinds of opportunities. Many entrepreneurs do not want to spend resources exploring where the good opportunities are because they anticipate that they will have trouble capturing a reasonable portion of the value created (Hausmann and Rodrik, 2003). In Brazil, universities and companies did not patent many of their innovations and findings. Media coverage of new technological innovations was poor and universities did not showcase their research activities effectively. In short, there was a lack of information about the pool of S&T that had been developed in the country. Many business ideas were lost because it was difficult for entrepreneurs to build upon existing domestic technologies.

According to interviewees, a business group is in a better position to address the problem of finding new business opportunities. A group has access to internal information coming from their own business areas that can lead to new opportunities (Belenzon and Berkovitz, 2010; Mahmood *et al.*, 2013; Mahmood and Mitchell, 2004). Moreover, business groups usually have vast experience in capturing the value created by different types of businesses in their home countries. Votorantim had a strong presence in agriculture, pulp and paper, and mining. Not surprisingly, many of VNN portfolio companies were related to those business areas. In agriculture, they owned Alellyx and CanaVialis. Alellyx also did research on eucalyptus, the main raw material that Votorantim used to produce paper. In 2009, Base Metals and SAM were two start-ups developing technologies for mineral exploration.

Issues related to investments in high-tech businesses were also hindering the emergence of new ventures in Brazil. According to interviewees, the traditional VC business model – investing in many start-ups expecting that a few of them will be

blockbusters – was not adequate for Brazil. There were not many opportunities to invest in new technology businesses. Therefore, the strategy of investing in a high number of new ventures in order to lower the risk of the whole portfolio of investments was difficult. Moreover, emerging markets are risky *per se*. Political, macroeconomic, and regulatory uncertainties make investments in high-tech start-ups even riskier than they inherently are (Ahlstrom and Bruton, 2006). According to VNN executives, the Brazilian Government had made efforts to compensate for the high level of risk associated with VC investments by offering different kinds of incentives, such as funds from BNDES[3] or FINEP[4] (Leamon and Lerner, 2012; Sennes, 2009). The problem was that there were still many inconsistencies. For example, if you invested in revolutionary products in industries with no substitutes you could be accused of being monopolistic (Wright, 2008).

At the beginning, VNN followed a more traditional VC model, but after a couple of unsuccessful attempts with some IT companies, its executives decided to develop a model that was more appropriate for Brazil. As one executive mentioned, VNN decided to follow the strategy of investing in a small number of start-ups with a more hands-on approach as a way to reduce the level of risk associated with the investments. However, the strategy of making a small number of investments and providing a lot of support and assistance required access to a significant amount of resources and know-how. VNN benefited from the know-how and resources coming from the group's different business areas because their investments were closely related to some of Votorantim's companies.

Exiting the business was another difficulty faced by venture capitalists in Brazil. The Brazilian market for IPOs was underdeveloped and illiquid. Additionally, closing a business was a lengthy and difficult process, even when compared to other large emerging markets. Amid this complicated setting for exiting a business, Votorantim had an important advantage. The group could potentially integrate the start-ups to its other established companies. This was facilitated by the relatedness between the start-ups and some of the group's businesses. The reputation and business experience that a business group usually has can also facilitate the sale of a business. The case of Alellyx and CanaVialis was a good example. As I mentioned previously, they were both acquired by Monsanto. Votorantim's reputation and experience facilitated the successful completion of this transaction.

The last component of the business environment I discuss here is markets for technology (Arora *et al.*, 2001). In many Latin American countries, executives are not used to purchasing technologies or contracting specialized technical services. Markets for technology are small and unsophisticated, and information asymmetries between buyers and sellers abound. Investments in research and development are small and IP laws are frequently not respected.

In Brazil, companies had little experience in doing business with new ventures. In addition to this problem, it was difficult to enforce contracts. Thus, performing business transactions required high levels of trust between the parties involved. New VCs and new start-ups need time to acquire institutional legitimacy and build their networks of connections, putting them at a significant disadvantage with respect to established organizations (Dahl and Sorenson, 2012; Pfeffer and Salancik, 1978). Entrepreneurial ventures are subject to liability of newness (Freeman *et al.*, 1983; Singh *et al.*, 1986; Stinchcombe, 1965). Due to the prevalence of institutional voids, this type of liability is even stronger in the case of new companies operating in emerging markets. Alellyx and CanaVialis were in a better position to navigate through Brazil's immature markets for technology. According to interviewees, Votorantim had a long history of acting responsibly and transparently. The group's reputation and network of contacts

generated trust that spilled over to Alellyx and CanaVialis. Therefore, compared to what would normally happen to a Brazilian venture, Votorantim's start-ups had less trouble in finding suppliers, customers, and partners. The group could also act as a substitute for the absence of adequate technology markets, which was possible because the technologies developed by the start-ups were related to other business areas in the group. In other words, some of Votorantim's companies could potentially become customers of the start-ups. This reduced the risk of VNN's investments.

3.2 Institutional environment

I define the institutional environment as the system of formal laws and regulations, informal conventions and norms that influence socio-economic activity and behavior (North, 1990). Institutions are an important part of the environment. Organizations must adapt their organizational structure and business strategies to respond adequately to the challenges imposed by their institutional environments (Oliver, 1991; Powell, 1988). Based on the analysis of the data, I focus the discussion on four aspects related to the institutional environment: IP; laws and regulations; university system; and bureaucracy and red tape.

In emerging markets, weak IP regimes are one of the classic issues that have a negative effect on technological development, innovation, and high-tech entrepreneurship (Murmann, 2003; Zhao, 2006). In Brazil, IP laws were considered appropriate, but enforcement was poor. There was no tradition of respecting IP rights. The patenting process was slow and complicated, and the general public had a negative view of patents – they saw them as a device to make the access to new technologies more difficult instead of perceiving them as an incentive to increase the number of technological investments and innovations.

According to VNN executives, nearly six years after they made their first investment in the biotechnology sector, the biggest challenge that VNN's biotech ventures faced was still patent infringement. Alellyx and CanaVialis' affiliation with Votorantim helped in dealing with IP issues. First of all, the business group had the power to potentially influence IP regulations that were important to the start-ups. This also applied to IP enforcement. In addition, business group executives had contacts in the government and congress that could potentially be used. The backing of Votorantim also created a more credible threat against potential IP violators.

Another problem faced by high-tech companies in Brazil – and in many other emerging markets – was patenting new discoveries. The National Institute of Industrial Property (INPI[5]) was the government institution in charge of granting patents and trademarks in Brazil. According to an INPI executive, understaffing and inadequate practices had made the process of getting a patent very lengthy and complicated. In 2009, it usually took more than four years to get a patent approved. In the USA, the same process typically took less than two years.

Alellyx and CanaVialis had access to the know-how and experience of Votorantim in dealing with IP issues. A good example was how the group had helped CanaVialis in the development of a more appropriate way to capture the value created by new sugarcane varieties. The strategy chosen was to bundle CanaVialis technologies with other services in order to offer a tailored solution for the management and improvement of sugarcane plantations and varieties, leading to a more controlled release of the technology. In the case of Alellyx, the plan was to release the technology through partnerships; for example, CanaVialis was its partner in the sugarcane business. Alellyx also established partnerships with the group's citrus and pulp and paper companies.

In Brazil, as in many other emerging economies, laws and regulations are complex and many times nonexistent. The process of drafting new laws and regulations is lengthy, bureaucratic, and uncertain – especially in matters that legislators are less familiar with, such as new technologies. High-tech entrepreneurs are especially affected by regulatory uncertainty. Lengthy disputes between the different parties affected by a new regulation means that entrepreneurs have to guess what the outcome of political decisions will be. Thus, the inherent riskiness of VC investments increases even more. These problems were experienced directly by the start-ups.

In Brazil, tax burdens were heavy and navigating through the complex tax legislation was very time consuming, which is especially problematic for new businesses because they usually do not have any "tax know-how." In 2008, the average total time required to comply with the three major types of taxes – corporate income tax, value-added or sales tax, and labor taxes – was 2,600 hours per year, compared to 325 hours per year in the USA (World Bank, 2008). Brazilian imports and exports regulations also generated disadvantages for small companies compared to large ones. While interviewees did not give specific examples, they mentioned that Votorantim's know-how and experience in dealing with Brazil's regulatory complexity and uncertainty was beneficial for the start-ups. The group also provided support in handling tax-related issues. Some executives also mentioned that Votorantim could eventually make use of its reputation and connections to speed up legal and regulatory decisions.

Regarding the university system, I focus on two aspects: the transfer of technology from universities to the private sector, and the academic culture. In Brazil, research was typically undertaken by public universities. These institutions did not have the tradition of protecting IP. The policy was to make knowledge and new discoveries freely available for everyone, and most public universities were reluctant to encourage their researchers to patent their inventions (Greco, 2003). Transferring Brazilian technologies from universities to the private sector was uncommon. Laws and regulations affecting technology transfer were scarce and ambiguous. The universities' policies on technology transfer were inadequate and the ownership of IP in joint projects between universities and the private sector was usually ambiguous. Technology transfer practices and infrastructure like technology transfer offices were practically nonexistent.

VNN developed a way to circumvent these technology transfer issues and other problems linked to the Brazilian public university system. VNN asked the founding scientists to leave their academic positions in order to participate in the creation of Alellyx and CanaVialis. Asking the founding scientists to leave their positions before joining the companies was a way to address the institutional problems related to university-private sector technology transfer. VNN also implemented the policy of developing all the technology internally and did not engage in joint research projects with Brazilian public universities. Votorantim was in a good position to handle the larger investments and longer horizons associated with this strategy. Poor technology transfer and cumbersome policies to handle university-private sector cooperation led to the adoption of this strategy.

Particularly in Latin America, the academic culture had traditionally been adverse to the private sector. Universities typically assumed the role of "critical consciousness" in their societies (Arocena and Sutz, 2001). This generated hostile relationships between universities and the typically conservative private sector, especially during the military dictatorships that prevailed in many Latin American countries during the 1960s and 1970s. Thus, it was not surprising when interviewees mentioned that many

Brazilian academics working at public universities were reluctant to cooperate with the private sector. Another aspect of the Brazilian academic culture that was discussed during the interviews was that many researchers believed that the country was not capable of making substantial scientific discoveries or produce world-class technologies. Some scholars have proposed that these kinds of attitudes explain, in part, the low levels of economic development observed in Latin American countries (Harrison, 2000). Certainly, this way of thinking disheartens scientists and damages the reputation of their profession, potentially leading to brain drain.

The last component of the institutional environment is bureaucracy and red tape. New ventures typically lack legitimacy and ties to government institutions, making them especially susceptible to bureaucracy and red tape. Bureaucracy increases information processing and transaction costs, putting entrepreneurial endeavors at risk (Luo and Junkunc, 2008). Here I focus on the processes of starting and closing a business, which have a considerable impact on entrepreneurial activity. In 2008, it took an average of 152 days to open a new business, compared to six days in the USA (World Bank, 2008). Eighteen procedures[6] needed to be executed to open a business; in the USA, only six procedures were required. The complexity and length of the process was frequently cited by Brazilian venture capitalists as a significant obstacle to entrepreneurship. Because high-tech ventures fail frequently, the process of closing a company is also important. Closing a business in Brazil was legally complex and bankruptcy laws were inadequate. According to the World Bank (2008), the ease of closing a business in Brazil was ranked number 127 out of 181 countries.

Executives at Alellyx and CanaVialis mentioned that Votorantim's experience, political connections, and reputation helped them considerably in dealing with the different kinds of bureaucratic requirements and red tape in Brazil. Compared to a business group, inexperienced VC firms are at a disadvantage, especially because they usually lack the depth of political connections that an established business group has.

3.3 Political environment

The political environment is another important factor that affects VC investments, entrepreneurial activity, and start-up survival. Based on the fieldwork, I chose to focus on two aspects: political and macroeconomic stability; and industrial and S&T policy.

The absence of political and macroeconomic stability is one of the classical reasons used to explain a lack of entrepreneurial activity and low levels of VC investments. Domestic and foreign venture capitalists are more reluctant to invest in unstable countries where access to capital is limited and uncertainty pervades the economy (Khoury *et al.*, in press). Entrepreneurial ventures are especially susceptible: political and macroeconomic uncertainty increases the total risk of these endeavors to a level that can be too high for the typical VC firm. In Brazil, the issue of political and macroeconomic stability had not been a problem recently. Notwithstanding, interviewees mentioned that this should not be taken for granted. In a setting like this one, foreign investors and venture capitalists should be more reluctant than Votorantim to make risky investments, given that the group is more familiar with Brazil's political and macroeconomic conditions and has a longer-term approach to its investments.

Industrial and S&T policy are two factors that can have a significant effect on the emergence and success of entrepreneurial ventures. In Brazil, the government provided many different ways to access funds to develop S&T businesses. Local state governments also funded S&T initiatives, such as the Foundation for the Support of

Research of São Paulo State[7]. BNDES is another institution that supports new businesses with the objective of improving the level of economic development of the country. These initiatives had been important to spur scientific and industrial activity in Brazil (Pereira *et al.*, 1998). However, interviewees mentioned that a nontrivial number of Brazilian entrepreneurs decided to start a business mainly to take advantage of subsidies and government incentives, creating firms that were very dependent on government support. According to VNN executives, when they were deciding whether to invest in the creation of Alellyx and CanaVialis, they evaluated the sustainability of the business without taking the availability of government subsidies into consideration.

4. Conclusions

This study makes five important contributions. First, I identify and analyze the most important problems faced by two emerging-economy start-ups between their foundation and acquisition. This analysis improves our understanding of the process of entrepreneurship in emerging markets and Latin America in particular. Second, I show and discuss how a business group acting as a venture capitalist can be an effective way to address some of the obstacles to entrepreneurship. Third, I analyze what happens inside two start-ups from the point of view of the entrepreneur and investor, complementing the literature on national innovative capacity (Furman *et al.*, 2002; Mowery, 1992, 1998; Nelson, 1992, 1993; Porter, 1990). Finally, I contribute to the literature on business groups. There is practically no previous work providing a detailed and in-depth analysis of how a business group can act as a VC investor.

Existing empirical evidence shows that, in emerging markets, a company can benefit from group affiliation (Khanna and Palepu, 2000; Khanna and Rivkin, 2001; Chang *et al.*, 2006). However, previous studies have not explored if these positive effects can extend to entrepreneurial ventures. The arguments discussed in this paper suggest that group affiliation can improve the chances of survival of emerging-economy start-ups. Amid pervasive institutional voids, business groups theoretically have a competitive advantage over both foreign VCs and young domestic VC firms. The involvement of business groups in risky ventures is an interesting "VC model" for emerging markets.

Business groups based within emerging markets should consider implementing VC initiatives. In developing nations, these large and established organizations have many competitive advantages that can be leveraged by entrepreneurial ventures. Conversely, entrepreneurs based in emerging markets might want to consider seeking the support of business groups. However, it is important to find a good fit between the business group and the new venture. The findings of this study also offer multiple lessons to international VC firms and VC arms of MNCs that want to invest in small high-tech businesses located in emerging economies and Latin America in particular. These VCs and MNCs must be aware that emerging-market start-ups need a different kind of support to succeed. They must develop strategies and business practices that are tailored to the particular circumstances of the emerging market that is receiving their investments. They should not underestimate the importance of forming joint ventures with established and experienced local players such as business groups.

The most important shortcoming of this research is its limited generalizability, given that I focus on one business group and two of its start-ups, in a specific industry and country. Naturally, the start-up/business group organizational structure is one out of many potential solutions to deal with environments that are hostile to entrepreneurial ventures. Also, it is important to note that the discussion of the Brazilian environment

was significantly influenced by the opinions of the people I interviewed. My aim has been to present the problem from the point of view of these particular investors and entrepreneurs. This work should not be considered an accurate and unbiased portrayal of the Brazilian situation. Finally, it should not be inferred from this study that, in emerging markets, business group backing is always superior to the support that a more traditional VC firm can offer.

Future research should use the arguments discussed in this paper and test them using a large-sample statistical approach. A comparative study between business-group-affiliated and non-business-group-affiliated entrepreneurial ventures would be particularly valuable. Additionally, it would be very interesting to analyze other specific business strategies and organizational structures that have been effective in increasing the level of entrepreneurial activity in emerging markets. Finally, future studies should also analyze how the effect of business group affiliation evolves over time, especially as the emerging market starts resolving its institutional deficiencies.

Notes

1. An extended version of this article is available from the author. To request this version, please send an email to santiago.mingo@gmail.com
2. Dr Reinach was profiled in *Science* (Volume 300, Issue 5624, May 30, 2003).
3. In Portuguese, Banco Nacional de Desenvolvimento Econômico e Social.
4. In Portuguese, Financiadora de Estudos e Projetos.
5. In Portuguese, Instituto Nacional da Propriedade Industrial.
6. A procedure is defined as any interaction of the company founder with external parties – for example, government agencies, lawyers, auditors, or notaries (World Bank, 2008).
7. In Portuguese, Fundação de Amparo à Pesquisa do Estado de São Paulo.

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