TYPES OF INNOVATION IN LOW-TECHNOLOGY COMPANIES OF EMERGING MARKETS: AN EMPIRICAL STUDY IN BRAZILIAN INDUSTRY

Autoria: Aurora Carneiro Zen, Fernanda Maciel Reichert, Lazaro Dionicio Sumba Quimi, Nathália Amarante Pufal, Paulo Antônio Zawislak

Abstract: Among these four groups, low-technology industry is still commonly regarded as unusual suspects in the modern process of innovation and economic change. However, we believe that innovation may happen in all different types of industries and companies, including low-technology firms. The aim of this paper is to analyze the types of innovation in low-tech intensity industries of emerging markets. We conduct an exploratory study in 21 low-tech companies, located in the southern region of Brazil. The results suggest that every type of innovation is an outcome that could be explained by the predominant innovation capability in the firm.

Keywords: innovation, low-technology industry, capabilities.
1 INTRODUCTION

In innovation research, this term “low-technology denotes the industrial sectors that have no or low R&D expenditures. This paper is about an industrial sector which, according to the usual socio-scientific indicators, is referred to as “low-tech”, respectively as non-research intensive and which mostly comprises “traditional” industries.

Schumpeter (1942) understands that innovation drives the economic development of societies. He mentions that the fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers’ goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates (Schumpeter, 1942). New goods, new methods of production, new markets, and so on, may occur in different industries, no matter of what technological intensity it is, i.e.: high-technology or low-technology. In that sense, firms that innovate will present a combination of different capabilities, being one more prevalent than other, which allow firms of lower technological intensity to develop its innovative capability.

The innovation capability is recognized as one of the main aspects leading to a competitive advantage amongst firms. Innovation capability is a special asset of a firm. It is tacit and non-modifiable, and it is correlated closely with interior experiences and experimental acquirement. The ability to quickly introduce new products and to adopt new processes has become an important facet of competition. (Guan & Ma, 2003). This capability refers to a firm’s ability to develop new products and/or markets, through aligning strategic innovative orientation with innovative behaviors and processes (Wang & Ahmed, 2004). Thus, innovative capability encompasses several dimensions.

According to Zawislak et al. (2011) the firm’s innovation capabilities refer to its ability to deliver new valuable solutions through its proficiency in at least one of the four inter-related capabilities (technological, managerial, operational and transactional), which are linked by the different organizational functions. They also affirm that every firm has all the capabilities and one of them predominates over the others and this gives the firm its innovativeness. They say that a firm to perpetuate in the market must change its technological, managerial, operational or transactional knowledge over time; and to innovate, its capabilities need to be specific and integrated.

The aim of this paper is to analyze the types of innovation in low-tech industries of emerging markets. To do so, we conducted an exploratory research in 21 low-tech companies, located in the southern region of Brazil.

This study has focus on a type of industry, which, according to the usual socio-scientific indicators, is referred to as “low-tech”, respectively as non-research intensive and which mostly comprises “traditional” industries. The interest in low-tech industry is motivated by the contradictory situation that, on the one hand, the debate about the perspectives of modern societies focuses on the rapidly growing importance of technological innovations, knowledge and research intensive economic sectors while, on the other hand, traditional industries make up a considerable fraction of employment and production, especially also in emerging economies (Hirsch-Kreinsen, 2008). Specifically, in the Brazilian case the low-tech industry players a significant role in the economy.

This paper is organized as follows: section 2 addresses the firm and the innovation capability; section 3 explains the research procedure; next, we present the results; and finally, we discuss our findings and future studies.

2 INNOVATION, CAPABILITIES AND THE INNOVATION CAPABILITIES MODEL OF THE FIRM
2.1 Innovation

The term innovation is not a fuzzy term and has been a theme of research focused in different levels. Several authors have studied innovation following a macro point of view (Nelson & Winter, 1982; Freeman & Perez, 1988; Lundvall, 1985, 2006, 2009; Bell and Pavitt, 1995 and Etzkowitz & Leydesdorff, 2000). Other authors have studied innovation following an industrial point of view and focused on market context (Richardson, 1972; Abernathy and Utterback, 1978; Williamson, 1985, 1991, 1995, 1998, 2003; Langlois, 2003; and Menard, 2004). And several authors have studied innovation following an approach focused on the firm context (Nelson, 1991; Dosi, 1992; Teece et al., 1997; Dosi et al., 2000; Knight and Cavusgil, 2004; Wang, 2008; and Figueiredo, 2010). Regarding all these approaches it is easy to understand that the phenomena innovation can be studied at different levels (national, industrial and firm) and sectors.

In general, sectors were supposed to be recognizably different from one another not only in the goods and services they produced but also in the technologies and processes they used to produce them. First introduced during the 1930s in the United States, the classification of manufacturing industries based on their technology intensity has been widely used since the 1950s in the other industrialized countries, in particular to analyze the industrial sector’s pattern of specialization and its comparative performance in international trade. In its most recent versions developed by the OECD (Organization for Economic Co-operation and Development) in the 1990s, and subsequently adopted by other international institutions such as Eurostat, the taxonomy enables manufacturing industry sectors to be aggregated into four groupings identified according to their level of technology intensity and termed as follows: ‘high-technology’, ‘medium-high-technology’, ‘medium-low- technology’ and ‘low-technology’. Sectors are allocated among the four groupings according to the values assumed by indicators based on the amount of R&D expenditure and determined by the OECD using the average values originally referred to a set of ten industrialized countries (Marcato and Malfi, 2012). Despite criticism, the OECD classification is still the most widespread and used in the literature.

Among these four groups, low-technology industry is still commonly regarded as unusual suspects in the modern process of innovation and economic change. However, we believe that innovation may happen in all different types of industries and companies, including low-technology firms.

Innovation is a phenomena linked to the entrepreneur’s domain, who is the agent of change, capable to modify the production pattern of the industry through exploitation of new creations or inventions that offer a novel technology to produce new goods or the possibility to produce the old ones in a new way, creating new products to fill out market requirement (Schumpeter, 1942). This process of creation to achieve innovation could have two important sources: First, firms can accumulate knowledge (experiences, competencies and skills) which represents an internal source to support innovation, and second, firms can imitate or adopt innovation from others (Nelson and Winter, 1982; Lewin and Massini, 2003). In order to deal with innovation and support the entrepreneurial activities, capabilities have to be developed by companies.

2.2 Capabilities

The term capability has been applied widely in the specialized managerial literature but there is not consensus about what it really means. For instance, the literature indicates that several authors have studied capabilities following a human resource approach (Penrose, 1959; Becker 1962; Barney, 1991). Other authors have used the term “competency” to identify a set of features that are very particular of the firm (Selznick, 1957; Snow and Hrebinia, 1980). In the same direction, authors as Richardson (1972) defined capabilities as
the set of skills, knowledge and experience which are very specific and let the firm perform as a unique entity. Taking into account the uniqueness of the firm, some authors coined the term “core competence” to define the main set of capabilities that support the business of the firm (Prahalad and Hamel, 1990). Focused on daily activities, the term “routines” was coined to describe all theses capabilities available in the firm (Nelson and Winter, 1982). Some times firms perform activities which are not easy to be described, following this approach Itami and Roehl (1987) define capabilities as a set of invisible assets.

At this point, it is possible to highlight that many authors have coined different terms and concepts to define capabilities, but the term capability is not yet well understood. At the same time, it is possible to identify a convergence among them, it is accepted that capabilities let the firms support operations and guarantee their existence. The firm operates based on its capabilities which provide the knowledge, experience and skill to identify market opportunities, to offer new value concepts and at the end the possibility to meet customer’s need.

2.3 Innovation capability

Richardson (1972) defined capabilities as skill, experience and knowledge which let the firm to perform as a unique entity. These capabilities let the firm identify market opportunities, develop new value concept (new business concept) and meet customer’s need in existing or new markets. Markets represent a very dynamic scenario where capabilities available in the firm provide the support to deal with the process of change and innovation. In this direction the literature identifies two relevant theoretical approaches: dynamic capabilities and technological capabilities.

Dynamic capability represent an approach which dealt with a dynamic scenario, where firms have to invent, build, adopt, adapt and make continue modifications in products, processes and/or organizational structure in order to meet customer’s need in dynamic markets, being well succeed in this process, the firm could guarantee sustain competitive advantage (Teece, Pisano and Shuen, 1997; Eisenhardt and Martin, 2000; Winter, 2003; Wang and Ahmed, 2007, Teece, 2007). Author as Dutrénit (2000) has tried to show that innovation process is not linear, instead it is complex and have to be achieved gradually. In her work, she presents arguments to explain how latecomer firms (Latin America and Asia) have been capable of achieving innovation and succeed in the international market, which is very dynamic.

Technological capabilities is an approach with also deal with a dynamic scenario, but focus on the set of capabilities that firms need to achieve innovation, mainly this approach is developed in a technological context, where firms need capabilities to create (new product and new process), adopt (new process, new resources, and new equipments) and make adjustment in the technology base, which could be considered necessary but not enough to achieve innovation (Bell and Pavitt, 1995; Lall, 1992).

2.4 Innovation Models

The literature gives insights that support the idea that firms need a set of capabilities to be innovative - what are those capabilities is a story that has not been completed. In this direction, some authors believe that there are capabilities that have not been described yet or which need more research for a better understanding (Burgelman, 1994; Christensen, 1995; Guan and Ma, 2003; Guan et al., 2006; Yam, et al., 2011).

Innovation capability has been explained applying different arguments, some authors have made research based on models (Lawson & Samson, 2001; Assink, 2006; Terzirovski, 2007; Zawislak et al., 2011) and others have developed studies focused on framework
development (Liu & White, 2001; Calantone et al., 2002; Malerba, 2005). Nevertheless, the literature indicates many gaps, which have to be filled out through new research.

Zawislak (2011, 2012) presents an innovation capability model which has two main capability drivers: a set of technological capabilities and a set of business capabilities (see Table 1). In this model, the technology drivers are represented by the technology development capability and the operational capability, and the business drivers are represented by the management capability and transaction capability.

Technology development capability is a set of knowledge, experience, ability and skills which have to be available in any firm. These capabilities have to be developed by the firm to interpret the state of the art in order to make adaptation and transformation of the technology base, creating new products, new processes, new materials, new equipment and devices. All these achievements will let the firm reach higher levels of technical-economic efficiency (Lall, 1992; Bell & Pavitt, 1995; Figueiredo, 2001; Afuah, 2002; Zhou & Wu, 2010).

Operational capability is a set of knowledge, experience, ability and skills that let the firm to perform daily routines which also includes the solution of day by day problems. This set of capabilities let the firm perform under the available productive capacity. In doing so, new processes, techniques, layout are developed and applied in the current technology base. This process of change will be focused on improvement in quality, efficiency, flexibility, confidence and reduction in cost and lead-times (Skinner, 1969, 1974; Swink & Hegarty, 1998; Ward et al., 1998; Flynn & Melnyk, 2010).

Management capability is a set of knowledge, experience, ability and skills that let the firm applied the technology base and its outcome into an organized and consistent structure to support operational and transactional activities. This set of capabilities let the firm innovate, creating new management methods, new agreements, better and most effective strategies, which will be focused on better coordination mechanisms and reduction of the interfunctional-friction (Whitley, 1989; Tsoukas, 1994; Tamkin et al., 2002; Mintzberg, 2009).

Transactional capability is a set of knowledge, experience, ability and skills that every firm needs to achieve transactional cost reduction. This cost reduction is related to firm’s operational activities (marketing activities, outsourcing, bargaining power, logistics and others). In this context, innovations are achieved through new strategies with suppliers and customer, better relationship with partners and asymmetric reduction (uncertainty) of market information (Langlois, 1992; Argyres, 1996; Langlois and Foss, 1999; Williamson, 1999; Mayer & Argyres, 2004; Mayer & Salomon, 2006; Argyres & Mayer, 2007).
Table 1: Innovation Capability Drivers

<table>
<thead>
<tr>
<th>Driver</th>
<th>Capabilities Definition</th>
<th>Innovation Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>Technology Development Capability. It is the ability that any firm has to interpret the current state of the art, absorb and eventually transform a given technology to create or change its operations capacity and any other capability aiming at reaching higher levels of technical-economic efficiency.</td>
<td>Technological Innovation. This type of innovations encompasses the development of new design, new materials and new products. In addition, they include the development of machinery, equipment and new components.</td>
</tr>
<tr>
<td></td>
<td>Operations Capability. It is the ability to perform the given productive capacity through the collection of daily routines that are embedded in knowledge, skills and technical systems at a given time.</td>
<td>Operations Innovation. This type of innovation encompasses new processes, improvements in existent processes, introduction of modern techniques, new layouts, etc. It allows the firm to produce products with quality, efficiency, flexibility with the lowest possible cost.</td>
</tr>
<tr>
<td>Business</td>
<td>Management Capability. It is the firm’s ability to transform the technological outcome into a coherent operational and transactional arrangement.</td>
<td>Management Innovation. This type of innovation encompasses the development of management skills which reduce the “internal friction” between different areas of the firm. It is intended to create new methods of management and new business strategy, improve decision making and inter-functional coordination, etc.</td>
</tr>
<tr>
<td></td>
<td>Transaction Capability. It is the ability to reduce its marketing, outsourcing, bargaining, logistics, and delivering costs, in other words, transaction costs.</td>
<td>Transaction Innovation. This type of innovations encompasses the development of ways to minimize transaction costs with suppliers and customers. It is intended to create new commercial strategies, improve relationships with suppliers, streamline market knowledge, etc.</td>
</tr>
</tbody>
</table>

Source: Zawislak et al., 2011.

3 RESEARCH METHOD

The aim of this paper is to analyze the types of innovation in low-tech industries of emerging markets. For the purpose of this research, a multiple case study method has been conducted. According to Eisenhardt (1989), it supports the replication and extension among individual cases. Yin (2003) corroborates, saying that cases must be carefully selected, so they can produce similar or completely opposite results, but for predictable reasons.

Considering that Brazil has figured prominently among the emerging economies due to its population contingent and its economic growth, it is relevant to analyze its firms. Throughout the years, Brazil has reached economic stability, becoming the sixth largest
economy in the world and attracting foreign investors. Presenting an open economy within the globalization process, the country has a large number of commercial trades. Brazil hosts the world greatest bio and climatic diversity, which provides assorted agricultural and industrial production, characterizing the country as an important supplier for all over the world. Thus, the study was carried out in the Rio Grande do Sul state, located in Southern Brazil, due to its predominantly industrial base.

We have parted from a total of 10,930 manufacturing firms within the region studied. A hundred of those were randomly selected, encompassing all industries, according to each industry proportion in the total amount. After that, the firms were categorized according to their technological intensity in accordance with the OECD definition: low, medium-low, medium-high and high technological intensity. It has been noticed that more than 50% of Southern Brazil’s firms are classified as low-technological intensity. As the research is still happening, not all 100 firms have been studied yet, therefore, for the present paper, we discuss 21 cases of low technological intensity firms.

3.1 Data Collection and Analysis

Data collection presents two major phases. Secondary data were found in the firms’ websites, articles, and annual reports. Then, in-depth interviews were conducted with the owners, directors and managers of each firm. The interview was guided by a qualitative questionnaire, which was divided in five parts, four of them related to the capabilities of the firm and the last one regarding innovation. The fifth part was focused on changes, innovation and differential examples, according to the respondent and the firm vision. The interviews have been recorded and transcribed. A report has been written after each visit, following the same structure used in the research instrument.
The analysis of the characteristics related to innovation in the firms is based on the information provided by the respondents during these interviews, besides the data collected in its websites, articles and annual reports concerning changes and innovation. Not all firms answered to all the questions. Besides, the examples regarding changes, innovation and differential presented some variation, due to the fact that a given example could be related even to one or other capability.

4 INNOVATION IN LOW TECHNOLOGICAL INTENSITY COMPANIES

Firms of low technological intensity industries were questioned about important changes that have occurred in the company. Main changes appointed by them are related to the operational capability, especially regarding process automation. In that sense, the acquisition of modern equipment and machinery allowed these firms to reduce set-up, to reduce waste rate and to reduce manpower. Company C mentioned “the main change occurred was the introduction of numeric command machinery, which is more economic, has larger memory capacity and allows more pre-set parameters, which at the end, reduces production set-up.”

Changes such as these decrease time to delivery and also reduce costs. In industries like food and beverages, they reduce the risk of contamination by employees contact. Other change mentioned by different companies is the verticalization or the centralization of some or of all processes. Interviewees also mentioned changes in their operational methods and systems, for example, a clothes company no longer applies push production system, but a pull
production system instead. Other changes such as in the operational area layout have also been mentioned as important to these companies.

It is notorious the operational area represent a key factor for achieving different type of innovation which are also important when aligning the business strategy with the market trends. Thus, to apply the business strategy, absorb and adapt new technology and to solve day by day problems, operational capabilities have to be available at the firm (Swink & Hegarty, 1998; Ward et al. 1998; Flynn and Melnyk, 2010).

Changes related to the technological capability have been the least mentioned. There have been only three comments in this regard. Company T highlighted the hiring of specialists on new product development: “hiring specialist in cracker and biscuits production in order to develop new products…” Company L mentioned investments in this area; and Company O exemplified a modification in their product by changing the use of inputs. The content analysis gives evidence to think the technological capability are very weak, most of them represent outcomes of adaptation and acquisition (Lall, 1992; Bell & Pavitt, 1995; Zhou & Wu, 2010).

Six companies mentioned important changes in transactional and management capabilities with the same frequency. As opposed to the operational capability, changes in the transactional capability did not present any pattern. They include entering in new markets, be the national or international; travelling internationally for benchmarking; increasing the number of collections launched per year; focusing in one type of product only, the one they are good at; working on the improvement of the company image; and verticalizing sales processes. Company M said they “established a distribution centers in a new area.” These cases present important transactional capabilities which are key factor when dealing with the production network (downstream and upstream) in order to apply the business strategy (Langlois, 1992; Argyres, 1996; Williamson, 1999; Mayer & Argyres, 2004; Argyres & Mayer, 2007)

Management capability changes have not presented any pattern either. Changes to this capability include major changes to the entire company such as to shut down the operational area and outsource the production, as did Company D; to acquire a competitor; and to transform a product line in an independent unit, as mentioned by Company M: “we launched [brand name], which used to be only one line of furniture product, and as it got bigger, we had to transform it in an entire new unit.” Other changes of less impact have also been mentioned by interviewees, such as implementing new pricing methods; implementing new ERP (enterprise resource planning) system; implementing an international standardized quality management system; and offering a training program to employees. In this direction, firm present not innovation management at all, this could be explained because most of them operate under traditional market structures with little variation (Tsoukas, 1994; Tamkin et al., 2002; Mintzberg, 2009).

Interviewees were asked not only about changes, but also about innovation in their companies. If, on the one side, there has been a capability where most changes have occurred, i.e. operational capability; on the other side, examples of innovation are more balanced across the four capabilities. Although the innovations have been mentioned more frequently in relation to technological capability, then to operational, to transactional, and finally, to management.

Following this order, the main innovations appointed by the companies, with regards to the technological capability are related to new products development. They may be final products, such as the development, some decades ago, of the first knee-high boots without any zipper, as mentioned by Company D; the development of colored shoes in a time where they used to be all black or in brown pallets; the development of printed furniture doors. They
may be parts of their final product, for example, steelwork for furniture or a shoe sole of a new structure (Company B). Other innovation came from the use of new materials, such as a replacement for hardwood in furniture for a lighter material, which is also of less cost. Technological changes in process have also been mentioned, such as being the first show company in the region to replace manual design by modern design software.

In relation to the operational capability, interestingly, what many companies mentioned as changes in this capability, have been identified by many others as innovation. They are especially related to process automation; modernization of equipment and machinery; optimizing processes with more efficient equipment and software. In that sense, Company J said they had and “evolution from very manual processes to more automated ones.”

Transactional capability’s innovations may occur in many ways, as cited by the interviewees. In trying to reach more customers, companies entered in a new market for them, which existed before, but they did not serve it; they have also launched a new brand of their products, aiming at a different public. Company H, targeting to get closer to their clients, have created an open-door, culture in the company, where its structure had to be revised in order to welcome clients and prospects. This company has also internalized all marketing activities, including printing materials.

Management capability innovations have been the less mentioned by interviewees, however, are no least important. They mentioned the professionalization of their management team, replacing the family centralized culture (Company J); changing strategic focus and training and preparing employees for different activities and situations that may occur in the company (Company O). Their aim is to be more and more competitive. Company S, a tobacco firm, cited major changes occurred in the product development area. They were once decentralized, in each country or unit, but now, they are managed by an integrated development center, which aim to align all other company product developments.

Some companies stated they are not innovative. Company U said they are followers, acting accordingly to what has been already released in the market: “we are not pioneers in terms of innovation, but we follow our competitors…” Company C one affirmed they only attend to costumers’ requests, and in that matter, any innovation is their clients’ property. Company K stated that they know they are innovating when they see their competitors imitating their products.

Most companies interviewed do not use any incentive offered by government programs to innovate. Some say they are not interested, but mostly, that they do not know how to participate or that it is a hard and bureaucratic process, which would cost them more to try to fit within the requirements than to not participate. Company L mentioned the use of government incentives, however, not related to innovation but to taxes. Company M said it used once, but do not use it anymore; and Company R, is aware of public incentives. They are looking into entering a program which offer funds to allocate researches inside the firms. They say it would be an advantage, because if they have to pay full salary for them, new products projects would not be financially viable.

Interviewees were requested to appoint what they consider to differentiate them from their competitor in the market. The main topic mentioned was the quality of their products. They also mentioned market recognition and respect for their company and brands. Having a product development designated area, in industries that this is not common, such as shoe industry, is also considered a differentiation. Having exclusive products have also been mentioned frequently. For example, Company G, a clothes company that produces underwear said their special products enhances the emotional side of women.

In less frequency, companies say that clients prefer them over their competitor as a result of the way they customer service. For them, this is one of the factors influencing in
customer loyalty. Some also say they try to be as close as possible to customers to understand what they expect from their products and to follow on market trends. Interviewees also see as their advantage the fact that they have a consolidated distribution channel and fast delivery time; and also, some mentioned their lower prices.

Mentioned by one company each, as a differentiation in relation to their competitors, the variety of their products (Company F), the marketing approach of glamour (Company J), verticalization of processes (Company N) and a much bigger production capacity than competitors (Company C).

In sum, most companies differentiate themselves from their competitors in characteristics related to their transactional capability, such as following market trends and efficient distribution channel. Secondly, they emphasize their operational capability, for example, by the quality of the product they produce and by their production capacity. And finally, they see as an advantage their technological capability, especially in the structure for new product development. Interestingly, not one company mentioned any advantage in relation to their management capability.

5 DISCUSSION

Table 3 presents the number of responses given by interviewees in relation to changes and innovations occurred in their companies, as well as how they see they differentiate themselves from their competitors. Each response have been linked to one of the four capabilities, that is technological, operational, management and transactional.

Table 3: Changes, innovation and differential by capability

<table>
<thead>
<tr>
<th></th>
<th>CHANGES</th>
<th>INNOVATION</th>
<th>DIFFERENTIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technological</td>
<td>3</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Operational</td>
<td>9</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Management</td>
<td>6</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Transactional</td>
<td>6</td>
<td>6</td>
<td>12</td>
</tr>
</tbody>
</table>

In general, the majority of innovations were identified as being mainly related to the companies’ products and considered technological. This is a result of the way firms understand innovation. When asked about it, they promptly answer regarding their products, but these innovations have been identified, very often, as a product improvement, and not an innovation per se. However, when asked what is their advantage in relation to competitors, their appointed to their transactional capability. Complementary, when they talked about changes, they manly occurred in the operational capability. In that sense, despite the reasoning of companies when talking about innovation, changes and advantages of companies of low technological intensity industries are related to operations and transactions.

It has been observed that companies are paying more attention to their transactional capability in terms of using new media, such as social networks, to promote their products. This is true for companies producing final products. It has also been noted that this companies do not necessarily have a formal department for research and development, especially research. Their development activities may sometimes occur together with other activities, for
example, quality control. In that sense, to keep an efficient production process, which offers, in the end, a product of good quality, is the aim of most companies of low technological intensity. That, however, does not mean they are not innovating.

Firms of this type of industries do innovate, however, not in the high-tech way that most times innovation is presented as. They innovate, especially, in terms of optimizing their processes and commercializing their products. And also in terms of developing new forms to communicate and provide services to their clients, that is, through their transactional capability.

Overall we understand that different types of innovation happened in the companies of low technological intensity. In that sense, we consider that even firms with low technological intensity can be considered innovative. And that innovative performance is a result of the capability they are strong at, which in the case of this type of industries, is mainly operational and transactional. That opposes the common sense that only high-technological companies innovate.

6 FINAL REMARKS

Low-tech companies in developing countries represent a new field to make research. This study suggests some congruencies and divergence when studying innovation capabilities in low tech firms. Thus, one important implication for that is the diversity of our sample, which suggests that bigger samples from specific industry should be studied in order to try to determine common characteristic among them.

Another important issue was the lack of response, which limits our study, because not all de interviewers answered all the questions. So, future research should take into account the adequate instrument to study innovation capability and its utility when applied with CEO’s and owners. The lack of responses presents difficulties to determine findings which limit the scope of any study.

This study gives some suggestion about the dynamic environment of low tech companies in an emerging country. These findings could be useful for a better understanding of the innovation Brazilian context. Thus, policy maker could have important insights to improve the effectiveness of resource allocation when defining innovation policies.

REFERENCES


