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BÁRBARA ILZE SEMENSATO

AS CAPACIDADES DINÂMICAS PARA A INOVAÇÃO E OS PADRÕES DE INTERNACIONALIZAÇÃO DE EMPRESAS DE BASE TECNOLÓGICA: UM ESTUDO DE CASOS MÚLTIPLOS COM PMEs BRASILEIRAS

THE DYNAMIC CAPABILITIES FOR INNOVATION AND THE INTERNATIONALIZATION PATTERNS OF TECHNOLOGY-BASED FIRMS: A MULTIPLE CASE STUDY WITH BRAZILIAN SMEs

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Prof. Dr. Marco Antonio Zago
Reitor da Universidade de São Paulo

Prof. Dr. Adalberto Américo Fischmann
Diretor da Faculdade de Economia, Administração e Contabilidade

Prof. Dr. Roberto Sbragia
Chefe do Departamento de Administração

Prof. Dr. Moacir Miranda de Oliveira Junior
Coordenador do Programa de Pós-Graduação em Administração

Bárbara Ilze Semensato

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Orientador: Prof. Dr. Fábio Lotti Oliva
Co-Orientador: Prof. Dr. Gilles Roehrich

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To my grandmother, Inês Veronezi Semensato Primo

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RESUMO

A globalização dos mercados e a crescente competitividade internacional nas duas últimas décadas proporcionaram a entrada de empresas no mercado, dentre as quais estão as pequenas empresas. Notadamente reconhecidas por sua importância social e econômica, as pequenas empresas dos setores da indústria, do comércio e de serviços são, em termos numéricos, a grande maioria das empresas no Brasil. Dada a importância deste objeto de estudo, a presente pesquisa possui como objetivo geral explorar a relação entre a orientação para a inovação e os padrões de internacionalização de pequenas e médias empresas (PMEs). Para a concretização deste objetivo principal, três objetivos específicos são traçados, sendo estes o estudo das capacidades dinâmicas para a inovação de PMEs de base tecnológica brasileiras, o estudo do processo e dos padrões de internacionalização deste grupo de empresas e o estudo da relação entre estes dois objetivos específicos. As capacidades dinâmicas para a inovação direcionam o desenvolvimento de inovações tecnológicas, quais sejam, inovações em produtos, processos e serviços, e também sustentam o desenvolvimento de inovações não-tecnológicas, em outras palavras, as inovações de Marketing e organizacionais. As capacidades dinâmicas também impactam positivamente na competitividade das pequenas empresas nos mercados domésticos e internacionais. A fundamentação teórica desta pesquisa reside nas Teorias de Internacionalização, fundamentando-se nos Modelos de Internacionalização, e nas Teorias de Inovação, referindo-se às Capacidades Dinâmicas para a Inovação. Com o intuito de melhor compreender o objeto de pesquisa, para cada um dos temas existem tópicos que apresentam as PMEs. A diversidade setorial das empresas participantes da pesquisa contribuiu para a magnitude de resultados sobre as capacidades dinâmicas para a inovação de PMEs brasileiras, assim como para a identificação de seus padrões de internacionalização. A partir de um estudo qualitativo, as análises mostram que as PMEs brasileiras buscam se diferenciar através da inovação em seus mercados de atuação internacionais. Com relação aos padrões de internacionalização das PMEs brasileiras, estes se diferem, em alguns parâmetros, ao apresentado na literatura. Portanto, a análise das capacidades dinâmicas para a inovação mostra que as pequenas empresas brasileiras possuem elevado potencial para o desenvolvimento da inovação. Sobre a internacionalização, as PMEs do estudo apresentam padrões específicos de internacionalização, necessitando, assim, de aproximações em relação aos parâmetros apresentados na literatura. Como contribuições acadêmicas, a pesquisa apresenta a análise das capacidades dinâmicas para a inovação relacionadas ao padrão de internacionalização das PMEs brasileiras, apresentando variáveis emergentes aos temas de pesquisa. Por fim, como contribuições gerenciais, a análise dos casos permite verificar como as PMEs buscam se posicionar competitivamente nos mercados internacionais.

Palavras-Chave: Internacionalização de Empresas; Inovação; Capacidades Dinâmicas para a Inovação; Pequenas e Médias Empresas.

ABSTRACT

The globalization of markets and the growing international competitiveness in the last two decades have provided the entry of firms in the market, among which are small businesses. Notably recognized for their social and economic importance, small businesses from the industry, the commerce and the services sectors are, in numerical terms, the vast majority of companies in Brazil. Given the importance of this object of study, this research has as general objective to explore the relationship between the innovation orientation and the internationalization patterns of small and medium enterprises (SMEs). To achieve this general objective, three specific objectives are set, which are the study of dynamic capabilities for innovation of Brazilian technology-based SMEs, the study of the internationalization process and the internationalization patterns of this group of firms, and the relationship between these two specific objectives. The dynamic capabilities for innovation drive the development of technological innovations, namely, innovation in products, processes and services, and support the development of non-technological innovation, in other words, Marketing and organizational innovations. Dynamic capabilities also impact positively on the competitiveness of small businesses both in domestic and international markets. The theoretical basis of this research lies in the Internationalization Theories, based on the Internationalization Models, and in the Innovation Theories, referring to the Dynamic Capabilities for Innovation. In order to understand better the object of research, for each of the themes there are topics presenting the SMEs. The sectoral diversity of the survey participants companies contributed to the magnitude of results on the dynamic capabilities for innovation of Brazilian SMEs, thus as the identification of their international patterns. From a qualitative study, the analysis show that Brazilian SMEs seek to differentiate through innovation in their international operating markets. Regarding the patterns of internationalization of Brazilian SMEs, these differ in some parameters, as presented in the literature. Therefore, the analysis of dynamic capabilities for innovation presents that Brazilian SMEs have high potential for the development of innovation. About the internationalization, the SMEs of this study present specific international patterns, thus requiring approaches in relation to the parameters presented in the literature. As academic contributions, the research presents the analysis of dynamic capabilities for innovation related to the patterns of internationalization of Brazilian SMEs, with emerging variables to the research topics. Finally, as managerial contributions, the analysis of cases allows verifying SMEs seeking to position themselves competitively in international markets.

Keywords: Business Internationalization; Innovation; Dynamic Capabilities for Innovation; Small and Medium-Sized Enterprises.

RÉSUMÉ

La mondialisation des marchés et de la compétitivité internationale croissante au cours des deux dernières décennies ont fourni l'entrée des entreprises sur le marché, parmi lesquels les petites entreprises. Notamment reconnus pour leur importance sociale et économique, les petites entreprises des secteurs de l'industrie, le commerce et de services sont, en termes numériques, la grande majorité des entreprises au Brésil. Compte tenu de l'importance de cet objet d'étude, cette recherche a pour principal objectif d'explorer la relation entre l'orientation à l'innovation et les modèles d'internationalisation des petites et moyennes entreprises (PME). Pour atteindre cet objectif principal, trois objectifs spécifiques sont définis, qui sont l'étude des capacités dynamiques pour l'innovation des PME basées sur les nouvelles technologies du Brésil, l'étude du processus et des modèles d'internationalisation de ce groupe d'entreprises et l'étude de la relation entre ces deux objectifs spécifiques. Les capacités dynamiques pour l'innovation conduisent le développement d'innovations technologiques, à savoir, l'innovation dans les produits, procédés et services, et de soutenir le développement de l'innovation non technologique, en d'autres termes, des innovations en Marketing et organisationnelles. Les capacités dynamiques ont également un impact positif sur la compétitivité des petites entreprises dans les marchés nationaux et internationaux. La base théorique de cette recherche réside dans les Théories d'Internationalisation, en se basant sur des Modèles d'Internationalisation, et les Théories de l'Innovation, se référant aux Capacités Dynamiques pour l'Innovation. Afin de mieux comprendre l'objet de la recherche, pour chacun des thèmes, il y a des sujets présentant les PME. La diversité sectorielle des entreprises des participants au sondage ont contribué à l'ampleur des résultats sur les capacités dynamiques d'innovation des PME brésiliennes, ainsi que l'identification de ses modèles d'internationalisation. D'après une étude qualitative, l'analyse montre que les PME brésiliennes cherchent à différencier par l'innovation dans ses marchés internationaux cibles. En ce qui concerne les modèles d'internationalisation des PME brésiliennes, celles-ci diffèrent dans certains paramètres, tels que présentés dans la littérature. Par conséquent, l'analyse des capacités dynamiques pour l'innovation montre que les PME brésiliennes ont un fort potentiel pour le développement de l'innovation. A propos de l'internationalisation, les PME de l'étude ont des modèles internationaux spécifiques, ce qui nécessite des approches par rapport aux paramètres présentés dans la littérature. Les contributions académiques, la recherche présente l'analyse des capacités dynamiques pour l'innovation liées à la structure de l'internationalisation des PME brésiliennes, avec des variables émergentes aux sujets de recherche. Enfin, à titre de contributions manageriales, l'analyse de cas permet de vérifier les PME qui cherchent à se positionner de manière concurrentielle sur les marchés internationaux.

Mots-Clés : l'Internationalisation des Entreprises ; l'Innovation ; Capacités Dynamiques pour l'Innovation ; Petites et Moyennes Entreprises.

SUMMARY

INTRODUCTION

The leading characteristic of the current economic context is the worldwide competition among organizations of different sizes. This phenomenon is a result of the liberalization and globalization that occurred during the last two decades, which brought as major consequences business opportunities and new challenges for organizations (Thomas, Narayanan, & Ramanathan, 2012). Small and medium enterprises (SMEs) are important players in this economic context, as they contribute to the economic and social development in developed and developing nations. SMEs also concur to the economic transition process, from a transition economy, characteristic of developing nations, to a market economy (Thai & Chong, 2013). In addition, due to the crescent liberalization, globalization and market competition, SMEs are increasingly expanding their market participation internationally (Chetty & Campbell-Hunt, 2003; Gashi, Hashi, & Pugh, 2014; Jones & Coviello, 2005; Nummela, Loane, & Bell, 2006; Oezçelik & Taymaz, 2004; Williams, 2006).

In order to appropriate market opportunities from this globalized economic scenario, SMEs must pursuit continuous improvements on their management and production processes, aiming to increase productivity to achieve economies of scale and to enhance the innovation development process (Thomas et al., 2012). In this sense, SMEs can deploy innumerous technologies to foster this process, to conduct changes in their organizational processes and to evaluate new market trends to ensure, amongst competitive strategies, sustainability and business growth (Pla-Barber & Alegre, 2007; Rodríguez & Rodríguez, 2005).

The focus, therefore, is on the innovation development process as the key driver to enhance competitiveness in international markets. New and improved products, outputs from the technological innovation development process, supports the improvement on domestic and foreign sales intensity and the firm's market performance (Cerrato, 2009; Chetty & Stangl, 2010; Colovic, 2013; D'Angelo, 2012; Esteve-Pérez & Rodríguez, 2013; Gashi et al., 2014; Gerschewski, Rose, & Lindsay, 2015; Guan & Ma, 2003; Halilem, Amara, & Landry, 2014; Karadeniz & Goeçer, 2007; Kylaeheiko, Jantunen, Puumalainen, Saarenketo, & Tuppura, 2011; Loefgren, 2014; Oxtorp & Elg, 2015; Pla-Barber & Alegre, 2007; Poblete & Amorós, 2013; Rammer & Schmiele, 2009; Rodríguez & Rodríguez, 2005; Roper & Love, 2002; Sass, 2012). This process aims to generate new products, services and solutions to the market, implies an increase in productivity due to changes in production processes and provokes modification in the organizational sphere, from the application of new management models and Marketing

techniques (Clark & Wheelwright, 1997; Christensen & Overdorf, 2000; Organisation for the Economic Development [OECD], 2005).

Mothe and Thi (2010) state that innovation also constitutes a central theme on national agendas, substantiating this affirmation through The Lisbon Strategy (2000). The Lisbon Strategy (2000), established by the European Union (EU) for the period of 2000 to 2010, illustrates this priority. Due to the intensification of the global competition, technological changes and an aging population, the member countries recognized the need to direct efforts on actions and objectives focused on increasing productivity and competitiveness. Thus, the main objective set by the EU, through the Lisbon Strategy, is to encourage domestic investment in R&D (Research and Development) to the extent of three per cent of the GDP (Gross Domestic Product). This proportion, according to this document, is the ideal for fostering development and economic growth based on innovation. Largely used in academic and government research, the "R&D" indicator aims to measure the organizational capacity to develop technological and non-technological innovations (D'Angelo, 2012; Mothe & Thi, 2010).

This indicator, however, does not contemplate the entire innovation performance of the firm. There are other measurements, such as innovation activities, which are also important to take into consideration, when firms invest smaller portions of their revenues in R&D activities (Red Iberoamericana de Indicadores de Ciencia y Tecnología, 2011). These firms attribute their competitiveness to organizational strategies aiming cost and quality differentials, structured Marketing and distribution channels, as well as building a solid relationship with customers, suppliers and competitors, which are considered part of Marketing and organizational innovation activities. Marketing and organizational innovations, also known as non-technological innovations, can sustain the technological innovation performance, as they enable the alignment of individuals, with specific competences and skills, directed to the development of new products and services. This alignment, in turn, leads to an increase in competitiveness and the expansion of the domestic and the international markets (Atalay, Anafarta, & Sarvan, 2013; Gunday, Ulusoy, Kilic, & Alpkan, 2011; Hashi & Stojčić, 2013; Mannheim Innovation Panel, 2010 Mothe & Thi, 2010; OECD, 2005).

Conducive to reiterate the importance of the innovation development to the organization's competitiveness and the strategic role of the R&D in the organizational context, the consulting firms PwC and Booz & Company elaborated the report "Global Innovation 1000 – Proven Paths to Innovation Success – Ten Years of Research Reveal the Best R&D Strategies for the Decade Ahead". This report focuses on the study of organizations that have the largest investments in corporate R&D in the world. The goal of this report is to verify whether is found

a positive relationship between financial investments in R&D and improvements on the organizational performance and in the innovation development. Among the key findings, this research elucidates that the efficient allocation of financial investments in R&D is related positively to the radical innovation development, which adds value to organizations and have the potential to generate higher revenues, when compared to incremental innovations (Jaruzelski, Staack, & Goehle, 2014).

The efficient allocation of financial resources in R&D is a central theme since the first report within this series of research on the innovation theme. Published in 2005, the report entitled "Money Isn't Everything" aims to examine the relationship between financial investments in R&D, in terms of either total R&D dollars or R&D as a percentage of revenues, and corporate sustainable financial performance. The main finding of this research shows that R&D spending levels have no apparent impact on sales growth, gross profit, organization's profit, market capitalization or return to shareholders. However, there is an exception to this finding. When the organization's investments in R&D falls into the bottom decile, in comparison with its competitors' spending, there is a commitment in the organizational performance. After conducting several statistical analyzes, this report concludes that the efficient allocation of financial resources in R&D, as well as in innovation activities, produces positive results that determine the organization's competitive performance in their markets (Jaruzelski et al., 2014).

The report "Global Innovation 1000 - Proven Paths to Innovation Success" presents cases related to the innovation theme. Oliver Nussli, head of project and portfolio management at food and beverage manufacturer Nestlé, affirms that keeping the focus of the R&D projects ensures the success of innovations in the market. The effective communication between business strategy and innovation managers, together with the efforts' concentration for the continuity and the development of innovations that meet the needs and preferences of the consuming public, are essential to achieve effective results for the financial sustainability of the organization. According to Ajit Sapre, group president of the research and technology area at the Reliance Industries Group, the India's largest private-sector company, investments in R&D for the development of radical innovations tend to increase. Due to the growing needs for infrastructure and energy in India, the strategic focus of the Reliance Industries group is to develop radical innovations that meet the characteristics of the Indian market. As radical innovations do not always turn into successful innovations, organizations should evaluate and measure the feasibility of their projects, in order to better align resources' allocation with their strategic purposes (Jaruzelski et al., 2014).

This study presents important observations concerning how organizations manage the innovation process and the investments in R&D. The innovation management is a key activity in the abovementioned cases and contributes to add value to organizations, in order to achieve sustainability and market expansion. It is important to note that organizations like Nestlé and the Reliance Industries Group had learning paths, with failures and successes, during the process of developing successful innovations. The analysis of these learning trajectories emphasizes the alignment amid the organizations' strategies and culture, also presenting the risks inherent to the innovation process, which may influence the organizations' competitive position in their markets. Therefore, the findings of this report, as well as the organization's strategies from the cases, are objects of replication in organizations that focus on performance improvements as the consequence of the innovation development (Jaruzelski et al., 2014).

The innovation development process is strategic, important for the organization's competitiveness and sustains the market expansion. Regarding the international market expansion, the product innovation development favors the outward internationalization process of the firm. This leads to an increase in the export volume, due to the novelty degree and the added value of this product (Pla-Barber & Alegre, 2007; Chetty & Stangl, 2010; D'Angelo, 2012; Gerschewski, Rose, & Lindsay, 2015; Halilem, Amara, & Landry, 2014; Loefgren, 2014; Oxtorp & Elg, 2015; Rammer & Schmiele, 2009; Rodríguez & Rodríguez, 2005). Yet, exigent clients, consumer and customers, i.e. buyers, can pose new challenges for organizations, such as requirements, standards and consumption trends that stimulate the learning process and the continuous development of products and services (Filippetti, Frenz, & Ietto-Gillies, 2013; Sedoglavich, 2012). As a result, innovative organizations are more prone to the international market expansion due to competitive advantages inherent to the innovation development and the improvement in their productive performance (D'Angelo, 2012; Pla-Barber & Alegre, 2007; Rodríguez & Rodríguez, 2005).

The internationalization process also favors the innovation development process, due to the learning process and the knowledge acquisition about international markets requirements (Halilem, Amara, & Landry, 2014). Importing innovative and technological products, whose characteristics and functionalities are unique to the importer, positively influences the internal development of products and the production processes aimed at incorporating these existing differentials worldwide. In this regard, the technological absorption capacity is related to the development level of the national innovation systems (Castellacci, 2008; Filippetti et al., 2013). Importing, considering it as the first entry form of an organization in international markets, can sustain the export activity. In order to start importing, managers need to, first, learn about the

inward internationalization process. The chosen for the import activity aims to minimize economic, legal and policy risks and to establish business networks. Subsequently to this consolidation phase, the organization may mobilize efforts to conduct foreign direct investments (Filippetti et al., 2013; Halilem, Amara, & Landry, 2014).

This Dissertation contemplates the study of the Business Internationalization and the Innovation Process. The research fields are the Internationalization of Small and Medium Sized Enterprises and the Dynamic Capabilities for Innovation. More precisely, the contribution of this Dissertation lies in the analysis of the SMEs' dynamic capabilities that ensure the innovation development. In this sense, the development of innovative product and services enhances the competitiveness of Brazilian technology-based SMEs in both domestic and international markets, which contributes to the sales intensity improvement.

The general objective of this Dissertation is to explore the relationship between the innovation orientation and the internationalization patterns of small and medium enterprises (SMEs). This research contributes to fill in the gap of the literature by empirically investigating what the dynamic capabilities for innovation of Brazilian technology-based SMEs are and how they drive the technological and non-technological innovation development, thus focusing on the product development. The study also contemplates the analysis of the dynamic capabilities for innovation inherent to distinct SMEs' internationalization patterns. The dynamic capabilities for innovation are, therefore, the group of capabilities inherent to the organizations that drive the organizations' innovative efforts that leads to the innovation development (Barreto, 2010; Cardoso & Kato, 2015; Guan & Ma, 2003; Makadok, 2001; Zahra, Sapienza, & Davidsson, 2006; Zollo & Winter, 2002).

II. RESEARCH OBJECTIVES AND RESEARCH PROBLEM

The innovation development ensures the organizations' competitiveness in both domestic and international markets. It is particularly important to note that the innovation development process is important to maintain the organizations' sustainability in international markets, where the competition level is global, through innovative products and services (Baregheh, Rowley, & Sambrook, 2009; Goswami & Mathew, 2004; OECD, 2005).

The innovation development contributes to the market expansion, as innovative products and services present unseen characteristics that converge to the achievement of the organization's competitiveness (Baregheh, Rowley, & Sambrook, 2009; Goswami & Mathew, 2004; OECD, 2005). Considering the research scope, the analysis of the dynamic capabilities for innovation as drivers for the technological and non-technological innovation development and market competitiveness, the research problem of this Dissertation is:

How the dynamic capabilities for innovation, inherent to internationalized SMEs, drive their innovation development process and market competitiveness?

The innovation management aims the coordination of the innovation process phases, to leverage organizational resources and competences in order to develop technological and non-technological innovations (OECD, 2005; Tidd & Bessant, 2015). The organizational context also influences the innovation development process. External changes such as the advent of novel technologies, unexplored market niches, demands of exigent buyers, new technologies and innovative production processes are part of the organizational context (Clark & Wheelwright, 1997; Chesbrough, 2003; Kim & Lui, 2015). The innovation management also requires different sources of internal and external information, in order to complement the existent internal knowledge concerned to the development of products and services (Nonaka & Takeuchi, 1997).

The knowledge management is inherent to the innovation management activity, as the combination of tacit and explicit knowledge within and external to the organization's boundaries fosters the development of new products and services (Nonaka & Takeuchi, 1997). Different sources of information and knowledge also enable the uncertainty reduction concerned to radical innovations, as there might have multiple forms of information combination that provide insightful ideas that support the process of developing radical innovations (Leifer, McDermott, O'Connor, Peters, Rice, & Veryzer, 2000). Products and services, examples of innovation outputs, can be unprecedented at the enterprise, market or world level (OECD, 2005). After the explanation of the research problem, the general research objective and the specific research objectives are determined:

General Objective: The general objective of this Dissertation is to explore the relationship between the innovation orientation and the internationalization patterns of small and medium enterprises (SMEs).

The SMEs' internationalization patterns are the traditional pattern firms, the born global firms, the international new ventures (INVs) and the born-again global firms. The decision criteria to define the internationalization pattern are the chosen international operational mode, the number of countries and the location of countries where SMEs operate, the international sales intensity and the entry timing, or the time lag from the enterprise's foundation year to the enterprise's commencement year in outward commercial activities (Bell, McNaughton, Young, & Crick, 2003; Olejnik & Swoboda, 2012; Oviatt & McDougall, 1994; Tuppura, Saarenketo, Puumalainen, Jantunen, & Kylaeheiko, 2008). Thus, there are distinctive parameters that explain the SMEs' internationalization patterns.

Specific Objective 1: Study the dynamic capabilities for innovation inherent to technology-based SMEs.

Teece, Pisano and Shuen (1997) analyze the dynamic capabilities approach considering a changing organizational context of intense competition among organizations. In order to achieve differentiation and competitiveness, organizations have to set a business strategy that sustains the management of the organizational resources, the firm's specific assets and the innovation development. The dynamic capabilities approach emphasizes how organizations achieve competitive advantages:

> The term 'dynamic' refers to the capacity to renew competences so as to achieve congruence with the changing business environment; certain innovative responses are required when time-to-market and timing are critical, the rate of technological change is rapid, and the nature of future competition and markets difficult to determine. The term 'capabilities' emphasizes the key role of strategic management in appropriately adapting, integrating, and reconfiguring internal and external organizational skills, resources, and functional competences to match the requirements of a changing environment (Teece, Pisano, & Shuen, 1997, p. 515).

Cardoso and Kato (2015) present a consolidation of the seminal definitions of the dynamic capabilities approach through a bibliometric study about this theme. For Helfat (1997), the dynamic capabilities enable organizations to create new products and processes in order to be able to respond to market conditions. Eisenhardt and Martin (2000) state that the dynamic capabilities are the strategic and organizational routines, from which enterprises establish new resource's configurations, while there are substantial changes in the firm's market. Makadok (2001), in turn, emphasizes the differences amid resources and capabilities. Figuring among the differences, the capabilities of an enterprise to generate resources is due to the combination of the enterprise's organizational processes that aims to achieve a result. The combination of these

processes are based on tangible and intangible information that are inherent to the enterprise, and are a result of interactions among the enterprise's resources during its existence.

For instance, Zollo and Winter (2002) define dynamic capabilities as a learned and stable pattern of collective activities through which the enterprise rearranges its operational routines systematically to obtain great efficacy. Zahra et al. (2006) present a similar definition of Zollo and Winter (2002), as the dynamic capabilities support the rearrangement of the enterprise's resources and routines according to the established by the main decision-makers. Barreto (2010) state that dynamic capabilities are the potential of the enterprise to solve problems systematically, due to its tendency to perceive opportunities and threats, to make correct decisions aiming the market and to alter its resource base.

The dynamic capabilities for innovation are the technological and organizational capabilities inherent to the firm. This latter encompasses the competences and organizational capabilities, as well as the firm's processes, paths and routines that lead the firm's innovative efforts, aiming the market differentiation and competitive advantages before its competitors. Thus, the dynamic capabilities direct the innovative effort of the firm (Barreto, 2010; Cardoso & Kato, 2015; Guan & Ma, 2003; Makadok, 2001; Zahra et al., 2006; Zollo & Winter, 2002). The dynamic capabilities approach explores not only the internal organizational aspects, but also the external environment, which, therefore, is an extension of the Resource-Based View Theory (Teece & Pisano, 1994; Teece, Pisano, & Shuen, 1997).

Specific Objective 2: Study the patterns and processes of internationalization inherent to technology-based SMEs.

Briefly explaining, the internationalization patterns explain the internationalization strategy of the firms, thus defining its objectives to the foreign market expansion. On the other hand, the internationalization process is the internationalization trajectory of the firm, from its beginning until nowadays. In this sense, the four internationalization patterns present distinctive decision criteria that encompass the firm's strategies (Bell et al., 2003; Olejnik & Swoboda, 2012; Oviatt & McDougall, 1994; Tuppura et al., 2008). The internationalization process, in turn, aims to explain how the firm structures its foreign commercial activities, considering the international operation mode and the progression of this market expansion. The sense of progression is the evolvement of the foreign commercial activities, in terms of both market expansion and retraction, as well as the diversification (Ruzzier, Hisrich, & Antoncic, 2006).

Specific Objective 3: Study the relationship amid the dynamic capabilities for innovation and the internationalization patterns of small and medium-sized firms, from technology-based sectors.

The innovation development process is strategic, specific to the firm and leads to the technological and non-technological innovation development, thus providing sustainable competitive advantages for organizations (Clark & Wheelwright, 1997; OECD, 2005). The one-way relationship focuses on the analysis of the dynamic capabilities for innovation as drivers for the technological and non-technological innovation development and international market competitiveness. This focus aims to investigate what the dynamic capabilities for innovation of Brazilian technology-based SMEs are and how they drive the technological and non-technological innovation development, thus focusing on the product development. The study also contemplates the analysis of the dynamic capabilities for innovation inherent to the Brazilian technology-based SMEs that present distinct internationalization patterns. In achieving this alignment, the organization aims to target competitive positions in its market to perform the business expansion. The foreign sales intensity is the percentage of international sales to total sales (D'Angelo, 2012; Gashi et al., 2014; Pla-Barber & Alegre, 2007). Thus, exporting is among the main international operation mode of SMEs, due to its low risk and complexity in comparison with other modes (D'Angelo, Majocchi, Zucchella, & Buck, 2013; Mas, Nicolau, & Ruiz, 2006; Gankema, Snuif, & Zwart, 2000; Testa, 2011).

The geographic proximity of enterprises, in the forms of clusters and industrial districts, positively support the innovation development of SMEs, which, consequently, leads to the improvement of the organizational performance (Amato Neto, 2009; Colovic, 2013; Porter, 1998). Nowadays, the Information and Communication Technologies (ICTs) provide further possibility of interconnectivity among organizations, also playing a key role in the process of innovation development (Abouzeedan, Klofsten, & Hedner, 2013). Interconnectivity enables the exchange of information and knowledge as well as provides opportunities of business networks for universities, research institutes and competitors, which are no longer solely dependent on geographical proximity. To accomplish the objectives of this research, a qualitative study will be conducted.

III. CONTRIBUTIONS OF THE RESEARCH

This Dissertation aims to explore the relationship between the innovation orientation and the internationalization patterns of small and medium enterprises (SMEs). The accomplishment of the Dissertation's objectives results in academic contributions to the Dynamic Capabilities for Innovation and Internationalization of Small and Medium Sized Enterprises theories and brings further perspectives of study. The Dissertation also aims to contribute to the Management field, providing guidelines referring to the dynamic capabilities for innovation and the innovation development process, as well as the internationalization processes and patterns, to managers and practitioners, thus focusing on the application of the scientific knowledge on the Business Management area. The accomplishment of this general objective leads to the following contributions:

1) Provide results to understanding the relationship between the innovation orientation and the internationalization patterns of SMEs. The examination of this one-way relationship enables the comprehension of the dynamic capabilities for innovation as drivers for the technological and non-technological innovation development. The innovation development process of the firm results in innovative products that aim to achieve competitiveness in international markets. Yet, this relationship permits exploring new research perspectives, particularly regarding the analysis of the dynamic capabilities that lead to the innovation development and sheds light on the comprehension of the innovation and the business internationalization processes.

2) Comprehend the sectoral specificities regarding the innovation process. Technology-based sectors encompass firms from low-technology industries, low-medium technology industries, medium-high technology industries and high-technological industries (OECD, 2011; Tether, 1997). The product innovation development and the technological efforts of the firm are the main unit of analysis to comprehend the innovative pattern of technology-based firms.

3) Understand the dynamic capabilities for innovation and the internationalization processes and patterns of the Brazilian technology-based SMEs. Technology-based SMEs are an important object of research due to their capacity of innovation and technological development (Toledo, Silva, Mendes, & Jugend, 2008). Additionally, technology-based firms participate intensively in scientific networks with universities and research centers to develop research

partnerships (Côrtes, Pinho, Fernandes, Smolka, & Barreto, 2005). The product innovation development in these firms incorporates the scientific and technological knowledge (Furtado & Carvalho, 2005; Toledo, Silva, Mendes, & Jugend, 2008). The competitive advantage, therefore, resides in developing products and services that are at the frontier of the scientific and technological knowledge in order to reach uniqueness, also incorporating Marketing and organizational innovations focusing on meeting the buyers' demands and specifications (Santos Junior & Mello, 1996).

Technology-based firms employ high-qualified personnel with scientific, technological and social skills, competences and abilities that are essential for the innovation development and for teamwork. In this sense, the knowledge management is an important activity for the innovation development, as the socialization, the externalization, the combination and the internalization of the knowledge provide a virtuous cycle of knowledge and innovation generation. Thus, this requires a strategic knowledge management in order to continue the innovation process to generate products and services and to ameliorate the organizational processes (Nonaka & Takeuchi, 1997; Nonaka & Toyama, 2003; Vick & Nagano, 2012).

From the managerial perspective, this Dissertation aims to provide to managers and practitioners findings concerned to the dynamic capabilities for innovation as drivers for the innovation development process, resulting in innovative products and services that lead to market competitiveness. These findings corroborate to advance the managerial practices and contribute to enhance the organizations' competitiveness in both domestic and international markets. Yet, the analysis of the emerging variables from this research supports the comprehension of the innovation and the business internationalization processes.

IV. TEXT STRUCTURE

The structure of this Dissertation has the present introduction and seven chapters. This Introduction presents the structure of the Dissertation and the contextualization of the research problem and objectives. The fulfillment of the objectives of the research leads to theoretical and managerial contributions. The literature review chapters aim to present the research variables of this study, the Business Internationalization, which encompasses the Internationalization of Small and Medium Sized Enterprises and the Innovation Process,

presenting the Dynamic Capabilities for Innovation, thus shedding light on the comprehension of the research object, the SMEs. Furthermore, the literature review chapters aim to contemplate the state of knowledge of the literature, presenting the advances concerned to the Business Internationalization and the Innovation Process theories and the research opportunities. The theoretical model, therefore, aims to delineate and structure the analysis of the research variables, thus focusing on the relationship between the innovation orientation and the internationalization patterns of SMEs.

The first literature review chapter contemplates the Business Internationalization research theme. The opening section of this chapter presents the definition of the business internationalization process and the role of the organizational environment variables. Subsequently, there is the presentation of the Behavioral School of Thought and the Economic School of Thought, in order to provide basis to understand the internationalization theories that aim to explain the internationalization process of SMEs, which is distinct from large corporations. The internationalization patterns address the firm's internationalization strategies. The decision criteria to define the internationalization strategies are the chosen international operational mode, the number of countries and the countries' location where SMEs operate, the international sales intensity and the entry timing, or the time lag from the enterprise's foundation year to the enterprise's commencement year in outward commercial activities.

The second literature review chapter contemplates the Innovation Process research theme. The opening section of this chapter presents the definition of the innovation process. Subsequently, there is the explanation of linear and interactive models of innovation. The innovation management explains the phases of the innovation process. Moreover, innovation is characterized in terms of type, novelty degree and control degree. The last section is dedicated to present the sectoral development of innovation, thus emphasizing the differences referring to the technological paradigms, the technological regimes and the technological trajectories of different types of industry and, lastly, the dynamic capabilities for innovation. The third chapter presents the Research Model, as well as the research propositions and research questions.

The Research Method chapter characterizes the research phases, in terms of epistemological positioning, the research approach and the methodology. In addition, it is presented the structuration of the data collection. The Data Analysis chapter presents the case summaries and the research development, considering as variables: the Internationalization Process, the Product Innovation Development Process and the Dynamic Capabilities for Innovation. The Comparative Analysis chapter presents the comparative analysis of the case firms, as well as the research implications. The last chapter, Final Considerations, recalls the

objectives of the research and the theoretical and managerial contributions, highlighting the contributions of this Dissertation to the theoretical and practical fields.

1 THE BUSINESS INTERNATIONALIZATION

The first chapter presents the business internationalization definition, the research theme of this chapter, and the subsequent subthemes that sustain the elaboration of this main theme. The adopted theoretical framework presents the outlines considered in this study, aligning them to the purposes and objectives formulated and aimed at implementing the Dissertation's assumptions.

In order to define internationalization, Ruzzier et al. (2006) present the contextualization that encompasses this phenomenon, based on Gjellerup (2000). Gjellerup (2000) explains that the internationalization process development comprises the period of early 1920, as the subsequent phase of imperialism, to 1970, the post-II World War era. The dominant organization principle of the imperialism was the framing cross-border interaction between market economies until the decade of 1920. Posterior to the imperialism, due to the shift of the economic internationalization, there was the internationalization summit in 1970.

According to Ruzzier et al. (2006, p. 477), internationalization is, in a broad sense, defined as "the geographical expansion of economic activities over a national's country border", through international operational modes, such as the inward, the outward and the cooperative (Korhonen, 1999, as cited in Ruzzier et al., 2006). The business internationalization theme is studied through multiples perspectives, such as Organization Theory, Marketing, Strategic Management, International Management and Small Business Management. The internationalization process circumscribes the crescent cross-border trade, the growth in foreign direct investment (FDI) and the international division of labor among national economic systems largely organized by transnational corporations (TNCs).

According to the OECD (2000), globalization, technological changes and the access to multiple sources of information and scientific knowledge provide opportunities to SMEs. Among the main opportunities from this phenomenon, which contributes to the international integration and the firms' achievement of global competitiveness, there are the strengthening of global trade opportunities. Thus, globalization creates opportunities and efficiencies inherent to market liberalization and fosters the integration of organizations facing global competition (Thomas et al., 2012). In addition, globalization compels organizations to restructure their operations internationally through the outsourcing and the offshoring of activities, which fosters the interconnection of the organization's global value chain. This process enables the

coordination of different stages of the production process across different nations, composed by producers, suppliers and buyers (OECD, 2014). This scenario, in conclusion, places the innovation development as a key process for the SMEs' competitiveness. Yet, the ICTs and the engagement in electronic commerce are factors that support the global expansion of these firms (OECD, 2000).

In furtherance of complementing this explanation, the ICTs are a set of tools that supports the resolution of long-term strategic goals, based on the analysis and application of marketing and organizational information for problem solving, addressing the increasing competitiveness (Dai, 2009; Shantanu & Soumya, 2007). Not only ICTs tools support the management process, shedding light on issues concerned to data gathering, information-processing and knowledge management, but also leverage innovation performance in high-technology smaller firms, as Abouzeedan, Klofsten and Hedner (2013, p. 123) state in the "internetization management" paradigm, which was first documented in Abouzeedan and Busler (2003). It is claimed "internetization management facilitates the management of innovation activities in SMEs. That is, improving the management of innovation would, in optimal conditions, accelerate the innovation output of firm because it can free more resources and make them available for these activities".

To sum up, business internationalization is the expansion of the firm's economic activities beyond national borders, while globalization refers to the "worldwide integration of ever more competitive markets and companies facing global competition" (Ruzzier et al., 2006, p. 477), which brings economic and social changes and, consequently, the interdependence of national economies (OECD, 2000; Thomas et al., 2012). The traditional internationalization process, an example of business internationalization process, focuses on the incremental development of foreign commercial activities and is one of the main SMEs' internationalization patterns (Andersen, 1993; Johanson & Vahlne, 2009).

Jones and Coviello (2005, p. 292) explain the internationalization as "patterns of behavior, formed by an accumulation of evidence manifest as events at specific reference points in time". This linear process approach emphasizes how experience and organizational learning determine the involvement of the organization in international activities, considering as endogenous variables for this process the international operation modes, psychic distances and market scope, which is divided into geographical diversification, serving a large number of markets, and geographical concentration, focusing on serving a limited number of markets.

Large corporations and SMEs tend to expand their markets through exporting to neighboring countries, which are, generally, culturally similar, to learn how international

operations are and to accumulate knowledge about different entry forms, other than exporting, a low-control mode, in foreign markets (Bell et al., 2003; Grandinetti & Mason, 2012; Johanson & Vahlne, 1977; 2009). The Uppsala Model affirms that there is a progressive development of the firm's commercial activities in international markets, along the "establishment chain", which begins with no regular export activities to evolve to export via independent representatives/agents, sales subsidiary and production/manufacturing (Johanson & Wiedersheim-Paul, 1975, p. 307). Besides these international operation modes, there are others which also may evolve from exporting, such as international alliances, non-equity alliances, joint venture, global sourcing, sales subsidiary and the FDI (Grandinetti & Mason, 2012; Olejnik & Swoboda, 2012; Sass, 2012; Singh, Pathak, & Naz, 2010; Testa, 2011; Tuppura, Saarenketo, Puumalainen, Jantunen, & Kylaeheiko, 2008).

Admitting the great acceptability of the gradual internationalization pattern, there are critics concerned to the Uppsala Model, due to the emergence of different internationalization processes and strategies, such as the born global firms and born-again global firms or re-born global firms (Testa, 2011). The main contribution of this model is that the lack of knowledge about foreign markets is a major obstacle in international operations and that the commitment decisions with other entry forms, as shown in the "establishment chain", are made incrementally because of uncertainty, which is, therefore, applied to a certain number of organizations (Andersen, 1993). The Uppsala Model presents a limited explanatory power concerning the relationship between the learning and knowledge gaining processes about international markets and the increasing foreign market commitment, which is dependent on the firm's performance and prospects. The model is, therefore, not deterministic, as it implies that the process of internationalizing concurs with favorable and profitable returns (Johanson & Vahlne, 2009; Olejnik & Swoboda, 2012).

The definition of the internationalization process of born global firms is "a rapid process of international expansion from firm inception, using a range of market entry modes in multiple markets" (Jones & Coviello, 2005, p. 284). Due to this distinctive characteristic, which is the internationalization from inception, after two to six years of the enterprise's foundation year, there are other decision criteria, along with their parameters, which precise the born global firms' internationalization pattern. They concern the entry timing, or the time lag from the enterprise's foundation year to enterprise's commencement year in outward commercial activities and the foreign sales ratio to annual total turnover, which varies from 20% from total annual turnover in two years to approximately 80% within six years (Acedo & Jones, 2007).

In order to comprehend better the born global firm's concept, independently of their international operation modes, the analysis of the foreign sales ratio encompasses firms that differ in terms of internationalization degree and market scope, which does not consider necessarily the psychic distance (Kuivalainen, Saarenketo, & Puumalainen, 2012; Kuivalainen, Sundqvist, & Servais, 2007). Additionally, firms aiming the regional internationalization are labelled as international new ventures (INVs); on the other hand, firms aiming the global internationalization are called as born global firms (Crick, 2009). Even though the definition of INVs are firms that operate in multiple foreign markets (Oviatt & McDougall, 1994), Crick (2009) and Johanson and Vahlne (2009), attribute this characteristic to born global firms, which are distinct from INVs, as the market scope of this latter group focuses on serving foreign regional markets, thus achieving a market share in a limited number of markets.

In pursuance of differentiating born global firms and INVs, Crick (2009) presents a study, considering as the research object a sample of technology-based SMEs from the UK, the parameters to define the born global and the INV internationalization strategy. This standardization converges with the affirmation that "[I]t therefore appears there is no agreement in the literature about a single agreed definition of what constitutes an INV or a BG, respectively, or indeed how to measure the performance of firms internationally" (Crick, 2009, p. 458). In this sense, the parameters to interline the differences amid these groups of firms are focused mainly in the market scope, irrespective of the international sales performance.

In consonance with the born global firms' strategy, the born-again global firms' strategy also refers to the firms' commitment with the global market expansion (Bell et al., 2003). However, the main difference attributed to this pattern of internationalization is that firms do not initiate the internationalization process from inception, which means their focus is on the domestic market and later on international markets. This rupture is explained by changes in the ownership or the management of the firm, mentioned as the "critical incident", followed by other examples of events such as an acquisition by another company or a client fellowship, which brings to the firm a new strategy directed to rapidly serving foreign markets. As born-again global firms achieved the business management experience and strategic resources that led to their differentiation in domestic markets, these factors may contribute to a successful international expansion (Bell et al., 2003; Kontinen & Ojala, 2012; Tuppura et al., 2008).

In summary, Bell et al. (2003) present the SMEs' internationalization patterns, which are the traditional pattern firms, the born global firms and the born-again global firms, describing the entry process through export and other international operation modes and Jones and Coviello (2005) present a framework that focuses on the International Entrepreneurship

theory. These integrative models focus on SMEs outward international operation modes, the focus of this study, justified due to the following reasons. Outward commercial activities can increase the competitive advantage of the company more than inward commercial activities. The outward international operation modes lead to the market expansion through the commitment of tangible and intangible resources that enable this process. In pursuance of competitive advantages, the strategic management of these resources is of paramount importance and aims to differentiate the company both in domestic and foreign markets (Ruzzier et al., 2006). Yet, the outward internationalization process enhances the development of technological innovations, which, successively, leads to the accumulation of knowledge and information for the development of technologies and the improvement of the productivity and business performance (Cerrato, 2009; D'Angelo, 2012; Gashi, Hashi, & Pugh, 2014).

Considering the country level, this international operation mode brings favorable results to the productivity performance and to the employment levels on the labor market, mostly in transactional and developing economies, foreign exchange accumulation and related externalities, such as industrial welfare, economic and social prosperity, increasing entrepreneurship and business networks and directs the development of public policies (Amal & Freitag Filho, 2010; Johanson & Vahlne, 2009; OECD, 2014; Thomas et al., 2012). Lastly, due to the globalization phenomenon, increasing liberalization and intensifying competition, especially of large corporations from emerging markets, SMEs recognize international activities along with productivity improvement, innovations and technology upgradations as vital for their future growth, profitability and survival (OECD, 2000; Thomas et al., 2012).

This chapter contemplates the study of the Business Internationalization theme. The ancillary themes are the Internationalization Process, the International Operation Modes, the Internationalization Theories, the Internationalization Strategies and the Small Business Internationalization Models. As mentioned in the literature, there are numerous studies that investigate the MNCs 'strategies and entry forms, mainly from North America, Western Europe and Japan (Singh et al., 2010). However, even if there is an extensive literature dedicated to enlighten the internationalization process of SMEs, there are promising possibilities of researches to contribute to this theme (Bell et al., 2003; Kuivalainen et al., 2007; Olejnik & Swoboda, 2012; Tuppura et al., 2008).

The possibilities reside on further studies about the internationalization process of SMEs from developed (Majocchi & Zucchela, 2003) and emerging economies (Amal & Freitg Filho, 2012; Chang, 2011; Mtigwe, 2005; Neupert, Baughn, & Dao, 2006; Thai & Chong, 2013) and

from high-technological and low-technological industrial sectors (D'Angelo, 2012; Hermel & Khayat, 2011; Li, Qian, & Qian, 2012; Sedoglavich, 2012). There are also opportunities of research beyond the study of the gradual internationalization pattern, which encompasses the rapid internationalization pattern (Bell et al., 2003; Chetty & Campbell-Hunt, 2003; Hermel & Khayat, 2011; Karlsson & Honig, 2009; Zhou, Wu, & Luo, 2007).

Additionaly, there are the drivers for the internationalization process, such as innovation (Cerrato, 2009; Chetty & Stangl, 2010; Colovic, 2013; D'Angelo, 2012; Esteve-Pérez & Rodríguez, 2013; Gashi et al., 2014; Gerschewski et al., 2015; Guan & Ma, 2003; Halilem et al., 2014; Karadeniz & Goeçer, 2007; Kylaeheiko et al., 2011; Loefgren, 2014; Oxtorp & Elg, 2015; Pla-Barber & Alegre, 2007; Poblete & Amorós, 2013; Rammer & Schmiele, 2009; Rodríguez & Rodríguez, 2005; Sass, 2012), business networks (Ghauri et al., 2003; Johanson & Vahlne, 2009; Tambunan, 2009; Tang, 2011) and the manager's goals and global mindset (Andersson & Tell, 2009; Bloodgood, 2006; Blackburn, Hart, & Wainwright, 2013; Miocevic & Crnjak-Karanovic, 2012).

Especially concerning the business networks, they play an important role in the internationalization process of high tech SMEs, as networks and the managers' relationships present potencial strengths that support the international business development (Kenny & Fahy, 2011), which may also support firms to overcome liabilities (Johanson & Vahlne, 2009; Tang, 2011). The liabilities of foreignness refer to the advantages local firms possess, as opposed to international entrants, concerning to the economic and social costs and the establishment of commercial relations in a local market (Luo & Mezias, 2002). The entry timing in international markets is also important, as SMEs are able to have advantageous positions in relation to other competitors, placing their developed innovation competitively (Sharma & Blomstemo, 2003).

Considering the abovementioned research perspectives and aiming to contribute to the internationalization theory, this research focuses on the study of the SMEs' internationalization process. In order to comprehend the specificities concerned to SMEs and to elaborate the research model, the subjects addressed in this chapter are presented as it follows: first, the description of the business internationalization theme through a broad perspective, aiming to explain which drivers and environmental factors are inherent to this process.

After this explanation, it is presented the international operations mode, their characteristics and complexity level. Subsequently, there is the presentation of the internationalization theories, which aims to understand the internationalization at the firm level and the environmental factors that enable this process. At the end of this topic, there is an

explanatory table. The next topic is dedicated to the analysis of the internationalization strategies. The subsequent subjects are concerned to the comprehension of SMEs internationalization process, grounded on integrative model (Bell et al., 2003), as well as the internationalization framework (Jones & Coviello, 2005), to finally present the SMEs' internationalization strategies based on these constructs.

1.1. THE INTERNATIONALIZATION PROCESS

The business internationalization is a complex process and its analysis requires a multidimensional construct (Ruzzier et al., 2006). In furtherance of achieving a competitive position in international markets, organizations settle the strategic diagnosis, which maps opportunities and threats present in the external environment and target markets as well as recognize the strengths and weakness present in the organization environment, allowing, consequently, the strategic planning and the organizations' competitive positioning (Cavusgil, Knight, & Riesenberger, 2010; Johnson, Scholes, & Whittington, 2008). In order to structure this diagnosis, Johnson, Scholes and Whittington (2008) present the internationalization drivers framework, which provides basis for the comprehension of the internationalization process through two perspectives: the coordination of all business units, independently of their location, and the internationalization strategy definition. The formulation of a global organizational strategy and the adoption of a comprehensive international strategy enhances the performance of a greater number of international operations, due to the flexibility of coordination of different business units.

The main contribution of this framework lies in the premise that the potential inherent to the internationalization process for industries is variable, as it is dependent on local and sectoral specificities, along with specific organizational characteristics. In order to determine the internationalization strategy, firstly the organization must assess what is the size of the international market scope for a particular sector and type of industry. The description of these drivers sheds light on the comprehension of this framework (Johnson et al., 2008). In conjunction with this explanation, Figure 1 presents the internationalization drivers:

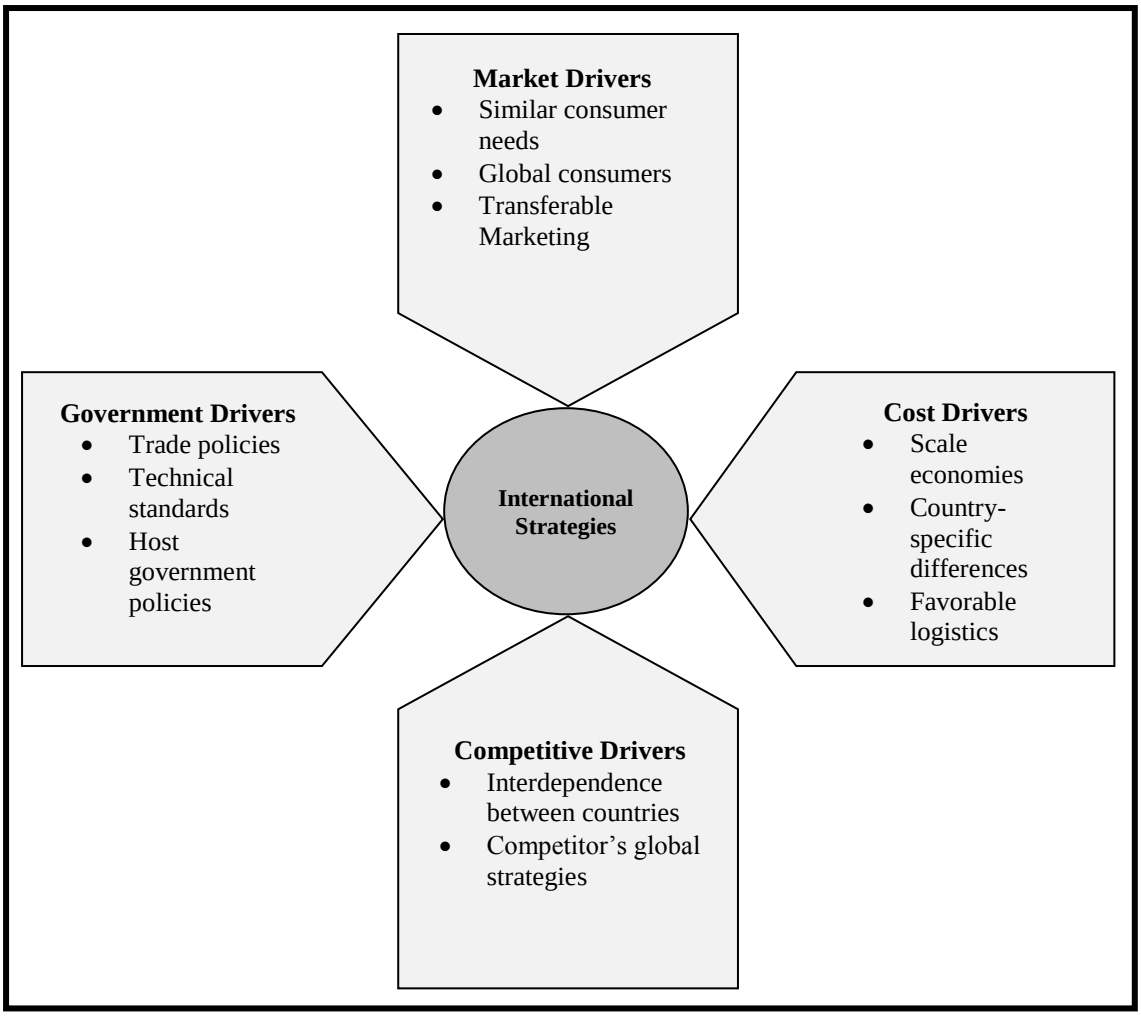


Figure 1: Internationalization Drivers

Source: Johnson et al. (2008, p. 297), adapted from Yip (2003)[1].

The analysis of market drivers postulates that the existence of similar consumption patterns present in different markets facilitate the process of internationalization. These are summarized in preferences and standardized consumer tastes, located in both domestic and international markets, as well as the presence of global customers, defined as MNCs inserted in business-to-business transactions, whose specifications with subcontractors direct the standardization of their products, which will be used as inputs in the manufacturing processes of the aforementioned MNCs. Finally, Marketing transferability allows the effectiveness of brand communication in different locations (Johnson et al., 2008).

Drivers regarding costs aim to generate economies of scale in all the stages of the production chain and in the purchase of inputs, due to the business internationalization. The economies of scale represent the capacity of the maximum utilization of the productive

[1] Yip, G. (2003). *Total Global Strategy II*. FT/Prentice Hall.

structure, and the results are the low cost of production and the increasing quality of goods and services. Consequently, the increasing productivity tends to supply the internal market first, to further extent this provision to external markets. Differentiation factors between countries, such as location costs, inputs, skilled labor force and access to technology for the development of innovation enable the cost reduction, generate economies of scale and favor the logistics distribution, representing opportunities and competitive advantages for organizations (Johnson et al., 2008).

The government drivers, in turn, determine the opportunities for new foreign entrants to compete in the local market and are facilitators or inhibitors of this process. The government, through laws and regulations, such as the imposition of tariff barriers, subsidies for domestic businesses, restrictions on ownership, control of capital flows and mechanisms of risk control, exercises control over MNCs in a territory. To attract new entrants, these legal prerogatives have to ensure political and economic stability and are key requirements for the trade liberalization and expansion of the international business (Johnson et al., 2008).

The global competitiveness works as a driver to the strategy formulation and serves as guidance for the coordination and allocation of the organizational activities domestically and internationally. First, the interdependence among operations in different countries demand for an overall global coordination of activities. The second element refers directly to competitor's strategy. According to Johnson et al. (2008, p. 298):

> The presence of ***globalised competitors*** increases the pressure to adopt a global strategy in response because competitors may use one country's profits to cross-subsidise their operations in another. A company with loosely coordinated international strategy is vulnerable to globalised competitors, because it is unable to support country subsidiaries under attack from targeted, subsidised competition [italic and bold in the original].

Therefore, this second element refers to the competition dynamics among competitors and the strategic role of subsidiaries. The importance of a coordinated international strategy is not only related to the maintenance of competitive advantages of the process of foreign expansion, but it is also related to the competitive permanence in international target markets and to the economies of scale achieved during this process (Johnson et al., 2008).

These drivers present the strategic perspective for the firm's internationalization. The organizational environment plays a key role in determining the drivers' influence degree in the internationalization process. As there are differences among national economies, organizations have to consider their institutional and economic environment to analyze, in what extend, the government, the costs, the market and the competitive drivers influence in their internationalization processes (Johnson et al., 2008).

The subsequent topic presents the international operation modes, their characteristics and complexity degree. This presentation is based on the "establishment chain" (Johanson & Wiedersheim-Paul, 1975) and does not intend to be deterministic. Instead, this proposition aims to enlighten the comprehension of the international operation modes according to the "establishment chain" logic. In accordance with this proposal, the inward operation modes are explained, followed by the outward and cooperation operation modes. The focus of this research, therefore, lies in the outward and cooperation operation modes.

1.2. THE INTERNATIONAL OPERATION MODES

The cooperation operation modes are the "company's involvement in international business that might arise when a company sells its products to foreign markets, buys products from abroad or starts to cooperate in some areas with foreign firms" (Ruzzier et al., 2006, p. 480). The understanding of international operation modes also encompasses the organizational structure, which presents how firms structure the technology, the human capital and the production process as well as how firms establish the management, aiming the effectiveness of the internationalization process and of the internationalization strategies (Cavusgil et al., 2010).

The cooperation operation modes comprehend the international relations established among enterprises, which involves the transference of tangible and intangible resources and the development of an administrative structure for a determined period (Ruzzier et al., 2010; Testa, 2011). The subdivision of these modes are the business networks and the cross-border clustering, which aims to position the organization strategically in international markets through the mediation of foreign partners without necessarily involve capital commitment, and into equity and non-equity international alliances, which involve financial investments (Majocchi, Mayrhofer, & Camps, 2013; Singh et al., 2010). The first refers to foreign relations, which entails equity investments for a determined period, such as joint ventures. The latter, au contraire, requires non-equity investments for a determined period of time, which may encompass different control hierarchies; as examples there are contractual modes like leasing, licensing, franchising and management service contracts (Dunning, 1988). For instance, as stated by Erramilli, Agarwal and Dev (2002, p. 229) "in general, all non-equity modes are collaborative because they necessarily involve a local partner. However, the role of the collaborator can shed some light on the degree and strength of the collaboration".

Majocchi et al. (2010) and Puljeva and Widén (2007) state that, for entering in foreign markets, firms consider three factors, which determine their choice for equity or non-equity international alliances: the selected foreign markets, the characteristics of the economic sector and the industry and the firm's factors. The first factor refers to cultural and psychic distances, which causes dissonances among nations involved in international activities (Johanson & Vahlne, 1977), the development level of market conditions, in terms of market structure, differences in both domestic and foreign currencies, which influence in trade operations and environmental uncertainties that involve economic, political and societal issues (Cavusgil, Knight, & Riesenberger, 2010). The industry factors are the sectoral characteristics, the performance and the technological intensity (Castellacci, 2008; Pavitt, 1984), the market size, the structure and the concurrence level (Cavusgil et al., 2010) and the industrial barriers (Porter, 1990). The last factor refers to the specificities of the firms, such as age and size, the managers' characteristics, like market experience, global mindset and social capital as well as the role of business networks (Andersson & Tell, 2009; Bloodgood, 2006; Blackburn, Hart, & Wainwright, 2013; Kenny & Fahy, 2011; Miocevic & Crnjak-Karanovic, 2012).

According to The World Bank (2016), the inward direct investment includes "all liabilities and assets transferred between resident direct investment enterprises and their direct investors. It also covers transfers of assets and liabilities between resident and nonresident fellow enterprises, if the ultimate controlling parent is nonresident". Additionally, the outward direct investment includes "assets and liabilities transferred between resident direct investors and their direct investment enterprises. It also covers transfers of assets and liabilities between resident and nonresident fellow enterprises, if the ultimate controlling parent is resident".

Concerning the inward operation modes, importing is the main example. Firms, in order to avoid risks, generally start to internationalize through less complex operation modes, and inward operation modes constitute the first international organizational learning, mainly due to involve low risk commercial transactions. Furthermore, importing high-technological products enhances the product and the process innovations, as the products' technological functionalities are available to be incorporated by the firms (Halilem et al., 2014).

Direct export means direct sales of goods manufactured domestically to foreign markets, due to an international sale contract for commercializing goods, which are produced and developed internally (Invest & Export Brasil, 2016). Indirect export covers other forms of selling goods abroad, through the intermediation of international buyers that will resell them on foreign markets or through the mediation of other actors involved in this process, like trading

companies and subsidiaries, responsible for finalizing this international transaction abroad (Puljeva & Widén, 2007).

It is inferred, therefore, that exporting may assume gradual stages, which are related to the firm's commitment with international activities, the learning process, the strategy and the objectives (Andersen, 1993; Kontinen & Ojala, 2012) also designed as the SMEs' main operation mode in international markets (Testa, 2011; Sedoglavich, 2012; Westhead, Binks, Ucbasaran, & Wright, 2002). Conversely, exporting aims to reduce risks and uncertainties and corroborates with the learning perspective (Gankema et al., 2000). The continuity or discontinuity of the export flow of goods is related to different economic factors such as exchange rate, absence of managerial capabilities and strategic planning, market uncertainties and the lack of assessment, which directly influence the export's intensity and performance (Confederação Nacional da Indústria, 2016).

Johanson and Vahlne (2009) affirm the importance of the international business networks in the firm's internationalization, defined as international market structures in which the firm participates and perceives advantages in order to continue its internationalization process. International business networks contribute to promote the learning process of entering foreign markets, as the mutual commitment between the firm and the foreign member of the network implies the establishment of relationships. Yet, business networks promote the resources' exchange, thus enabling firms to form a knowledge base about international markets and partners. The web of business' connections sustains the composition of the business networks, favoring linked exchanges among firms, which, in turn, influence the established network (Johanson & Vahlne 2009, p. 1414). Yeung (1997, p. 5) state that "a network is more than just an integrated structure, because it is simultaneously a structure and a process. . . . Networks are enduring structures emerging from social relations and hence networks represent the sum of all social relations focusing at a particular nodal. . . . "

Horizontal networks, also known as marketing channel networks, are "co-operative relationships between suppliers, producers and buyers, aiming at a solution for marketing problems, improved production efficiency, or the exploitation of market opportunities. In line with this definition we consider subcontracting relationships as networks" (Ghauri et al., 2003, p. 731). Sandberg (2013) also presents the "entry node", which consists on the firm's international expansion through an establishment point into foreign market networks via existing international operation modes, focusing on the possible interface between the firm's suppliers that already have operations abroad and foreign business networks. The firm's supplier is the connection between the firm and potential international markets.

During the internationalization process of the firm, business networks are fundamental for solving export-related problems (Ghauri et al., 2003), to leverage specific resources that are of difficult acquisition not available within enterprises (Tang, 2011), to provide access to new market opportunities for firms from emerging countries (Mtigwe, 2005; Tambunan, 2009), to exploit and to ascend the manager's social capital (Basly, 2007; Gerschewschi et al., 2014; Kenny & Fahy, 2011; Kontinen & Ojala, 2012), to obtain information about countries' political, economic, legal and cultural issues (Crick, Kaglanda, & Matlay, 2011; Zhou et al., 2007), to obtain information and knowledge about the characteristics of the market and the consumer patterns of behavior (Cavusgil et al., 2010), and to explore possibilities of co-innovation with international partners for a better product performance (Loefgren, 2014; Oxtorp & Elg, 2015). These reasons reinforce the importance of business networks, especially to SMEs, as these commonly face resources, knowledge and information constraints in order to internationalize (Tang, 2011; Westhead, 2008).

According to Asarpota (2014) and Erramilli et al. (2002), concerning the non-equity international strategic alliances, there are significant differences amid franchising and management-service contracts. The business-franchising format is the concession of a license by the franchisor company for a predetermined financial return, which is determined accordingly to market characteristics and business potential, to franchisees entrants. The franchisor not only assures the profitability but also provides a complete business package, including training, support and a well-known brand linked to the corporate name, enabling franchisees to operate their own business conforming to settled standards and format. The franchisor holds a certain degree of strategic control, but little operational control in most franchising agreements. The choice for this business format is typical in retailing and service sectors due to these benefits and to the low-risk commitment in starting a new business. The management-service contract is, therefore, the foreign entrant concession of its brand name to the host-country partner, and within this contract, there are terms that secure onsite technical and management support. This specialized support on a long-term basis renders management-service contracts more expensive to operate when compared to the franchising mode (Erramilli et al., 2002).

Cavusgil et al. (2010) define joint ventures as the union of legally independent organizations or an association, also known as consortium of enterprises, in order to establish a new legal entity through equity investment or fund assets for a determined period. The main requirement to begin a joint venture is to set goals and define the structure shape. This alliance commits the involved firms to share management, profits, risks and losses, which are estimated

in contract terms. Joint ventures favor the transfer of expertise, technology and human resources, aiming to enhance the performance of the involved organizations and the achievement of competitive scale advantages.

The globalization and the trade liberation intensified competition in almost the totality of economic sectors. This contemporary scenario presents the emergence of global players from emerging markets, especially China. These competitors are known for their large-scale productive systems and the low prices, which, consequently, generate imbalances in international markets due to the increasing competition. Even though organizations from transitional and emerging economies are strongly competitive and represent a threat in market positions of organizations from developed countries, they are also identified as potential suppliers for these organizations (Bregman, Peng, & Chin, 2015).

In this sense, the global sourcing is the organization's search process for suppliers in international markets in order to reduce costs and enhance competitiveness among conventional suppliers. The success of the global sourcing is attached to four preconditions: the level of labor costs of new global suppliers must be significantly lower compared to local traditional suppliers, in order to compensate all additional costs and risks related from buying abroad; global suppliers' technological and innovation capabilities are equivalent to the conventional suppliers. Thus, the suppliers should strive to respect the rules that highlight the economic, the social and the environmental sustainability (Colin, 2006).

Due to the increasing sensitivity of consumers from developed countries on the principles of sustainable development, organizations that appeal to suppliers that do not follow these principles are exposed to risks, which are the lack of consumers' interest or even a boycott of the products from this organization. Yet, the link amid the organization and the global suppliers is due to complex logistical processes that aim to minimize risks (Colin, 2006). The accomplishment of these preconditions enables the suppliers' selection and plays a key role to the competitiveness and better organizational performance. The last international operation mode presented is the foreign direct investment. Subsidiaries, acquisitions and manufacturing plants are FDIs. According to the OECD (2013), the FDI is the:

> . . . cross-border investment by a resident entity in one economy with the objective of obtaining a lasting interest in an enterprise resident in another economy. The lasting interest implies the existence of a long-term relationship between the direct investor and the enterprise and a significant degree of influence by the direct investor on the management of the enterprise.

Settling a subsidiary, which is a productive unity based abroad, also called as "green-field entry", is considered a strategic decision, as there are transferences of capital, technology,

innovation practices and processes and production techniques to the host country, as well as there might be the transference of these resources from abroad to the resident organization (Buckley & Casson, 2009b). The location-choice is also a decisive factor for establishing a subsidiary, as the selected host country supports the consolidation of competitive positions and organizational growth. The possibility of obtaining access to not only traditional cost factors but also to non-pecuniary factors, especially skilled labor force, research institutes and business networks, are of main importance and determinant for this strategic decision (Rasmussen, Jensen, & Servais, 2011).

Acquisitions are alternatives to the green-field entry, as organizations are already established; the process consists in the purchase of stocks of an established firm in the host country by another firm whose headquarter is outside the country, alone or with one or more partners, in a sufficient amount to confer control (Cavusgil et al., 2010; Testa, 2011). According Cavusgil et al. (2010) and Testa (2011), based on Puljeva and Widén (2007), the main distinction amid subsidiaries and affiliates, in contrast to acquisitions, resides precisely in the organizational control delegation, as the focus is on the property and organizational controls. While in the former the multinational enterprise centralizes the organizational control of the subsidiaries and affiliates, the opposite manifests with the latter, as the degree of organizational control differs in case of the acquired organizations. This factor depends on the organizational structure, on the activities and on the strategic role of the acquired organizations.

After presenting the entry forms in international markets, the next section presents the Behavioral School of Thought and the Economic School of Thought, the models and the theories of business internationalization. Table 1 systematizes the presentation:

Behavioral School of Thought	Economic School of Thought
Uppsala Internationalization Model	Transaction Costs Theory
Innovation-Related Model	Internalization Theory
Network Models	Eclectic Paradigm Theory
International Entrepreneurship Model	Market-Imperfection Theory
SMEs Knowledge-Based Model	Resource-Based View Theory

Table 1: The Presentation of the Behavioral School of Thought and the Economic School of Thought

Source: Based on Ruzzier et al. (2006) and Thai and Chong (2013).

The focus lies in models and theories that aim to explain and to provide variables inherent to the SMEs' internationalization process. The Uppsala Internationalization Model, the Innovation-Related Model, the Network Models, the International Entrepreneurship Model, the SMEs Knowledge-Based Model and the Resource-Based Approach for Internationalization,

based on the Resource-Based View Theory contemplate this approach (Ruzzier et al., 2006; Thai & Chong, 2013).

1.3. THE INTERNATIONALIZATION THEORIES

According to Johanson and Vahlne (2009) and Thai and Chong (2013), the Behavioral School of Thought is based on the work of Cyert and March (1963), Penrose (1959) and Aharoni (1966), which provides basis for the comprehension of this theoretical perspective. Cyert and March (1963) considers the firm as the basic unit of analysis, defined as a coalition of groups, from managers to workers, along with different objectives that are managed through the process of decision-making. This study reinforces the gradual internationalization models, as the focus resides on the learning process and the decision-making process in order to evolve in the internationalization process. The Uppsala Model converges with this affirmation as, according to Johanson and Vahlne (2009, p. 1412) "[T]he underlying assumptions of our 1977 model are uncertainty and bounded rationality". This involvement in international activities reiterates that the gradual internationalization process is path-dependent from the organizational strategy and knowledge management (Olejnik & Swoboda, 2012; Thai & Chong, 2013). Johanson and Vahlne (1977, p. 26), based on Aharoni (1966), explain that the Uppsala model presents the incremental internationalization process of the firm based on changes in the intra and interorganizational environment, rather than a process that focuses on comparing and evaluating the possibility of exploiting foreign markets according to the optimum allocation of the firm's resources.

Thai & Chong (2013), fundamented on Barney (1991) and Penrose (1959), present the Economic School of Thought. This School focuses on the analysis of the firm's tangible and intangible resources in order to obtain competitive advantages in international markets. The classical approach states that the possession of intangible resources, which are valuable, rare, inimitable and non-substitutable, bring competitive advantages to the firm (Barney, 1991). According to Penrose (1959), firms can obtain intangible resources from market opportunities, which lead to organizational growth and change. Teece, Pisano and Shuen (1997) present the dynamic capabilities of the firm approach, which enable the acquisition, development and deployment of resources in order to create differentiated products and to establish a sustainable

competitive advantage. This explanation, therefore, grounds the analysis of the Resource-Based Approach for Internationalization Model.

1.3.1. THE UPPSALA INTERNATIONALIZATION MODEL

The Uppsala Internationalization Model (Johanson & Vahlne, 1977; 2009) is an important reference for understanding the internationalization process of MNCs and SMEs (Bell et al., 2003; Jones & Coviello, 2005; Hermel & Khayat, 2011; Olejnik & Swoboda, 2012). This model states that internationalization is a gradual process. The internationalization process begins with psych and geographic closer international markets through low-commitment operational modes to establish other entry forms to expand to further international markets, which are psychologically and geographically distants (Johanson & Wiedersheim-Paul, 1975). The Uppsala Internationalization Model is grounded on the gradual commitment of resources in order to evolve into other entry forms from different complexity level, on learning processes and knowledge acquisition about the foreign markets' characteristics and the psych distance (Johanson and Vahlne, 1977). Yet, according to Johanson and Vahlne (2009), based on Penrose (1959), firms create value not only due to the possession of tangible and intangible resources, but also due to the efficient management of resources, which, therefore, is not dependent on market conditions. This important contribution encompasses the analysis of the firm's involvement in international markets (Johanson and Vahlne, 2009) as well as emphasizes that the strategic management of resources leads to the innovation development and growth (Teece et al., 1997).

The learning process is based on sequential stages of entering in international markets, represented as a continuum of different entry forms, varying from low risk and commitment modes to complex forms of operating abroad. The learning process evolves according to the knowledge acquisition about potential the characteristics of the target markets and the overcoming of the psychic distance, which implies that cultural and social proximities favor the choice of foreign markets. Yet, the internationalization process is related to the organizational performance and the firm's capacity to overcome barriers, as well as the possession of essential organizational competences for operating abroad (Dal-Soto, Paiva, & Souza, 2007).

Although the Uppsala Internationalization Model presents an important theoretical contribution in explaining the gradual internationalization process, emerging patterns of

internationalization, arising from different organizational arrangements, do not follow this pattern. Attracted by the market potential arising from the development of different technologies and innovation processes, born global and INVs do not present the abovementioned internationalization pattern and start the internationalization process within their first years of existence. Yet, born-again global firms present a non-linear internationalization pattern. Due to this characteristic, theoretical approaches emerged aiming to explain the competitive advantages of the early and rapidly internationalization process and the organizational characteristics of born global and INVs, considering as variables of analysis the international operational modes, the international sales intensity and the target markets (Bell et al., 2003; Chetty & Campbell-Hunt, 2004; Jones & Coviello, 2005; Li et al., 2012).

1.3.2. THE INNOVATION-RELATED MODELS

The Innovation-Related Models state that the internationalization process occurs through gradual patterns of pre-involvement to full-involvement exporting (Andersen, 1993). The innovation is, in this sense, related to the progress achieved in an export pattern that evolved to the subsequent pattern (Gankema et al., 2000). This evolutionary sequence begins with pre-export activities, export via independent representatives/agents and direct export. The pre-exporting phase considers internal managerial decisions in order to start exporting. Bjoerkman and Forsgren (2000) explain this problematic considering the internationalization process of Nordic firms. This explanation relies on the Penrosian theory (1959) and the work of Cyert and March (1963), as Nordic researchers interpret the internationalization process as incremental and progressive, placing managers in a prominent position in this analysis, as individuals that tend to avoid risks and as decision-makers that fundament this process based on experimental and individual knowledge. The second phase defines the exporting organization; however, there is the mediation of external agents that enable this activity. The last phase presents the organization as an independent exporter. The presence of the exporting process is a condition in this evolutionary process, which can be irregular or regular (Andersen, 1993).

Even though the presentation of this gradual pattern is a continuum, some internationalization cases present different patterns, as there is the possibility of overcoming phases, due to the firm's organizational competitive advantages (Oviatt & McDougall, 1994). The investments towards implementing export, considering these stages, depend on the

commitment level to the export activity, the knowledge degree the company has about the target markets and the served markets, as well as the opportunities of international commercial activities (Machado Neto & Almeida, 2008).

The definition of the exporting phases presents the market behavior of organizations, as there are inherent characteristics to each phase, which explain the managerial competences and resources involved in order to export. However, as there are other sequential forms of exporting without necessarily obey this linearity, the innovation-related models have a limited explanatory power (Andersen, 1993). There are different types of international starters with different background, knowledge about international operations and sources of information that aim other exporting patterns apart of the evolutionary pattern (Kuivalainen et al., 2012; Kuivalainen et al., 2007; Mas et al., 2006). Besides considering internal decisions and changes in the organizational structure, managers have to consider the organizational context, as there are variables such as government incentives, the economic integration, the possibility of participating in international networks and the request of the company's products and services by unknown foreign customers that influence the internationalization process (Crick & Chaudhry, 1997).

1.3.3. THE NETWORK MODELS

The Network Models bring further contributions to the theory of the Uppsala Internationalization Model (Hilal & Hemais, 2003; Johanson & Vahlne, 1977; 2009). The focus of these models resides on the analysis of the firms as embedded actors in business networks, which may assume different levels. The vertical and horizontal relations established in business networks foster the internationalization process, as business networks provide access to different sources of knowledge and information, each enterprise making strategic uses from this source of data to compete and to sustain advantages in international markets. The strategic alliances resulting from business networks are coordinated and mediated by a governance framework that conducts international commercial transactions (Johanson & Vahlne, 2009).

The international business networks are organizational arrangements that support and enable the participating organizations in international activities, from the commercial expansion, indicating the suitable international operation modes that can position the organization worldwide competitively, to a foreign focal point, which serves as a guidance for

the strategic management of the organization's units abroad (Ghauri et al., 2003; Yeung, 1997). Johanson and Vahlne (2009) affirm that the importance of international business networks mainly lies in overcoming risks and obstacles related to the relationships amid the parts involved in the international commercial transaction, the international buyer and the domestic seller, which are barriers of political, economic and legal orders.

The managers' social capital, defined as the managers' relationships and primarily strategic alliances, is important for the internationalization process. The social relationships allow the manager to access other enterprises and to operate in dynamics of cooperation and collaboration. Social relationships are intended to establish business networks to achieve different sources of knowledge for the internationalization process, to enhance ownership practices and the innovation development, arising from the interconnection power of the participating members and the available knowledge within these networks (Granovetter, 1983; Fligstein & Dauter, 2007). The commitment level in social relationships and business networks determines which are the objectives and the strategies settled by participants in order to maintain their market position (Johanson & Vahlne, 2009).

Fleury and Fleury (2003) also emphasize the role of the business networks and the strategic alliances for the organization's competitive international projection. Business networks encompass companies with specific competences and resources that sustain the strategic position of the network. This position, therefore, supports the internationalization process and confers competitive advantages in international markets. The business networks not only provide access to international markets, but also contribute to understand the international position of the company's country of origin. In reference to this statement, Brazilian enterprises are prone to participate in international networks to expand their target markets and to develop competencies and skills that concede competitive differentiation to their products in established markets. Towards the market expansion, enterprises have to invest in efficient production systems to improve productivity, to supply a potential increase in demand.

The strategic alliances enable the learning and the information-gathering processes for internationalization. These alliances provide intangible strategic resources, such as information and knowledge about markets' characteristics, which are important for the SMEs' Marketing plan elaboration. The presence of large corporations in business networks enhances the exchange of intangible resources, as they might possess databases with great sources of information concerning aspects like culture and consumer's preference. The insertion in heterogeneous business networks enables SMEs to access these data, which privileges a better

understanding of the regulatory sphere and the legal system operation of foreign markets (Majocchi & Zucchella, 2003).

Industrial districts also foster the market globalization and the creation of international business networks. The similarity of the industrial sectors converges to the promotion of the firms' connections and the development of interactive models of knowledge generation. Guerrieri and Pietrobelli (2006) affirm that different forms of industrial structures present in developed and emerging economies also cooperate to the evolutionary ability of industrial districts in promoting the development of innovation and local and global networks.

Amal and Freitag Filho (2010) present the dynamics of the internationalization process of Brazilian SMEs through the business networks perspective. Together with the entrepreneur's social capital and risk strategies, networks are part of the main variables for the internationalization process, influencing the enterprise's selection of foreign target markets and international operation modes. Managers aiming the expansion of networks have to focus on innovative and proactive learning directed to the diversification of export markets. The greater the SMEs' degree of integration and involvement with international networks, through the integration with customers and suppliers, the greater the possibility of obtaining optimal performance in foreign markets. Sainio, Saarenketo, Nummela and Eriksson (2011) also emphasize the importance of a management model that emphasizes the organization's key processes for value creation and the integration with partners and suppliers through international business networks.

Business networks also play a key role regarding the resolution of export-related problems for firms from developing countries. In the organizational context, problems are related to quality in production processes, the adopted management models, financial barriers and the information flow. Considering the external context, the problems are centered in the dynamics of the export market or sector performance and industry. Although networks can be established amid entrepreneurs who had never had previously relationships, whether through government initiatives or other intermediaries, networks are, in majority, established from mutual interests aimed at the achievement of positive results (Ghauri et al., 2003).

The possibility of coordinating the participating companies' behaviors in networks is an advantage, as this coordination undermines opportunistic objectives and short-term advantages and favors the achievement of long-term mutual objectives. The synergy found in networks is promising and enables long-term cooperative behavior to achieve sustainable competitive advantages, avoiding the application of control and monitoring mechanisms. The results of this synergy is a business network with a non-hierarchical form of governance that collaborates with

the knowledge and information flows, consisting as an alternative to the control mechanisms and hierarchical forms of governance (Fink & Kraus, 2007).

The main purpose of the networks is, therefore, to propel efficiency to promote the competitive development of the participating enterprises. The networks are dependent on bonds of trust established among the participant firms and on communication channels that enable information exchange in order to collaborate with the productive performance of the enterprises' activities (Andersson & Florén, 2008). The managers' management capability to exploit the relationships and the business networks support the internationalization process of SMEs from high-tech sectors (Kenny & Fahy, 2011), and the firms' exploration of foreign business resources, like foreign market information, experiential knowledge about the dynamics of internationalization and access to distribution channels sustain and enhance the rapid internationalization, bringing firms access to strategic resources (Tang, 2011).

According to this argument, technology-based firms judge the participation in business networks important for knowledge acquisition and information exchange, in order to support their innovative and technological development. The combination of external and internal sources of knowledge and information, allied with a skilled workforce capable of maximizing the use of information content, supports not only the innovation and the technological development, but also enhances the internationalization process. Thus, business and scientific networks engender changes in human relations that are internal and external to the organizations' boundaries and bring new forms of intellectual capital accumulation, which intensifies the innovative power of organizations (Fucci-Amato & Amato Neto, 2008).

1.3.4. THE INTERNATIONAL ENTREPRENEURSHIP MODEL

The International Entrepreneurship Model resides on the analysis of the manager's strategic perspective about the internationalization process, as the manager is the strategist and assumes the coordination of activities concerning the business internationalization. The focus on manager's competences makes reference of the importance of entrepreneurship for organizations, defining entrepreneurship as the establishment of an enterprise through the commitment of tangible and intangible resources (Nummela, Loane, & Bell, 2006; Oviatt, McDougall, & Loper, 1995; Ruzzier et al., 2006). Entrepreneurship, in this sense, refers to individuals provided with interpersonal characteristics, such as international orientation, risk

tolerance, proactivity, the capacity to globally coordinate activities and the international experience in industrial sectors (Engelman & Fracasso, 2013), and it is also an important component for the organizational and the economic development of small and large organizations (Shane & Venkataraman, 2000).

In consonance with the analysis of the managers' perspective and the dynamic capabilities approach (Teece et al., 1997), the economic environment also plays a key role in the internationalization process of the firm, as the comprehension of the target markets and the economic conditions are part of the strategic planning (Oviatt et al., 1995; 2005). From this explanation, the definition of international entrepreneurship centers on the manager's role and is "the discovery, enactment, evaluation, and exploitation of opportunities – across national borders – to create future goods and services" (Oviatt & McDougall, 2005, p. 540).

The manager's international orientation supports the establishment of the organization's strategic planning and, in order to tame the organizational and environmental variables properly, relies on several sources of information and knowledge that support this activity. In addition, the strategic planning requires a structured management and technological operations systems. In conjunction with the international orientation and experience, the adoption of a global mindset allows managers and decision-makers to recognize market opportunities and is strategically effective for the systematization of the export process. Considered as an intangible competence, the adoption of a global mindset can influence the financial performance and organizational arrangements (Miocevic & Crnjak-Karanovic, 2012). In addition to the managers' characteristics, the business networks play a meaningful role, as networks provide a range of unexplored opportunities and resources not previously available within the organization (Andersson & Florén, 2008).

Penrose (1959), according to Kor and Mahoney (2004), describes the firm as a combination of strategically managed resources that ensure the competitive performance and productivity and the development of innovation. The strategic and efficient use of resources and the managerial and administrative capacities of the entrepreneurs enable firms to acquire, to develop and to employ resources, converting them into innovative products, which provide the basis for the firm's competitive differentiation and sustainable growth. The strategic management and the entrepreneur's competences and knowledge converge to the INVs' competitiveness to operating in multiple markets (Oviatt & McDougall, 1994). In accordance with the strategic decision to go abroad, business networks and strategic alliances are also important for the internationalization process (Johanson & Vahlne, 2009). The recognition of obtaining strategic resources present in foreign markets comes from the managerial capacity

and is a driver for the internationalization process (Tang, 2011). This managers' perception, in conjunction with the networks, enables firms to commence their internationalization process, thereby giving greater dynamism to this process (Oviatt & McDougall, 1994).

1.3.5. THE KNOWLEDGE-BASED MODEL

The Knowledge-Based Model of Mejri and Umemoto (2010) presents the SMEs internationalization process considering the knowledge sphere, which is encompassed in the market knowledge, networks knowledge, cultural knowledge and entrepreneurial knowledge. The networks' knowledge is the knowledge embedded in the networks, which is achieved through the socialization of the participating enterprises. Referring to this model, the knowledge acquisition aims to enhance the knowledge exchange and information sharing, the cultural knowledge comprehends the environment in which the organization operates. However, this focus lies in the cultural and social aspects, that is peculiar to the characteristics of a nation and the entrepreneurial knowledge refers to the accumulated business experience of the manager.

Advancing in the internationalization process, from the pre-internationalization phase to the novice-internationalizing phase and to the experienced-internationalizing phase, is linked to the degree of knowledge acquisition in each of the knowledge spheres. This model alludes to the contemporary "knowledge economy", mainly characterized by the strong exchange of knowledge and information from a tacit or explicit nature, which fosters and sustains the internationalization process (Chapman, Mackinnon, & Cumbers, 2004).

According to Nonaka and Takeuchi (1997), the knowledge acquisition is of an explicit nature, which, in the case of the Knowledge-Based Model, refers to the market knowledge, referring to the objective knowledge and information about markets and the competition degree. The tacit nature of knowledge, therefore, refers to the experience and maturity degree achieved in the internationalization process, which is related to the network knowledge, the cultural knowledge and the entrepreneurial knowledge. The SECI Model for Knowledge Conversion presents how organizations assimilates knowledge, through the socialization, the externalization, the internalization and the combination, thus presenting how this process generates value for organizations.

The tacit and the explicit knowledge are part of the decision-making process and of the internationalization process, as managers use the explicit knowledge more intensively in

internationalization pre-activities (Johanson & Wiedersheim-Paul, 1975). The learning process about potential foreign target markets and consumer demands enables to explore the tacit knowledge to advance in the internationalization process, which is intangible, strategic and a valuable resource (Mejri & Umemoto, 2010). In conclusion, this model sheds light on the comprehension of the SMEs internationalization process from a knowledge perspective.

1.3.6. THE RESOURCE-BASED APPROACH FOR INTERNATIONALIZATION

The main assumption of the Resource-Based Model for Internationalization is to develop a dynamic capabilities/resource-based theory of firms operating globally. The Resource-Based View theory (RBV) presents that organizations possess a combination of resources, which ensures their competitive base (Barney, 1991, as cited in Teece et al., 1997; Penrose, 1959, as cited in Teece et al., 1997). In order to sustain competitive advantages and market positions, organizations have to focus on the acquisition, development and sustainability of valuable and rare resources, aiming the differentiation from other organizations. This context calls for the analysis of the dynamic capabilities approach, such as skills, knowledge and experience, which enables firms acquiring, developing, deploying and disposing resources to transform the valuable and rare resources into innovative and valuable products that ensure the competitive position of the firms (Teece, et al., 1997). Physical resources and the technological capacity also support the product development process (Parthasarthy & Hammond, 2002). The management of capabilities and resources aims to consolidate the sustainable advantage of organizations and to explore unrivaled resources present in the environment, which converges to this differentiation (Barney, 1991, as cited in Teece et al., 1997; Penrose, 1959, as cited in Teece et al., 1997).

Considering the analysis of the SMEs' internationalization process through the resource-based and capability-based view, the acquisition and the co-ordination of resources are not restricted to the organization's boundaries, as there are strategic and unexplored resources within networks that contribute to overcome resources' constraints (Kylaeheiko et al., 2011; Ruzzier et al., 2006). The role of networks to the SMEs' internationalization process is not only conditioned to knowledge and information exchange (Nonaka & Takeuchi, 1997; Nonaka & Toyama, 2003), which is explained by the manager's social capital, considered the main decision-maker (Kontinen & Ojala, 2012), but also converges to the innovation

development and the growth of the firm, therefore advancing the internationalization process (Colovic, 2013; Loefgren, 2014; Oxtorp & Elg, 2015).

The simultaneous analysis of the networks, the resource-based and the capability-based views concedes a broad perspective concerning the SMEs' internationalization process (Teece et al., 1997; Johanson & Vahlne, 2009). As SMEs might face resources' constraints to initiate and to sustain the competitive position in foreign markets, the networks and the manager's social capital are useful means as they provide access to strategic resources and enhance the organizational performance (Kontinen & Ojala, 2012). The combination of internal and external resources brings efficiency to internal processes, which, consecutively, may lead to costs' reduction and internal synergy generation (Kylaeheiko et al., 2011; Ruzzier et al., 2006).

Even though the networks are promising means to internationalize, factors such as the innovation development and skilled human capital are of paramount importance, especially for high-technology SMEs, as they constitute the organization's core valuable resources (Li et al., 2012; Pla-Barber & Alegre, 2007; Sedoglavich, 2012). Therefore, as stated by Loefgren (2014) and Oxtorp and Elg (2015) networks are important for SMEs to obtain strategic resources and to enhance the innovation development that leads to international market competitiveness and further business opportunities.

1.3.7. SYNTHESIS

Table 2 presents a descriptive perspective framework of the Behavioral School of Thought and the Economic School of Thought. The explanation of the SMEs' internationalization models presents the basic assumptions, as well as theoretical constructs, explanatory variables, decision criteria and the main studies underlying each model, which concedes a comparative understanding. Conducive to analyze the SMEs' internationalization process, Bell et al. (2003) and Jones and Coviello (2005) present integrative models focusing on the SMEs' internationalization patterns, considering as main variable of analysis the entry timing, the market scope and the foreign sales ratio.

Schools of Thought	Basic Assumptions	Theoretical Constructs	Explanatory Variables	Decision Criteria	Main Studies
Economic School: Internationalization is determined by rational evaluations aiming at optimal results for the firm	- Internationalization is a means to obtain competitive advantages during the productive process	The Product Life Cycle	Competitive advantages present in nations	Minimization of production costs	Vernon (1966)
	- Internationalization is a means to boost the firm's profits and performance	Transactional Costs	Transactional characteristics	Minimization of transactional costs	Reid (1983)
	- The multinational enterprise is efficient	Internalization Theory	Market imperfections	Exploitation of rent-seeking opportunities	Rugman (1981)
	- Decision makers are rational and well-informed	Eclectic Framework	Ownership, location-specific and internalization advantages	Exploitation of competitive advantages	Dunning (1988)
	- Firms do through market research and scanning to organize their international activities	Market-Imperfection Paradigm	Control	Trade-offs between risk and reward	Dunning (1988); Buckley and Casson (2009a)
		Resource-Based Theory	Firm-specific advantages	Exploitation and development of firm-specific advantages	Barney (1991); Penrose (1959)
		Organizational Capability	Firm's capability	Trade-offs between value and cost	Teece et al. (1997)
Ecological School: Internationalization is determined by external conditions	- The firm is subject to external influences	Adaptive Models	Adaptability to the environment	Congruence among structural choices, strategic choices and human resources choices	Calof and Beamish (1995)
	- Foreign market entry modes are different forms of business activity suitable for different types of firms in different circumstances conditions and areas of competence	Network-Based Perspective	Internationalization characteristics of the firm and of the market	Exploitation and development of relationships	Granovetter (1983)
		Institutional Theory	Institutional constraints	Operationally within institutional constraints	Yiu and Makino (2002)
		Evolutionary Theory	Environmental changes	Environmental fit	Kogut and Zander (1993)

Schools of Thought	Basic Assumptions	Theoretical Constructs	Explanatory Variables	Decision Criteria	Literature Review Studies
Behavioral School: Internationalization is determined by the firm's learning curve, which helps reduce risks	- Decision makers and organizations are subject to limited rationality, lack of knowledge about alternative actions and their outcomes, conflicting goals and aspirations and attempts at avoiding uncertainty - Learning curve reduces risks associated with uncertainty	Psychic Distance	Cultural distance	Uncertainty avoidance	Johanson and Vahlne (1977)
	- International operation modes evolve according to the learning process	Uppsala Models	Knowledge and commitment	Trade-offs between growth and risk	Johanson and Wiedersheim-Paul (1975) Johanson and Vahlne (1977)
		Innovation-Related Models	Firm-specific market, knowledge and commitment	Trade-offs between growth and risk	Andersen (1993)
		International Entrepreneurship	Behavior and performance	Value creating events	Jones and Coviello (2005)
		Network Models	Knowledge and commitment	Strengthening network position	Johanson and Vahlne (2009)
		SMEs Knowledge Models	Market knowledge, experiential knowledge, network knowledge, cultural knowledge and entrepreneurial knowledge	Level of experience	Mejri and Umemoto (2010)

Table 2: Contributions of the Existing Literature on the Internationalization of Firms

Source: Adapted from Thai and Chong (2013, pp. 393-395).

The internationalization models ground the comprehension of the internationalization strategies, subsequently presented. The presentation order of the strategies considers the direction of the simple export strategy, identified as a strategy with low degree of complexity, to the global strategy, with a high degree of complexity and risks, typically from multinational and transnational corporations.

1.4. THE INTERNATIONALIZATION STRATEGIES

The internationalization strategies aim to place organizations competitively in foreign markets and to provide advantages over competitors, which also cooperate to consolidate the organizational structure and the distribution patterns of the production chain. Although there are entry barriers in international markets, investments and migration restrictions, these factors are less important when compared to previous decades, due to current international regulations and governance related to foreign investments (Cavusgil et al., 2010; Johnson et al., 2008).

The elaboration of the internationalization strategies is based on the examination of the market complexity, the economic conditions and the political and fiscal measures that drive the managers' decision-making process in instable environments, as well as the coordination and the integration of the multinational corporation and the subsidiaries, focusing on the continuous development of the key areas. Production costs structure and information availability to support the decision-making are competitive factors that differentiate and design organizations in international markets (Buckley & Casson, 2009b). The multinational enterprises, defined "as a firm that owns and controls activities in two or more different countries" (Buckley & Casson, 2009a, p. 1564), have organizational structures that pursue efficiency and aim global competitiveness. This means that the global production structures add value, are flexible, in other words, the structure not only is efficient but it is also adapted to market conditions, sustain the ability to learn worldwide and according to the context in which organizations operate (Buckley & Casson, 2009b).

The efficiency refers to the optimization of the organizations' global activities and the reduction of transaction costs. Decentralizing the MNCs' activities that aim to achieve efficiency and economies of scale should be in accordance with the established international strategy and the headquarters' decisions, concerning the assignment of activities to the strategic management board or to subsidiaries. The flexibility comes from the urgency to adapt

organizations to different economic environments. In order to perform satisfactorily in international markets, organizations are prepared to develop skills and internal capacities to exploit in a proper manner resources and recognized opportunities found in markets where they operate. Therefore, the definition of the learning process involves the appropriation of specific advantages given in the global scenario (Aakerman, 2014; Cavusgil et al., 2010; Johnson et al., 2008). In contemplation of improving internal capabilities from the internalization of knowledge and information present in international markets, organizations reduce risks and uncertainties and are able to know specific characteristics of their target markets. Such improvements are centered generally in R&D and technology areas, responsible for the innovation development and products' specifications, but are also applicable to the development of new managerial skills (Cavusgil et al., 2010; Johnson et al., 2008).

The product standardization and the product customization are important variables concerning the elaboration of international strategies. The need to adapt a product to commercialize abroad depends on the characteristics of the target market, in terms of specification and customers preferences. Due to the increasing global competition and in accordance with the demands of the served international markets, the strategic scope results in two possible configurations, which are the pressure for global integration or the pressure for local responsiveness. Global integration is defined as the coordination of activities among the served markets in the search of increasing operational efficiency, also aiming to obtain advantages over similarities present in different locations. Local responsiveness is designed to respond effectively to specific needs of each served market, closely respecting the demands' requirements (Johnson et al., 2008; Cavusgil et al., 2010).

Domestic and multi-domestic strategies are suitable in analogous organizational contexts, due to the similarity of the domestic and the international demands. A global strategy approach and a local responsiveness perspective calls for adjustments to serve markets with specific demand patterns, thus searching for similar patterns to achieve economies of scale. Therefore, four international strategies are drawn, according to the configuration and the level of coordination of international activities (Johnson et al., 2008; Cavusgil et al., 2010).

The first strategy resides on concentrating the productive structure and the organizational activities in the organization's country of origin and the international projection occurs exclusively through commercial transactions. The **simple export** strategy focuses on appropriating domestic competitive advantages as means of entering in foreign markets through direct or indirect exporting. Therefore, the maintenance of the production structure in the organization's country of origin minimizes risks arising from international investments. The

multi-domestic strategy directs marketing research and manufacturing activities to the identification of consumers' patterns and preferences for product development in international markets. Each target market is treated independently, as the products' manufacturing and specifications are developed exclusively for attending preferences of a determined public, so the "multi-domestic" designation. This strategy is possible where there are few economies of scale and strong benefits to customize products to local needs (Johnson et al., 2008; Cavusgil et al., 2010).

The centralization of most organizational activities in the country of origin of the company and the international coordination of Marketing activities define the **complex export** strategy. The maximization of economies of scale in order to achieve R&D and the manufacturing development are the main competitive advantages inherent to this strategy. This strategy differs from the simple export strategy due to the systematically coordination of the brand distribution and the pricing process, thus strengthening the brand and the establishment of international business networks (Johnson et al., 2008).

The multinational and the transnational corporations largely adopt the **global** strategy, as they have a higher degree of internationalization, mature international activities and operate in multiple markets with complex environments. In terms of organizational structure, this strategy claims for a strong coordination of the organization's international activities in different locations, which implies a global integration and a high level of local responsiveness. This strategy appropriates competitive advantages present in each served market, listed as the convergence of the consumer trends and common needs present in different markets, the global sourcing of workforce, raw materials and components and the ability to purchase high quality inputs from large suppliers to achieve economies of scale. The considerable investment required to implement this strategy comes from the high coordination level required to conduct international activities, aimed at maintaining and expanding markets (Johnson et al., 2008).

This section aims to explain the internationalization strategies. The analysis focuses on the organizations' competitive differentials aiming to compete in international markets. Organizations from small to medium size generally adopt the simple export, the multi-domestic or the complex export strategies, while large corporations adopt the global strategy. The subsequent section contemplates Bell et al. (2003) integrative model for understanding the internationalization of SMEs and Jones and Coviello (2005) SMEs' internationalization framework. There are four internationalization patterns, the traditional pattern firms, the born

global firms, the INVs and the born-again global firms, each of them pursuing different internationalization strategies.

1.5. THE SMEs' INTERNATIONALIZATION MODELS

The SMEs' internationalization models aim to provide an integrative approach in order to comprehend the internationalization process of SMEs. Bell et al. (2003) and Jones and Coviello (2005) present models that encompass other internationalization modes than the traditional pattern firms, which are the born-global and the born-again global firms, shedding light on the comprehension of the SMEs' internationalization process, thus providing decision criteria to formulate the internationalization strategies.

Bell et al. (2003) present an integrative model to explain the SMEs' internationalization "paths", defined as internationalization trajectories. The explanation for the main patterns, the traditional pattern firms, the born-global firms and the born-again global firms considers the entry timing, the market scope and the international sales ratio. This integrative model relies on the Uppsala Model of Internationalization, which affirms that the internationalization process is sequential and evolves through the knowledge acquisition and the international experience, in order to progress the international market expansion (Johanson & Vahlne, 1977; 2009).

Although the incremental approach of internationalization attains to the reality of most SMEs, the born global firms and born-again global firms have different internationalization processes. These patterns encompass the International Entrepreneurship model, focused on the manager experience and behavior directed to expand the organization's operations abroad intending the value creation (Bell et al., 2003; Oviatt & McDougall, 1994), the Network models, comprehended as the role of business networks and the social capital, which provides access to resources that support the internationalization process (Johanson & Vahlne, 2009; Ruzzier et al., 2006).

The Resource-Based Approach to Internationalization aims to explain the resource constraints for the internationalization process and the means to obtain, deploy and develop strategic resources to place competitively the organization in international markets. The comprehension of the internationalization process is not only progressive and evolutionary, as SMEs may face periods of de-internationalization and the focus, consecutively, turns to the domestic market (Bell et al., 2003).

Based on a qualitative research with British, Australian and New Zealand SMEs, this model has three trajectories of internationalization that are the traditional pattern firms, the born-global firms and the born-again global firms. These patterns are related to the company's resource possession, expertise and knowledge, which influence the patterns and the progression of the international expansion stages (Bell et al., 2003). The traditional internationalization process comprehends the international market expansion as a sequential process. The born-global firms, due to their technological efforts and innovative goods, aim the international commercial expansion in their first years of existence, to obtain competitive advantages and the born-again global firms experienced a rapid international expansion due to events such as governing member changes or acquisitions by other companies.

The learning process, defined as the firm's management of internal knowledge, aims to place strategically the organization in both domestic and international markets and influences the patterns of the international market expansion. The experience and knowledge achieved in the learning process leads to improvements on the organizational performance, which, therefore, enhances the productive process, the development of innovative portfolio of products and the market expansion in order to acquire new clients. The association of internal and external sources of knowledge provides new information that are directly related to growth rates of international sales and the ability to respond to market changes (Aakerman, 2014).

In terms of technological advances, SMEs focusing the traditional internationalization process and the born-again global firms usually are medium-low technology industries from traditional manufacturing sectors. On the counterpart, born-global firms are known to belong to high- technology industries, from innovative sectors focused on the product and process innovation development and are knowledge-based enterprises (Bell et al., 2003). Small and medium size born global firms, classified as knowledge-intensive enterprises, have the focus on the technology development, which orientates the international market expansion through innovation. The internationalization from inception ensures the achievement of specific advantages in dynamic sectors, as the innovative products and services of born global firms serve specific market niches. Thus, born global firms place the launching strategy of their products before their competitors. This strategic entry positioning in markets ensures the pioneering of innovative products or services derived from technological innovations (Karlsson & Honig, 2009).

The intensive use of technology as a major differentiator for the development of innovative products and services is an important characteristic of born global firms. The intensive use of scientific knowledge and knowledge-based resources and competences in the

sphere of the product and process improvement, as well as the knowledge development and other sources of information for conducting business, sales and Marketing activities gives competitive advantages to born global firms. The scientific knowledge is used to improve and to offer new services, to increase productivity and to introduce new production methods. The advent of technologies such as the ICTs, biotechnology and new materials and their multiple applications cooperates to the internal knowledge generation and contributes to the development of highly specialized products and services and optimal production process. The internationalization process, therefore, is from inception, which assures the pioneering product launch that determines the market success (Bell et al., 2003).

The born-again global firms, often from traditional industrial sectors, may also present technological changes in products and in manufacturing processes, as a result of the innovation development and the application of technologies and market intelligence, resulting from managerial and organizational transformations. The consequences resulting from the governance change are not only related to the international expansion, but also are associated to capital inflows after the managerial transformation, the intensive application of technology to foster the product innovation development in order to expand the target markets and to increase sales revenues (Bell et al., 2003).

The main contributions and advances of the integrative model reside, therefore, on strategic issues related to the internationalization process. This model aims to provide elements for both the strategic and the operational issues, to contribute to the decision-making process, to the allocation of financial resources for international operations and sheds light on the public policy formulation supporting the SMEs' internationalization processes, circumscribing trajectories other than the traditional internationalization process (Bell et al., 2003). Tuppura et al. (2008) systematize the SMEs' internationalization strategies focusing on three decision criteria, which are the internationalization pattern, corresponding therefore to the traditional pattern firms, the born-global firms and born-again global firms, the chosen international operational mode and the number of countries where the SMEs operate.

Jones and Coviello (2005) center the comprehension of the SMEs' internationalization process with the theoretical contribution from the entrepreneurship research, thus evidencing internationalization as a process of entrepreneurial behavior and the major role of the entrepreneur's decisions and actions concerning the internationalization process, which is a composite of behavior, innovation, proactivity, risk-seeking and value creation. The first dimension considered in this model is time, which encompasses and describes the process and behavior, which is an accumulation of actions or events in relation to time. The methodology

to develop this model first shows the simple linear models, in order to first present a general model to after precise the model, which comprises the time and the internationalization behavior and constructs, named as the entrepreneur, the environment, the firm and the performance that enables the delimitation of the model.

The entrepreneurial internationalization is analyzed through the subsequent variables, which are the entrepreneur, the organizational structure, the internationalization behavior and the performance in order to understand the INVs' internationalization behavior, considering the fingerprint pattern and a profile over time. Jones and Coviello (2005), therefore, affirm that the model provides foundation for internationalization theories with the focus on the entrepreneurial process, as well as the three level analysis permits the identification of units of investigation to further comprehend the phenomenon through a precise model, focusing on the conceptual development of the internationalization process and positioning time as a critical element. In this sense, the international behavior is determined by the manifest and measurable evidence represented by the firm's fingerprint pattern and profile, to consequently delineate the internationalization strategies, which are derived from this behavior pattern. Table 3 synthesizes the internationalization patterns criteria. This table serves as a proxy to define the internationalization patterns, as, according to Crick (2009), there is no consensus in the literature that differentiate the born global firms from the INVs.

The internationalization models are frameworks that permit the comprehension of patterns of internationalization and the evolution of this process in terms of market expansion, the international operational modes, the innovation development and the entrepreneur's objectives concerned to the foreign market expansion. The patterns contemplate the SMEs behavior to internationalize, which, for instance, contributes to the strategy elaboration for achieving competitive advantages. The final considerations of this chapter lies in the analysis of the internationalization models and the comprehension of the SMEs' internationalization patterns, considering not only the foreign operation modes, but also the previous factors that support this international expansion, which relies on the role of the entrepreneur, the resources and the networks that converges to the internationalization decision. The strategies are, consequently, the result of the internationalization path, the entry form and the market scope. Table 3 presents the decision criteria for the internationalization patterns:

	Traditional Pattern Firms	Born Global Firms	International New Ventures	Born-Again Global Firms
Typical Description	Older firms Traditional manufacturing industries Successive entry in and commitment to foreign markets No global focus Reactive Gradual internationalization	Young firms; Knowledge-intensive industries, global niche markets; Simultaneous entry into foreign markets; Global from inception; Proactive; Radical and committed internationalization.	Young firms; Knowledge-intensive industries, global niche markets; Simultaneous entry into foreign regional markets; Global from inception; Proactive; Focused and committed internationalization.	Older firms; Traditional manufacturing and service-intensive industries (e.g. retailing); Internationalization triggered by critical incident; No initial global focus; Reactive; Radical and committed internationalization.
Countries (Geographic Scope)	Domestic expansion first; Successive international expansion in psychically and/or geographically close markets; Single market at a time.	Concurrent domestic and international expansion; Worldwide operations focusing on lead markets; Several markets at the same time.	Concurrent domestic and international expansion; Foreign operations focusing on foreign regional markets; Several foreign regional markets at the same time.	Several markets at the same time.
Foreign Sales Ratio (Intensity Scale)	Not the main characteristic; Small to medium share of foreign sales.	Large share of foreign sales; Different definitions, usually more than 20% to 80%.	Large share of foreign sales; Different definitions, usually more than 20% to 80%.	Large share of foreign sales.
Foreign Operation Modes (Structure Scale)	Increase in commitment along the establishment chain: no regular export activities, exports via agent, sales subsidiary, production/manufacturing.	Flexible choice of entry modes; No defined sequence; Varies from exports to collaborative modes and FDI.	Flexible choice of entry modes; No defined sequence; Varies from exports to collaborative modes and FDI.	Flexible choice of entry modes; No defined sequence; More committed modes possible because of strong resource base.
Time Lag (Commencement)	Late.	Early; From 3 years to 10 years after the firm's inception.	Early; From 3 years to 10 years after the firm's inception.	Late.

Table 3: Characteristics of the Traditional Pattern Firms, the Born Global Firms, the INVs and the Born-Again Global Firms Internationalization Patterns

Source: Adapted from Olejnik and Swoboda (2012, p. 487), based on Bell et al. (2003), Acedo and Jones (2007), Crick (2009), Kuivalainen et al. (2012), Kuivalainen et al. (2007), Oviatt and McDougall (1994) and Tuppura et al. (2008).

This section presents the SMEs' models and strategies of internationalization. The SMEs' internationalization patterns are, therefore, the traditional pattern firms, the born global firms, the INVs and the born-again global firms. Consequently, the decision criteria (the geographic scope, the foreign sales ratio, the foreign operation modes and the time lag from the enterprise's foundation year to enterprise's commencement year in outward commercial activities) present different parameters that define the internationalization patterns of the SMEs.

The next chapter, entitled "The Innovation Process" presents the definition of the innovation process, considering the managerial implications and the organization's competitiveness in their target markets. Subsequently to this introductory presentation, the attributes of the innovation process are elucidated, enabling the comprehension of the inputs and the outputs of the innovation development. The chapter presents, in the final part, the characteristics of the sectoral innovations, which permits the comprehension of the specificities concerned to different technology-based sectors. The last section of this chapter encompasses a discussion concerned to the dynamic capabilities approach research theme.

2 THE INNOVATION PROCESS

The second chapter presents the innovation process definition, the research theme of this chapter, and the subsequent subthemes that sustain the elaboration of this main theme. The adopted theoretical framework presents the outlines considered in this study, aligning them to the purposes and objectives formulated and aimed at implementing the Dissertation's assumptions.

In the current context of globalization and market competition, innovation is among the key drivers for the sustainable development and a source of competitive advantage for organizations. The innovation development converges to the enhancement of the organizational performance, in order to enable organizations to respond to internal and external challenging environmental changes and to sustain their market positions (Baregheh, Rowley, & Sambrook, 2009; Goswami & Mathew, 2004). In conjunction with this statement, Baregheh et al. (2009, p. 1323) affirm that innovation aims to "respond to changing customer demands and lifestyle and in order to capitalize on opportunities offered by technology and changing marketplaces, structures and dynamics". Thus, the core finality of an innovation is to create value and to sustain the organization's competitive advantages and performance (Baregheh, Rowley, & Sambrook, 2009; Goswami & Mathew, 2004).

Baregh et al. (2009), based on Adams, Bessant and Phelps (2006) and Damanpour and Schneider (2006) affirm that, even though there are extensive studies about innovation as a concept, there is not a singular and authoritative definition of this concept, which complies with its complexity and multidimensionality. In contemplation of shedding light on this matter, the comprehension of the innovation's main attributes converges to provide a definition for this concept (Baregheh, Rowley, & Sambrook, 2009; Goswami & Mathew, 2004). According to this approach, the analysis of the organizational capabilities and resources is related to the technological and organizational spheres, the knowledge generation, the product development process and the collaborative networks. In addition, there are the innovation indicators, such as investments in R&D and patents and trademarks registers, which also elucidate the concept of innovation and the evaluation of the firm's innovative efforts (D'Angelo, 2012; Nonaka & Takeuchi, 1997; OECD, 2005; Parthasarthy & Hammon, 2002; Mannhein Innovation Panel, 2010; Teece et al., 1997).

The definition of innovation, therefore, assumes multiples facets, each of them focusing on the analysis of the innovation inputs, throughputs and outputs indicators, thus providing the explanation of this concept (D'Angelo, 2012). The OECD (2005, p. 45) defines innovation as "the implementation of a new or significantly improved product (good or service), or process, a new Marketing method, or a new organizational method in business practices, workplace organization or external relations". This definition is used in academic researches with the purpose of analyzing the patterns of national innovation development from high and low-technological sectors (D'Angelo, 2012; Kannebley Junior; Porto, & Pazello, 2004; Mothe & Thi, 2010; Pla-Barber & Alegre, 2007; Rammer & Schmiele, 2009), based on national innovation surveys (Encuesta sobre Innovación en las Empresas, 2014; European Union Community Innovation Survey, 2012; Mannheim Innovation Panel, 2010; Pesquisa Industrial de Inovação Tecnológica, 2000).

The analysis of sectoral patterns enables the recognition of sectoral specificities to the innovation generation (Castellacci, 2008; Pavitt, 1984). The main differential of the OECD (2005) definition is the inclusion of Marketing and organizational innovations, which not only focuses on technological innovations, but also on non-technological innovations (Atalay, Anafarta, & Sarvan, 2013; Gunday, Ulusoy, Kilic, & Alpkan, 2011; Hashi & Stojčić, 2013; Mannheim Innovation Panel, 2010 Mothe & Thi, 2010; OECD, 2005). As there are multiple definitions of this theme, an exclusively section is dedicated to this subject.

In order to define innovation properly, the initial approach to develop this research theme is to present the innovation conceptualization through the linear and interactive models, which explain the dynamics and the evolution of the innovation process, considering as main units of analysis the organization and its environmental context (Kline & Rosenberg, 1986). Within the interactive model, business networks and clusters play important roles related to the prospection, development and incorporation of new practices and process of innovation, mainly due to positive externalities arising from the collaboration and cooperation among enterprises (Iacono, Almeida, & Nagano, 2011).

Further, it is presented a diagram that circumscribes the key attributes and descriptors in order to define the innovation process. Subsequently, the distinct types of innovation are presented, divided into technological and non-technological innovations (Cantisani, 2006; Mothe & Thi, 2010; OECD, 2005). After, the impact of innovation is explained, which can be radical or incremental, considering the changes brought to the organization, the market and the sector. As stated by O'Connor and DeMartino (2006), radical innovations are related to

organizational capabilities that enable the development of new lines of business based on technical competences fostered within the organization, which brings considerable opportunities in terms of economic gains and value generation, nevertheless followed by high rates of risks and uncertainties. In the sequence, there is the presentation of the open and closed innovation development (Chesbrough, 2003). The last subject is concerned to the strategic innovation management, which affirms the innovation strategic importance to the organizational performance (Tidd & Bessant, 2015).

2.1. THE INNOVATION DEVELOPMENT

The strict relationship between economic growth and change and economic growth and technical progress is an important issue in the economic literature (Dosi, 1982; Nelson & Winter, 1977). However, the direction of these two binomial relationships explains the technological change from different theoretical perspectives, the degree of independence of technical change and the role played by institutional factors, which leads to different theoretical perspectives, the technology-push and the demand-pull. These linear models are concerned to transformations of the economic and institutional environment, which commonly is neglected by the orthodox economic theory that emphasize instantaneous adjustments (Dosi, 1982). The emergence of a new paradigm to explain the industrial structure converges with a historical perspective and the Schumpeterian theory (1976, p. 81), which states that, in the "creative destruction" process, the establishment and decline of firms are mainly related to the technological progress. In conclusion, the development of scientific research for the industrial and technological progress conceives the science-push model (Cantisani, 2006).

After the II World War, during the 50's and the 60's, the linear models of innovation were the dominant paradigm in the economic literature to explain the development of innovation and the scientific and technological dynamisms. The linear models of innovation also supported the public policy elaboration for the innovation development and the economic growth in developed nations (Dosi, 1982). The main premise of the linear models lies in the comprehension of technical changes as a sequence of stages, as the scientific research is responsible for the knowledge generation that leads to invention processes and then applied into research activities and technological development, resulting in the introduction of marketable products and processes (Cantisani, 2006).

The theoretical basis of the linear models of innovation are on two perspectives about growth and development of the firm, which are the classical theories that place innovation through a mechanistic perspective, considering the internal variables of the organization, such as the product and the productive process. The neoclassical theories, in turn, incorporate the external forces and assign internal technical change to external factors (Conde & Araújo-Jorge, 2003; Nelson & Winter, 1977). The first model states that the technology development and its applicability are the demand drivers, defined as "science-push" and the second model positions the market demands as determinants for the innovation and the technological development, defined as "demand-pull".

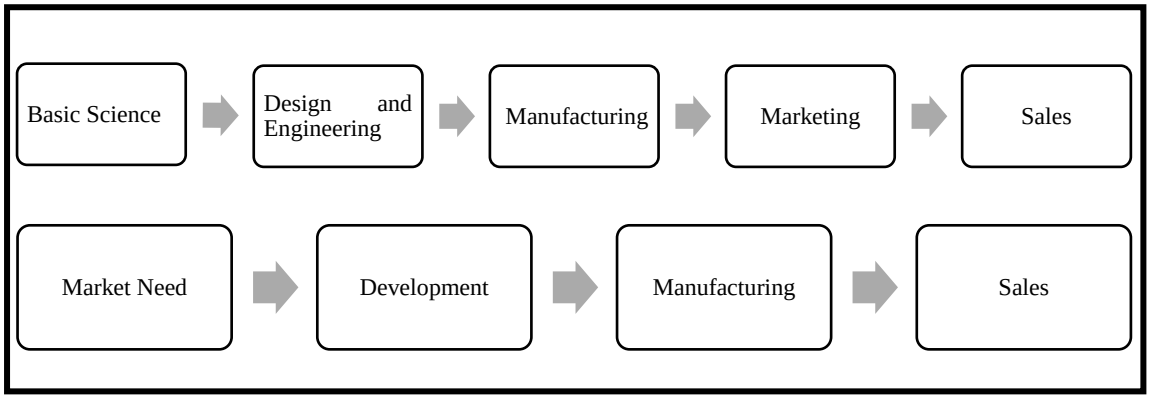


Figure 2: The Science-Push and the Demand-Pull Theories of Innovation

Source: Cantisani (2006, p. 1295) from Rothwell (1994)[1].

The deterministic perspective concerned the linear models of innovation provides a limited explanatory power about the current innovation development. The interactive model of innovation suppressed the linear models, which were important due to the consideration of the market sphere (Kline & Rosenberg, 1986). The interactive model is part of the "knowledge economy" paradigm, which advocates that there are interconnections between the economic and technological development and science. The distinctive remark of this paradigm is the intense exchange of knowledge, information and technical and scientific knowledge among the different actors in the innovation process, i.e., the industries, universities and the government (Chapman et al., 2004; Conde & Araújo-Jorge, 2003; Iacono, Almeida, & Nagano, 2011).

The technology in the interactive model is interdependent and dynamic, bringing a new understanding of the innovation generation process. The interactive model has an endogenous character, since it emphasizes the systemic interdependence among economic agents and the organization's capabilities and skills during the process of designing innovation. Although the neo-Schumpeterian theoretical perspective recognizes the importance of internal R&D, an

[1] Rothwell, R. (1994). Industrial innovation: success, strategy, trends. In M. Dogson, & R. Rothwell (Eds.). *The Handbook of Industrial Innovation*. Edward Elgar, United Kingdom.

essential organizational area that drives innovation, the focus lies in the importance of the organization as the leading developer of technologies, depending on organizational skills that enable the identification of opportunities and the establishment of multiple forms of interaction. The higher the degree of the organization's development skills, the most strategic will be the learning earnings from activities directed to the management of innovation, organizational routines and manufacturing processes, focusing on the advancement of the innovation development. This model ensures the feedback among the phases of the linear models and the interactions between science and technology in each phase of the innovation development (Cantisani, 2006; Conde & Araújo-Jorge, 2003; Iacono et al., 2011; Meirelles & Camargo, 2014). Figure 3 represents the interactive model:

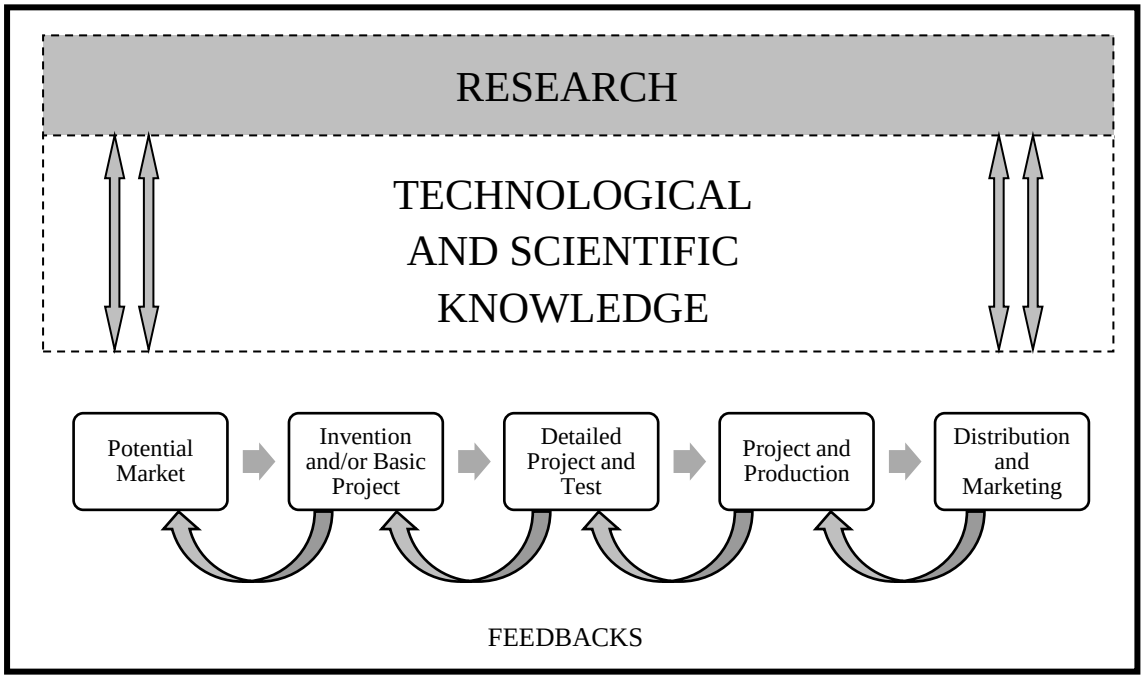


Figure 3: The Interactive Model of Innovation Process

Source: Iacono et al. (2011, p. 1495), adapted from Kline and Rosenberg (1986).

The interactive model comprehends innovation as linked to the accumulated scientific knowledge and the continuous innovation development calls for further scientific investigations to generate new scientific knowledge. Thus, the link amid science and innovation does not occur exclusively during the period of innovation conception and design, but extends throughout this process. The innovative and scientific processes are developed jointly; the latter as essential to support the continuity of the innovative cycle. Searching for solutions to technological problems begins, first, by consulting the availability of internal and external scientific knowledge to the organization. If this pool of knowledge is not sufficient to provide a solution for problems, then there is the need of further investigations, thus enabling the development of

a new set of scientific knowledge that sustains the innovative processes (Kline & Rosenberg, 1986).

The interactive model dynamism enhances the interactions within organizational boundaries and among other organizations and science and technology systems of innovation, thus refuting the determinism of market spheres for the innovation development. Therefore, the main contribution of the interactive model is to extend the innovation analysis to the comprehension of the National Innovation Systems. According to the OECD (1997, p. 7) "the National Innovation Systems approach stresses that the flow of technology and information among people, enterprises and institutions are key to the innovative process". The process of innovation and technology development is, thus, part of collaborative networks established among innovation developers and innovation diffusers, from the public sphere (government, universities and research institutes) and the private sphere (other organizations).

The National Innovation Systems emphasize the national context as determinant for this process and provide patterns for governments to elaborate public policies to support the economic growth and national development. The basis for this achievement centers on the interplay amid firms, the government and universities, which converges into promoting the innovation and technological national development (Lundvall, 2005; OECD, 1997). Even though the National Innovation Systems has as the main initial focus the developed nations, Albuquerque (2007) also emphasizes the importance of this approach, explaining the divergences amid develop and developing nations in terms of capacity for national wealth generation. The explanation first centers on the evolutionary theory in order to present the phases that led to the comprehension of this subject in developing nations. The main conclusion of this study is the recognition of the historical path and the characteristics of developing nations to comprehend their national development, i.e. Brazil, to propose the "institutional innovation" (p. 687), defined as a combined formation of innovation and welfare systems as an institutional response to mitigate structural social disequilibrium.

Besides the National Innovation Systems, the Triple Helix is another prominent model that aims to explain the innovation dynamics. Etzkowitz and Leydesdorff (2000) explain that this model focus on the important role of universities to the innovation development, which, therefore, interposes the National Innovation Systems, as the focus is mainly on the role of enterprises to the innovation development, due to the Schumpeterian perspective. The Triple Helix model thesis states "the university can play an enhanced role in innovation in increasingly knowledge-based societies . . . We focus on the network overlay of communications and

expectations that reshape the institutional arrangements among universities, industries, and governmental agencies" (Etzkowitz & Leydesdorff, 2000, p. 109).

The Triple Helix Research Group (2016), from the Stanford University, affirms that there are central concepts to this thesis, which are the Entrepreneurial University and the Triple Helix Systems of Innovation. The former is related to the extension of the innovation concept as exclusively inserted on the firms' dynamics to the university. In this way, the university is a protagonist that fosters social changes, collaborates to the innovation development, as the role of universities overcome teaching and research, thus encompassing the socio-economic development. The Entrepreneurial University also contributes to develop the students' capacities to idea generation to entrepreneurship enhancement, in terms of business generation and as key actors to organizational changes. The latter contemplates the key features of the Triple Helix interactions into a framework that contributes to the comprehension of the relationship between its components, namely the R&D and non-R&D innovators, single-sphere and multi-sphere (hybrid) institutions; and individual and institutional innovators, synthesized into technology transfer, collaboration and conflict moderation, collaborative leadership, substitution and networking (Ranga & Etzkowitz, 2013).

Currently, due to international common issues concerning worldwide nations, the concept of "Science Diplomacy" has emerged. There are, nowadays, innumerous global challenges that require global solutions, concerning important issues in domains such as health, international security, climate change, natural disasters, environmental sustainability, migrations, nuclear disarmament and economic crises. In the pursuance of analyzing, establishing action stages and developing solutions to these issues, the scientific community claims for an international and cooperative action (The Royal Society, 2010). The main pillar of the science diplomacy field is that science has an important role to play in diplomatic action (Ministère des Affaires Étrangères et du Développement International, 2016). Even though the "Science Diplomacy" is a broad concept, it is applied usefully to the role of science, technology and innovation in three dimensions of policy. The first dimension is informing foreign policy objectives with scientific advice, which is science in diplomacy, the second is facilitating international science cooperation, which is diplomacy for science and the third is using science cooperation to improve international relations between countries, which is science for diplomacy (The Royal Society, 2010).

The emphasis of the Science Diplomacy field is, therefore, the international scientific cooperation in order to address global issues that are not isolated solved. The diplomatic organizations play an important role on promoting scientific cooperation, as they, among other

functions, enable the exchange of specialists among nations to work on country-level related issues and are responsible for international policy elaboration that fosters the international scientific development. The innovation development on science diplomacy gains an international perspective, as there are forms of cooperation that not only encompass business groups and institutional and market networks, but also valuable international networks that generate applied results for dealing with humanity problems and at the same time contribute to build a solid knowledge base (The Royal Society, 2010).

This section contemplates the innovation development models that explain the innovation development process and the knowledge exchange among organizations and the external environment, which circumscribes other organizations, universities, research institutes, suppliers and consumers. The external knowledge and information sources contribute to the effective innovation development that enhances the organization's innovative performance and brings to the scene ideas and practices not previously found in organizations. The interactive model not only provides basis to comprehend the process of co-innovation, in the sense that organizations are units of knowledge pools within an organizational environment that fosters the exchange of knowledge and information, but also contributes to the analysis of the National Innovation Systems, which, consequently, serves as a framework for public policy formulation. It is presented the Triple Helix model, which enhances the university role in the innovation generation process. In the international field, therefore, the Science Diplomacy concept encompasses the international development of innovation and science to deal with humanity problems. The next section aims to present the definition of innovation for this research, together with the attributes that converge to explain the innovation process.

2.2. THE DEFINITION OF INNOVATION

The definition and the comprehension of innovation not only encompass how organizations effectively manage the resources in order to innovate, but also the key attributes that converge to define this concept, as presented in Figure 4. Thus, Baregheh, Rowley and Sambrook (2009) frame innovation as a process and, converging with this approach, the OECD (2005) includes on the innovation definition the non-technological innovations. In this regard, innovation is a multi-stage process whereby organizations transform ideas into new/improved

products, services, processes or in Marketing and organizational methods, in order to advance, compete and differentiate themselves successfully in their marketplace.

The description of the attributes respects the order of the innovation process. Baregheh, Rowley and Sambrook (2009, p. 1331-1332) define the attributes as follows:

- Nature of innovation refers to the form of innovation as in something new or improved;
- Type of innovation refers to the kind of innovation as in the type of output or the result of innovation, e.g. product or service;
- Stages of innovation refers to all the steps taken during an innovation process, which usually start from idea generation and end with commercialization;
- Social context refers to any social entity, system or group of people involved in the innovation process or environmental factors affecting it;
- Means of innovation refers to the necessary resources (e.g. technical, creative, financial) that need to be in place for innovation;
- Aim of innovation is the overall result that the organizations want to achieve through innovation.

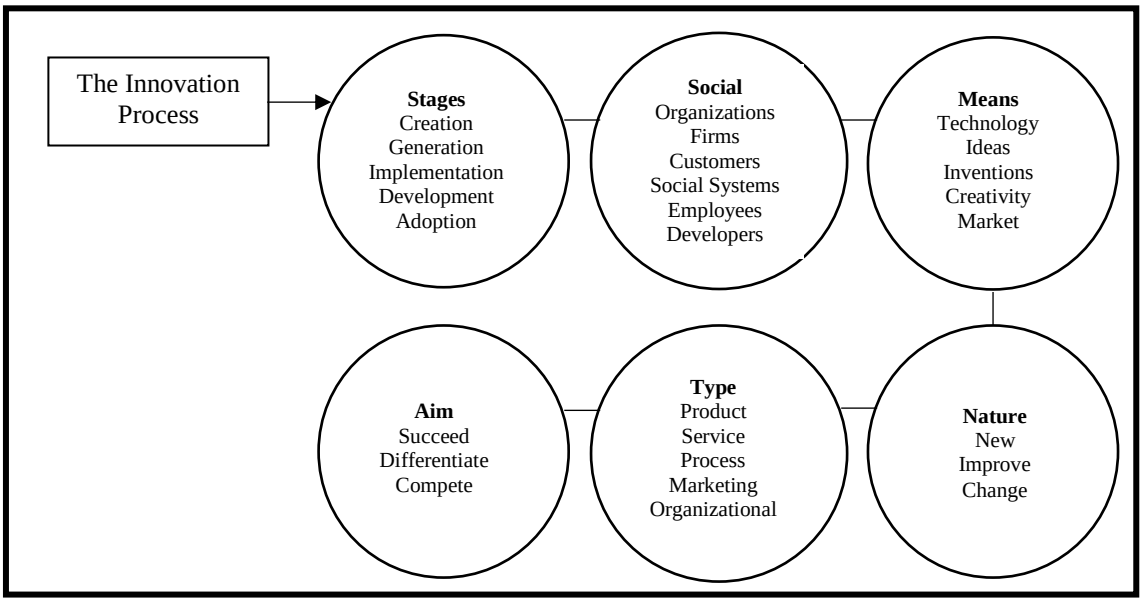


Figure 4: A Diagrammatic Definition of Innovation

Source: Based on Baregheh, Rowley and Sambrook (2009, p. 1333) and the OECD (2005).

The innovation development within organizations is based on the arrangement of business activities performed in-house or outsourced (Goswami & Mathew, 2004). Explaining Penrose (1959), Kor and Mahoney (2004) affirm that this strategic choice considers the costs of performing the innovation activity internally and the analysis of the resources' availability that sustain the organization's competitive advantage.

Wikhamn and Knights (2011) explain that, from the perspective of the Transaction Costs Theory, the actual possibilities of communication would be expected to reduce the transactions costs related to the search and selection of information and, therefore, would support the opening of the innovation process, enhancing the inflow and outflow of knowledge

in organizations. However, the perceived risks and opportunistic behaviors, concerning the collaborative relations and the costs involved in facilitating knowledge exchange, contribute to the possibility of undermining the open innovation process, which turns the focus of the managerial practices on the maintenance of arm-length transactions.

Even though there are constraints concerning the exchange of knowledge with the external environment, there are positive aspects related to the development of collaborative innovations, which foster and support the concept of "open innovation" (Chesbrough, 2003). The advent of the ICTs and the access to different sources of knowledge, such as universities, institutes of research and specialists are the main drivers to the open innovation process, which enables the advancement of the innovation development of the firm and, consequently, the market expansion through the introduction of innovative products and services. Conversely, business networks influence the internal context of innovation, bringing within the participating firms external resources, like knowledge, information and technology resources that provide innovation opportunities for firms.

Kor and Mahoney (2004) present the Penrosian theory (1959), which presents the links between resources, capabilities, competitive advantage and profitable firm growth. Considering this theory, Kor and Mahoney (2004, p. 184) explain the links amid resources and the generation of productive opportunities for growth and innovation. The managerial experience functions "as a catalyst in the conversion of firm's resources into firm capabilities and new product applications. In the spirit of dynamic capabilities, new combinations of resources lead to innovation and economic value creation".

The tacit knowledge within organizations is a differential resource that enables the generation of innovative ideas that directs the firm to explore the "unused resources", which are a potential source of competitive advantages that indicates opportunities for growth. The analysis of the organization's resources emphasizes the strategic experimentation in diversification strategy, which enables organizations to explore economies of scope and maintaining the existing technological capabilities and expertise, which ensures a competitive advantage for a determined period of time (Kor & Mahoney, 2004; Kylaeheiko et al., 2011).

This section presents the definition of innovation and the explanatory attributes that enable the innovation process. Yet, this section contemplates the analysis of the decision-making of the innovation development, in terms of organizational costs, referred to the internal development of the innovation process or the external costs, referred to the outsourcing of the

innovation development. The further sections comprehend the explanation of each attribute of the innovation process, presenting their characteristics and functions.

2.3. THE INTEGRATED MODEL FOR THE INNOVATION MANAGEMENT

The achievement of an integrated model for the innovation management depends on the integration of technological and market elements, from the external environment, with human and organizational factors, from the organizational context (Nagano, Stefanovitz, & Vick, 2014). Considering the diagrammatic definition of the innovation process, the management of innovation aims to systematize the internal innovation system, based on the stages of the innovation process and integrates the innovation means, grouped into technology resources and human and organizational factors, also considering the knowledge sphere. The technology resources, as an integral part of organizations, sustain the innovation process (Smith & Sharif, 2007). The definition of technology goes further than the focus on physical resources and artifacts, as it also encompasses practical knowledge and skills. Smith and Sharif (2007) define technology, according to Burgelman, Christensen and Wheelwright (2004, p. 2), as:

> . . . the theoretical and practical knowledge, skills, and artifacts that can be used to develop products and services, as well as their production and delivery systems. Technologies can be embodied in people, materials, cognitive and physical processes, plant, equipment and tools. Key elements of technology may be implicit, existing only in an embedded form (like trade secrets based on know-how) and may have a large tacit component.

The integration of the technology resources, as presented in the definition, along with the organizational strategy, enables the definition of the internal system of innovation, along with the implementation of the innovation practices (Nagano, Stefanovitz, & Vick, 2014). The explanation of the technology's assets is according to Smith and Sharif (2007). The main assumption of this explanation is to leverage organizations' core competences, as stated in Prahalad and Hamel (1990). Christensen and Overdof (2000) emphasize the valuable resources within organizations, which are the resources, processes and values. The resources are the capabilities of people or the staff, the "humanware", as well as the physical resources, known as equipment, machinery and patent and industrial protection of a specific technology are the "technoware". The processes are the valuable capabilities of the organization, in the form of specialized people and differentiated physical resources, compounding the "orgaware". The "inforware" is, therefore, the values of the organization, which are the analysis of the

organizational environment that contributes to determine the organization's specialization (Smith & Sharif, 2007).

In conjunction with the abovementioned groups of technology, the knowledge management and the analysis of the organizational environment are of great importance in order to determine the innovation management. The knowledge management assures the generation of new ideas, promotes the flow of information and explicit knowledge within the boundaries of the organization, enables the conversion of tacit knowledge into explicit knowledge through the socialization among individuals and sustains the innovation process, as the knowledge management, and its generation, has among its main finalities the innovation development (Nonaka & Takeuchi, 1997). Additionally, organizations have to implement systems that promote the innovation process and design an organizational structure adequate to sustain internal interactions among individuals and with the external environment in order to generate value through innovation practices (Mintzberg, 1979; Nagano, Stefanovitz, & Vick, 2014).

Conducive to evaluate the knowledge management, Oliva (2014) identifies, from a quantitative study with large Brazilian firms, that there are barriers that undermine the knowledge management in this group of firms, thus compromising the management and the innovative performance. The barriers are associated with human and organizational issues, such as lack of interest from employees, inefficient communication, lack of culture sharing, lack of competence of the staff and lack of incentive. The identification of barriers enables a counterpoint to the best practices that foster the knowledge management, which are the placement of the knowledge management aligned with the organizational strategy, the innovation culture, the competence level and the transparency in terms of defining the knowledge management. The result of this twofold analysis is, therefore, a model for assessing the maturity level in knowledge management. In order to comprehend each level of this model, Figure 5 presents its configuration:

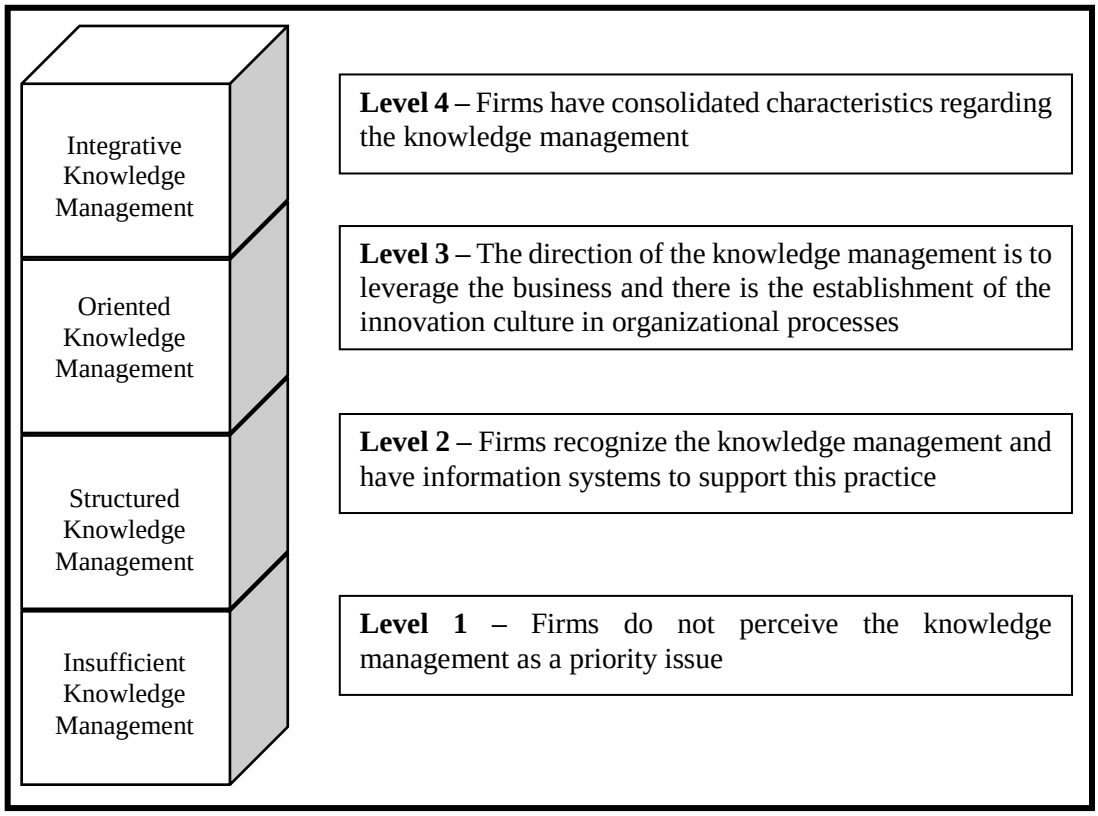


Figure 5: Level of Maturity in Corporate Knowledge Management

Source: Oliva (2014, p. 1070).

The first and the second level of the model represent organizations that are in initial stages of the knowledge management. These firms perceive the importance of the knowledge management as an important practice that contributes to the organization's strategy. The second level present firms that recognize the importance of the knowledge management and possess information systems that sustain this managerial practice.

In the third level, the organization culture provides basis for the knowledge management and sustain its diffusion through the organization. The fourth level, the "Integrative Knowledge Management", presents organizations that have consolidated characteristics of awareness, organization and transparency regarding the knowledge management process. There is the inclusion of the staff in this practice and communication flows are important components as well. The distinctive factor of this level is the significance of the organization environment, which serves as an important source of knowledge. The pursuance of competitive advantages results from the knowledge management and the adoption of an innovation culture. The importance of this model resides in focusing on the best practices for the improvement of the firms' knowledge management (Oliva, 2014).

The structuring of the innovation management assumes that innovation is a process conditioned to the organizational as well as to the external environments. The phases of the

innovation process are the unit of analysis for the innovation management execution. The starting point of the innovation process is the fuzzy front-end phase, the uncertainty phase, or the prospection phase. The description of the subsequent phases enables the comprehension of the innovation execution and implementation (Nagano, Stefanovitz, & Vick, 2014). Tidd and Bessant (2015) and Nagano et al. (2014) explain the innovation management process.

The prospection phase is defined as the "internal and external scenarios' analysis in the search of – and processing the relevant signals of – threats and opportunities for change". (Tidd & Bessant, 2015, p. 55). This phase is marked by uncertainties not only related to the scenario analysis, but also concerned to the new product development. This fuzzy front-end phase is the first stage to the development of a new product, and the evaluation of the initial idea leads to the continuity of the innovation process aiming to consolidate the new product development or the termination of this activity (Tidd & Bessant, 2015; Verworn, Herstatt, & Nagahira, 2008). Yet, this phase encompasses the research of market characteristics and tendencies, as well as the product strategy formulation, which refers to the definition of the product and the project planning to execute its production process (Cooper, 1988; Khurana & Rosenthal, 1998, as cited in Verworn et al., 2008).

The ideation is a subsequent phase that consolidates the prospection phase. In this phase, the creativity is essential to promote the ideas to the new product development. DiPietro and Anoruo (2006) state that creativity and innovation enhance the economic growth and the development of the nations. Creativity, as a predecessor for the innovation development, is a key element within organizations that needs to be coordinated in order to foster the idea generation and evaluation and to progress with the innovation chain.

The innovation strategy is the decision concerned to the continuity of the innovation. This phase encompasses the analysis of the external scenario, which is complex and is in constant changing, with uncertainties related to the technological development future and the market threats. Yet, the organization's internal structure and processes have to equilibrate the internal demands in order to establish the innovation development that brings value to the organization. The incremental path of the innovation strategy enables continuous adjustments and fosters the learning process, thus not conditioning the strategy into a static activity (Nagano et al., 2014; Tidd & Bessant, 2015).

The mobilization of tangible and intangible resources is the subsequent phase of the innovation strategy and the implementation of the innovation process consists in translating the initial potential idea into something new to the market, which is profitable, adds value to the organization and differentiates the organization among its competitors. This phase is

challenging, as there is a great mobilization for knowledge to innovate and the unpredictability of the market demand (Nagano et al., 2014; Tidd & Bessant, 2015).

Lastly, the evaluation of the innovation process aims to verify, in which extent, the innovation process presented the results previously defined. Therefore, the management leader conducts the analysis of the innovation development process through indicators and determines further goals (Damanpour et al., 2006; Nagano et al., 2014; Tidd & Bessant, 2015). This plan is helpful for organizations that aim to expand their portfolio in the pursuance of obtaining competitive advantages and it serves as guidance for necessary changes within the innovation management (European Commission, 2016). The sustainable diffusion of the innovation outputs and the acquired learning are also evaluated, as these results foster the expansion of the knowledge base and the innovation cycle (Nagano et al., 2014; Nonaka & Takeuchi, 1997; Tidd & Bessant, 2015).

The degree of the organizational control on the innovation development determines whether innovations are closed, developed within the organization's boundaries, based on the organization's resources and competences and dependent on the internal (Tidd & Bessant, 2015) or external R&D (Chesbrough, 2003). Van de Vandre, de Jong, Vanhaverbeke and de Rochemont (2009, p. 424) state that open innovations are:

> Purposive outflows of knowledge, or technology exploitation, implies innovation activities to leverage existing technological capabilities outside the boundaries of the organization. Purposive inflows, which we will refer to as technology exploration, relates to innovation activities to capture and benefit from external sources of knowledge to enhance current technological developments.

The focus is, therefore, on the search of external knowledge to foster the organization's technological development, which, in turn, adds value to the production chain (Teece et al., 1997; Van de Vandre et al., 2009). The open innovation model, according to Chesbrough (2003, p. 36), proposes an original approach for organizations to shift their innovation development cycle and to bring new ideas to the market:

> In this new model of *open innovation*, firms commercialize external (as well as internal) ideas by deploying outside (as well as in-house) pathways to the market. Specifically, companies can commercialize internal ideas through channels outside their current businesses in order to generate value for the organization. Some vehicles for accomplishing this include startup companies (which might be financed and staffed with some of the company's personnel) and licensing agreements. In addition, ideas can also originate outside the firm's own labs and be brought inside for commercialization. In other words, the boundary between a firm and its surrounding environment is more porous, enabling innovation to move easily between the two.

This novel prerogative presents a counterpoint to the closed innovation model, which states that firms are the solely responsible for their innovation development, relying on internal

sources of knowledge, ideas and research development, focusing on their internal R&D to generate innovations and to bring them to the market. It is true that the adoption of the open innovation model is not for every organization, as there are sectors that exclusively rely on their internal innovative power. The open innovation model states that there are further forms to develop innovation, which can be found outside the organization's boundaries (Chesbrough, 2003). In order to illustrate this model, Figure 6 presents its configuration:

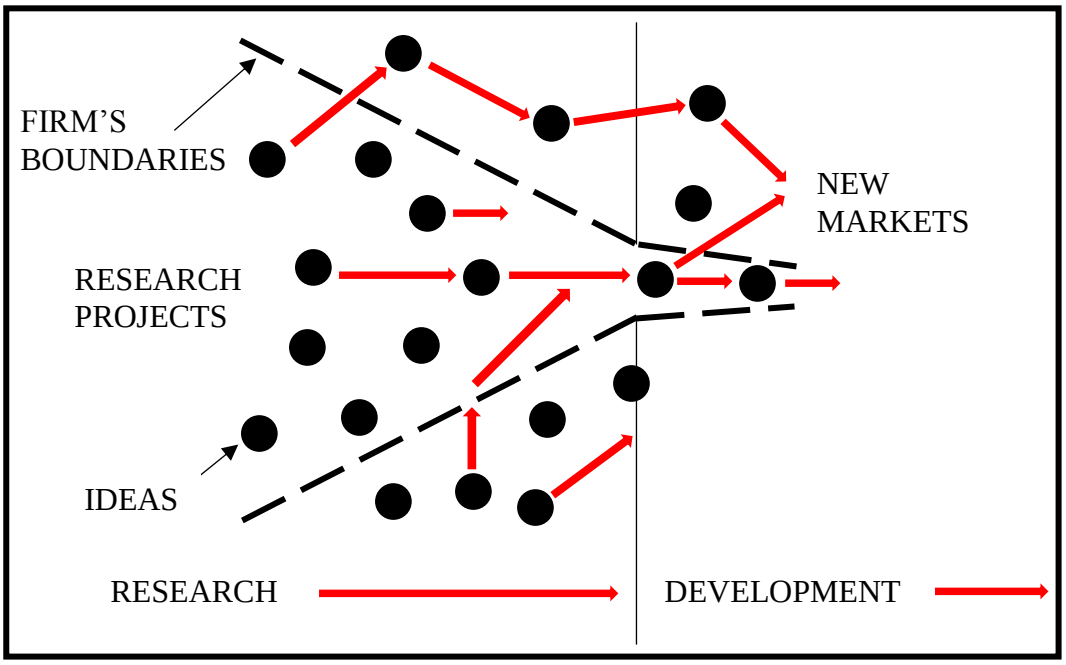


Figure 6: The Open Innovation Model

Source: Chesbrough (2003, p. 37).

The proper knowledge appropriation, coming from different external sources and actors present in the external environment, through business and social networks and alliances, drives the development of internal innovation, encourages new forms of organizational learning and shifts the organization's growth (Nonaka & Konno, 1998; Nonaka & Takeuchi, 1997; Popadiuk & Choo, 2006). In the pursuance of successfully converting the knowledge embedded in external sources in internal applied knowledge, which may also trigger the innovation development, organizations employ specialists in their core areas to decode and make useful application of the external knowledge, and turn this asset into a strategic intangible resource (Nonaka & Takeuchi, 1997; Nonaka & Toyama, 2003; Popadiuk & Choo, 2006). There are, thus, three types of external networks and learning characteristics, related to the knowledge domain, the knowledge relatedness and the appropriability scope of the partner. The understanding of these dimensions enables the comprehension of the knowledge flow within different networks and allows organizations to act strategically in order to maximize the results (Kim & Lui, 2015). Table 4 provides a synthesis of the external networks' types:

	Institutional Network	Market Network	Business Groups
Partners	Partners in the public sector, such as government agencies, university research institutes and trade associations	Partners with which a firm interacts in the same competitive business market, such as suppliers, customers and competitors	A business group represents a closely connected business network of a firm and can be found internationally
Knowledge Domain	Explicit and tangible technological knowledge	Tacit and intangible market knowledge	Tacit and intangible market knowledge derived from multiple industries
Knowledge Relatedness	Knowledge different from existing knowledge base: Difficult knowledge diffusion and assimilation	Easy knowledge diffusion and assimilation	Easy knowledge diffusion and assimilation through common culture and control systems
Appropriability Scope of Partner	Moderately opportunistic due to the non-profit nature of institutional partners; More open and willing to share knowledge	Most opportunities due to competition for sales and market share in the same industry; Less open and willing to share knowledge	Easy knowledge diffusion and assimilation through common culture and control systems; Least opportunistic owing to trustworthy and long term relationships; More open and willing to share knowledge

Table 4: Learning Characteristics of External Networks

Source: Adapted from Kim and Lui (2015, p. 1966).

Along these lines, Nieves and Osorio (2012) present the connection between social and external networks and knowledge generation and the consequent innovation development. The low redundancy of ties enhances the exchange of heterogeneous knowledge, which is critical for the innovative performance. The opposite situation presents that the higher density of the network corroborates to share ideas and information among participating actors, especially tacit knowledge, which is essential for knowledge creation. These perspectives shed light on the stock of information and knowledge contained in a network, thus emphasizing their heterogeneity. Organizations, in this sense, are going to take advantages from networks they are embedded in due to the convergence of the defined innovation strategy with the most suitable condition of this organizational environment, also being able to face the complexity within the networks, which cooperates to reduce uncertainty and to improve decision-making.

In furtherance of presenting the advantages from the business networks, Todeva (2012) presents the networks' sociological analysis focusing on the relationships among the participants, which enables the understanding of the formation and the beginning of the network, as well as the essence and the motivation for its creation. Individuals, when inserted and integrated in a given environment, tend to contribute to the achievement of a common goal, in this case the networks' evolution, in order to continue to perform their functions. This

cooperative and collaborative behavior converges to the generation and exchange of information and knowledge among the participants.

The information systems, which are part of the ICTs group, play an important role on the external knowledge record and storage and work as knowledge repository for organizations. The knowledge systematization provides blueprints that identify the paths and the trajectories organizations had for obtaining and converting the external and the internal tacit knowledge into internal strategic intangible resource, in order to apply this resource for the innovation development. The knowledge management also plays a key role in enabling the stock and the database formations of tacit knowledge that assist in its codification for future use, thus contributing to convert it in explicit knowledge (Plessis, 2007). The organization, therefore, develops innovation projects through the mobilization of tangible and intangible assets, as well as resources, on the behalf of seeking competitive advantages, either through increasing the market share with the introduction of new or improved products and services and better performance indices, accompanied with organizational changes and market strategies (Van de Vandre et al., 2009).

Despite of the positives externalities concerning the open innovation, business networks and alliances to develop innovations, there are also negative aspects that organizations must take into account. Frenz and Ietto-Gillies (2009) present that issues related to the appropriability of the results of collaborative research that also affect the success of business networks for the innovation development. Furthermore, considering the UK scenario, both the international and external partnerships do not present strong evidences to successful translate the innovation performance, compared to international internal networks. Additionally, Nummela, Saarenketo and Loane (2014) reinforce the role and the influence of the economic environment in the internationalization process and, in a lesser degree, in the partnerships for innovation development. Yet, the strategy planning for the internationalization process is also important in order to determine the market expansion of the firm. Oxtorp and Elg (2015) present factors that inhibit the continuity of business networks and alliances aiming the innovation development, which are:

- Contract barriers, considering that the final output of the innovation process requires further legal support; such as patent's rights;
- Costs inherent to the learning process and efforts devoted to the alliance management;
- Costs inherent to the maintenance of the business alliances, especially in case of international partners;

- Power imbalances, in reference of the established partnership;
- Risks and uncertainties intrinsic to the innovation development, especially concerning R&D transferences;
- The asymmetry power, especially concerning the relationship between large and small enterprises, which leads to imbalances concerning the knowledge and innovation appropriation and the need to interrupt the alliance.

The synthesis of the main stages of the innovation management aims to present the main process, sub-process and objectives within the innovation management process. Tables 5 and 6 present the framework that provides the necessary clarification about the processes and the sub-dimensions of the innovation management.

Process	Sub-Process	Objectives	Main Studies
Prospection	Monitoring technological tendencies	Grasping tendencies of new technical solutions to meet current and future needs	Verworn et al., 2008 Tidd and Bessant (2015)
	Monitoring consumption tendencies	Capturing tendencies of benefits to be delivered to consumers/customers using innovations	
	Monitoring of competitors	Understanding progress not mapped internally or input for tactic interaction	
Ideation	Generating new ideas	Generating new ideas of products and technology	DiPietro and Anoruo (2006) Nonaka and Takeuchi (1997) Plessis (2007)
	Capturing ideas	Searching for internal and external ideas to feed the pipeline of ideas	
	Managing ideas	Making generated, analyzed and classified ideas available for potential future use	
Constructing Strategies	Drawing up product plan	Mapping out the cadence of desired new products over next years	OECD (2005) Tidd and Bessant (2015)
	Strategic management of project portfolio	Selecting and prioritizing projects to be carried out	
Mobilizing Resources	Identifying needs, searches and mobilizing resources	Search for internal and external resources in for carrying out prioritized projects	Chesbrough (2003) Teece et al. (1997) Tidd and Bessant (2015)
	Operational management of portfolio	Dynamic allocation of mobilized resources between activated projects	
Implementation	Product Development Process	Developing product from conception to launching	Tidd and Bessant (2015)
	Technology Development Process	Developing and checking technology, leaving it ready to be applied to a product	
Evaluation	Evaluating results and learning from the projects	Evaluating final results and consolidating learning obtained throughout the project	European Commission (2016) Tidd and Bessant (2015)
	Evaluating performance and continuous improvement	Diagnosing flaws and continuous improvement of innovative performance	

Table 5: Innovation Management Process

Source: Adapted from Nagano et al. (2014, p. 70).

Sub-Dimension	Element	Objectives	Main Studies
Innovation Culture	People management	Creative potential; motivation for professional development, for creative and collective work; entrepreneurial attitude	DiPietro and Anoruo (2006) Nonaka and Takeuchi (1997)
	Strategic orientation to innovation	Searching for innovation as a value of the organization	
Organizational Structure and Governance	Multifunctional integration mechanisms	Promote the appropriate structure so that multifunctional work flows	Mintzberg (1979) Nonaka and Konno (1998)
	Structuring of work teams	Promote structure that does not overwhelm the long-term initiatives compared to short-term needs	
External Relationships	Scope of the network of relationships	Establishing solid channel to exchange knowledge with diversified external actors	Chesbrough (2003) Kim and Lui (2015) Nieves and Osorio (2012) Nonaka and Takeuchi (1997) Plessis (2007)
	Ability to absorb external knowledge	Effective capacity of the company to learn about the environment and keep up-to-date	

Table 6: Organizational Context for Innovation

Source: Adapted from Nagano et al. (2014, p. 72).

This section examines the innovation management and the innovation stages, their characteristics and the transitory aspect among the stages. The innovation development, as presented, can be developed internally or in cooperation with other institutions and organizations. Open innovations are part of the organizational innovation strategic and converges to provide information and knowledge, important intangible resources for the innovation development. The next topic contemplates the nature and the aims of the innovation development. There are, therefore, the radical, the incremental and the disruptive innovations, which possess different objectives and are in accordance with the organizational strategy. In addition, it is presented the frugal, the green and the social innovations that are current trends and perspectives of the innovation development.

2.4. THE NATURE AND THE AIMS OF THE INNOVATION

According to Christensen and Overdof (2000) and O'Connor (1998), innovations are of radical, incremental and disruptive natures. The development of radical innovations is the source of strategic renewal for organizations and aims to position competitively the organization in the global economy (DeMartino, Neck, Dwyer, & Tresse, 2012; O'Connor & DeMartino, 2006). The development of radical innovations encompasses substantial changes in the organizational structure, the use of significant new technologies and converges to the productive process optimization and the product development.

Radical innovations cover the new-to-the-world products that provoke significant changes related to customers' perception about its utilization, to processes that drastically reduce costs, time, material using or improve performance and shift existing technologies to new applications and to markets under conditions of high competition and technical and organizational uncertainties (Leifer, McDermott, O'Connor, Peters, Rice, & Veryzer, 2000). Aligned to this statement, Veryzer Jr. (1998, p. 306) states that "terms such as "radical", "breakthrough", "revolutionary", "really new", "game-changing", and "boundary expanding" have all been used to refer to products that involve dramatic departures from existent products or their logical extension".

Radical innovations cause significant market changes as well as in the organizations' economic activities, create new market demands, which render obsolete or unused existing products. Investments in radical innovations are, thus, higher than in other innovations, also are

the perceived risks (Christensen & Overdof, 2000; Leifer, McDermott, O'Connor, Peters, Rice, & Veryzer, 2000). Yet, an important remark about radical innovations is that they may have been previously considered disruptive innovations until the time they were introduced to the market, due to the uncertainties concerned to the acceptance of the products originated from radical innovations (OECD, 2005).

DeMartino et al. (2012) affirm the importance of radical innovation development to not only large organizations, but also to SMEs. Due to the necessary efforts to develop this innovation, which are mainly the high costs of investments in R&D and in trend technologies, the degree of uncertainty, the unity of the organizational culture and the strategic alignment, radical innovations prevail in large organizations. The resources, capabilities, process and skills from large organizations encourage and incorporate the radical innovation development, which ensure the prevalence of scientific literature that focus on this thematic. DeMartino et al. (2012) propose, through an exploratory perspective, the investigation of the radical innovation development in SMEs.

The main findings are concerned to the strategic intent, as in SMEs there are the business units devoted to the radical innovation development and the acquisition process as an organizational strategy in order to achieve new sources of innovation that lead to radical innovations (DeMartino et al., 2012). Large organizations explore team works and knowledge management, thus covering the organizational totality, aimed to maximize the potential for innovation (Davenport, de Long, & Beers, 1998). Another particularity concerns the limited R&D, Marketing and resources available within SMEs, which leads to the employment of radical innovation in core markets, thus not exploring new market perspectives, as it occurs in large organizations.

The most important difference between large and small organizations lies in the process side, as SMEs are more conducive to radical innovations. The managers are intensively involved in the evaluation and decision-making process and are close to the project supervision and to the innovation process (De Jong & Vermeulen, 2006). The organizational flexibility is, therefore, a positive aspect concerning SMEs. This advantage places the SMEs innovation project management in a strategic position and, due to this aspect, a useful proposition is the separation of incremental and radical innovation processes, in order to achieve a better innovative performance and the establishment of an internal framework that provides the management and the support for radical innovation commercialization.

On the counterpart of the radical innovations, there are the incremental innovations. The main characteristic of incremental innovations is that their changes present a lower market

impact, in terms of the customers' perceived novelty degree. The improvements and enhancements on products and processes are made in a once or in a series of small changes and use existing technologies for their implementation, to their subsequent market introduction and commercialization (Christensen & Overdof, 2000; O'Connor, 1998).

Dewar and Dutton (1986) state that the complexity degree intrinsic to incremental innovations is lower when compared to radical innovations. The organization's exposure through contacts with the external environment and with innovations developed externally to the organizations facilitates the adoption of incremental innovations. This exposure happens in business networks and through the acquisition of innovative products and technologies from other organizations, aiming the absorption, or, in a lesser degree, the imitation of innovations and technologies. This pattern of innovation development is commonly found in latecomers innovators from transitional and emerging economies (Gashi et al., 2014).

The main characteristic of the disruptive innovation is the capacity of creating an entirely new market due to the introduction of a new product or service that presents a differentiated market introduction process. Initially, the outputs of the disruptive innovation are judged to present an inferior performance, according to the perception of the high-value customers, are not adherent to the organization's values and present lower profit margins per unit sold. Although these products and services do not serve the high-value customers portion of the organization's market, they can serve other markets, due to their reduced price. The occurrence of these innovations is intermittent, which means that organizations do not have routine processes to develop disruptive innovations. Therefore, disruptive innovations are opposed to the sustaining innovations, which are products or services of a better performance and of a high-perceived value from mainstream customers (Christensen & Overdof, 2000). Leader organizations continuously develop new or improved products to maintain their competitive position in the market (Christensen, 1997).

Nowadays, there are emerging unprecedented innovation forms that encompass diversified social needs and political, economic and organizational issues. The frugal innovation (Bhatti, 2011) aims to contemplate the social role of innovation, as this main purpose is to develop products for the bottom-of-the-pyramid market, which is a low-income consumer market located mainly in emerging markets. This innovation covers the borders of social, technical and institutional innovations to establish a unique space that permits the development of a new research field within innovation studies. Thus, frugal innovations are positioned strategically to focus on serving the crescent bottom-of-the-pyramid market.

The development of low-price products and services are under specific local conditions and are not sub-standards products and services, as the production process is adjusted and adapted to the local conditions of this market share. The basis of the frugal innovation architecture of value is on resources' limitations, typical characteristic of emerging markets, and on three elements that explain the product suitability for the low-income consumer market, which are low manufacturing and material costs, the focus on basic functionalities and a minimum set of facilities. The product development converges with environmental idiosyncrasies, the production strategy and the market needs, as the products are for consumers with low purchasing power. In addition, frugal innovations support new production methods development, as organizations regard the resource constraints as opportunities to implement adequacies in the production system as well as to reduce costs of the production chain (Zeschky, Widenmayer, & Gassmann, 2014).

Green innovations are important strategic tools to meet with the environmental and sustainable trends and to enhance the productive systems performance, as green innovations enable the reduction of environmental loads and confer firms the green label, a sign of the firm's environmental sustainability practices. (Chen, Chang, & Wu, 2012). These innovations are linked to green products or processes, including innovations in energy-saving technologies, pollution-prevention, waste recycling, environmental protection, green product designs or corporate environmental management and social protection, which are related to an environmental sustainable development. The notably importance of green innovations appears in innovations surveys and enables to identify the currently organizational sustainable practices and map aspects that require further improvements (Chen et al., 2012; Mannheim Innovation Panel, 2009).

The last recent innovation presented is the social innovation, which results from social structure transformations to serve emerging needs from social groups. The innovation development results from social changes, as the organizational sphere is not the only innovative locus; social structures are also objects of innovations. Social innovations lead to different approaches concerning the innovation in social structures in different spatial scales (Bund, Gerhard, Hoelscher, & Mildenberger, 2015). Therefore, the Centre for Social Innovation (2016) defines social innovations as:

> Social innovations refer to the creation, development, adoption, and integration of new concepts and practices that put people and the planet first. Social Innovations resolve existing social, cultural, economic, and environmental challenges. Some social innovations are systems changing – they permanently alter the perceptions, behaviors, and structures that previously gave rise to these challenges. Even more simply, a social innovation is an idea that works for the public good.

In addition, social innovations have as main inputs the human creativity and symbolic resources, which leads to different measures of productivity, as this innovation is abstract in nature and is embedded in a social context that presents specific characteristics and culture. In order to measure and provide blueprints of social innovations, there are core factors that characterize social innovations processes, which are the social need structures, financial resources, political anchoring and support, and the social capital and networks. The first and the second factors affect the social innovation processes, as the social needs are the main inputs and the starting point for conceptualizing the content of the social innovation and the financial resources' availability sustains the social innovation continuity. The third factor is the political anchoring, which refers to the important role of political institutions to support, and, in some cases, confers legitimacy to the innovation. Lastly, the fourth factor is the social capital, that is, in this context, the source for mobilizing actors and the public sector to the acknowledgement and the action on the social need (Bund et al., 2015).

The configuration of these determinants states the characteristics of the social innovation systems that assures social transformations and changes. Therefore, the aim of the social innovation, as presented in the definition, is to provoke modifications and possible ruptures in a social context, focusing on the role of the social needs (Bund et al., 2015).

This section explains the nature and the aims of innovation, considering the definitions of radical, incremental and disruptive innovations, as well as the frugal, the social and the green innovations, contemporary forms of innovations that comprehend the globalization context and provide solutions for economic and social issues. The next section presents the innovation types, which are product, encompassing goods and services, process, Marketing and organizational innovations, their characteristics and functionalities and their performed roles in the organizational context.

2.5. THE INNOVATION TYPES

The OECD Oslo Manual (2005) is the primary international basis of guidelines and a fundamental reference source to describe, identify and classify innovations at the firm level and for defining and assessing innovation activities. The European Statistical System bases the Community Innovation Survey on the guidelines presented on this manual in order to evaluate

the innovation development among EU nations as part of the EU science and technology statistics. The Oslo Manual presents four different types of innovation divided into technological, product and process innovations, and non-technological, Marketing and organizational innovations.

In this sense, product innovation is "the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements on technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics" (OECD, 2005, p. 48). It is important to note that new products and services differ significantly in their characteristics or intended uses from the previously versions produced by the firm and their development require an extensive use of technology and an intense working process on R&D, to enlarge the market share and to serve unexplored market niches (OECD, 2005).

The sequential process of the product development begins in a fuzzy front-end phase, in which firms recognize opportunities, generate ideas, conduct further investigation required to develop a new product or to provide significant modifications on it, and is punctuated by uncertainties in relation to the results from the research development and the idea generation (Boeddrich, 2004; Verworn et al., 2008). The subsequent phase is the production process of the innovative product. In this phase, firms mobilize resources, technology resources and distinctive competences and capabilities that permit the manufacturing and the commercialization of the new or significantly improved innovative product (OECD, 2005; Tidd & Bessant, 2015). The innovation generation conceptualization comprehended into the fuzzy front-end phase and the production phase aims to explain the distinctive characteristics within firms that support this process (Verworn et al., 2008).

The process innovation is, in turn, "the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software" (OECD, 2005, p. 49). The main finalities of process innovations are to decreasing unit costs of production or delivery and to increasing quality to produce or deliver new or significantly improved products (OECD, 2005). In the same vein, Utterback and Abernathy (1975) state that the unit cost reduction from the innovations in process and systems is the principal incentive for their continued improvement and development, which results in an increasingly specialized system, from which economies of scale in production and the development of mass markets are essential.

The first non-technological innovation presented is the Marketing innovation that is "the implementation of a new Marketing method involving significant changes in product design or

packaging, product placement, product promotion or pricing" (OECD, 2005, p. 49). The product design innovations are the changes in the product form and appearance as well as in products' packing, without altering the product's functional or user characteristics. Subsequently, the product placement refers to the introduction of new sales channels, which are the methods used to sell products, not dealing with logistics methods. The product promotion aims to use new concepts to promote the products of the firm and Marketing innovations in pricing are the use of pricing strategies to commercialize the products of the firm, in order to obtain advantages over competitors (OECD, 2005).

The organizational innovation is, thus, "the implementation of a new organizational method in the firm's business practices, workplace organization or external relations" (OECD, 2005, p. 51). Examples of organizational innovations are, according to Gunday, Ulusoy, Kilic, and Alpkan (2011, p. 663):

> . . . the introduction of practices for codifying knowledge by establishing databases of best practices, lessons learnt and other knowledge, so that they are more easily accessible to others: the introduction of training programs for employee development and improved employee retention or the initiation of a supplier development program.

The organizational innovations are of two different kinds, although these usually interrelate. The first are the structural innovations, which "encompass responsibilities, accountability, command lines and information flows. They change the number of hierarchical levels, the divisional structure of functions or the separation between line and support functions" (Wengel, Lay, Nylund, Bager-Sjoegren, Stoneman, Bellini, Bonaccorsi, & Shapira, 2000, p. 2). Wengel et al. (2000, p. 2) state that managerial innovations impact on:

> . . . operations and procedures of the enterprise such as the specifications of the responsibilities, the contents of commands and of information flows and the way they are dealt with. They concern speed and flexibility of production and the reliability of products and production processes.

Innovations appear in different organizational levels, in sub unit levels, the departments or functions of a firm, in organizational levels, the firm as a whole, or in the relationships between the firm and its environment, specifically referring to the interaction amid the firm and other firms or institutions (Wengel et al., 2000). Figure 7 illustrates this dynamic:

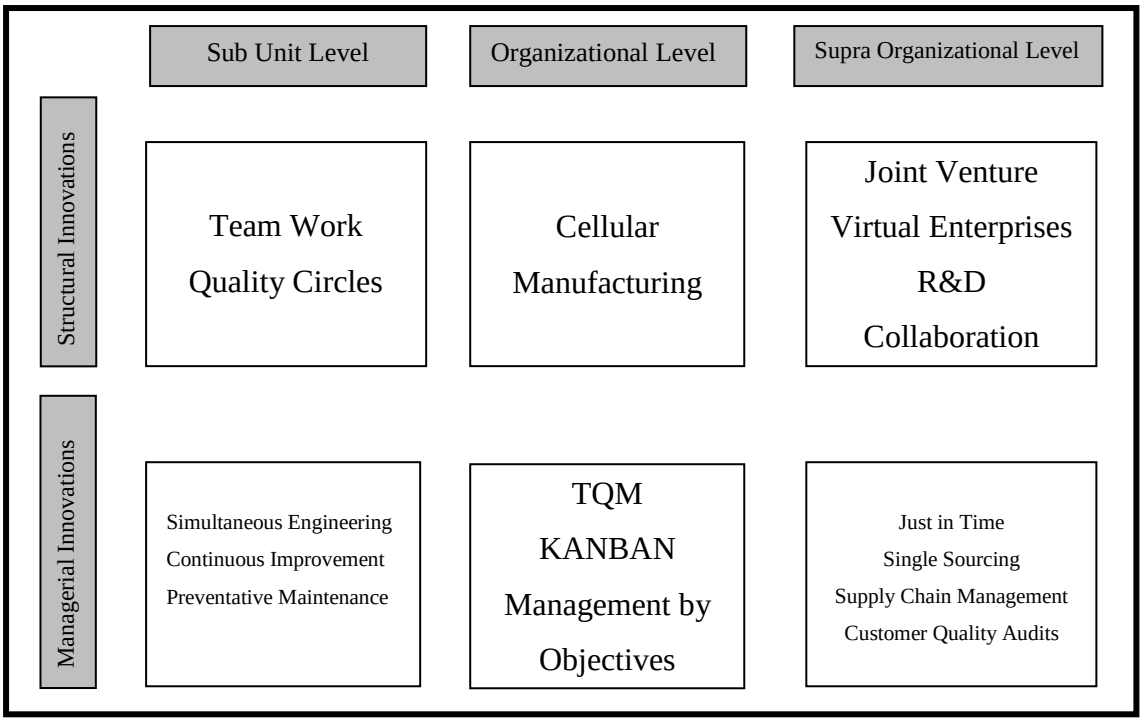


Figure 7: Classifying Organizational Innovations

Source: (Wengel et al., 2000, p. 3).

Atalay, Anafarta and Sarvan (2013), Gunday et al. (2011), Hashi and Stojčić (2013) and Mothe and Thi (2010) acknowledge the important analysis of the relationships between innovation types and the firm performance, considering several indicators of organizational performance in order to investigate the organization's innovativeness strategies to obtain sustainable competitiveness in their markets. The aim to establish relations between technological and non-technological is to enhance the organizational productivity, which results in impacts that lead to internal changes of practical relevance.

The empirical findings direct to different conclusions concerned to the innovation types and the firm performance relation. Atalay et al. (2013) concluded, from the Turkish automobile supplier industry, that product and process innovations positively and significantly affect the firm's performance, which confirms the characteristics of the industry. This sector is capital-intensive and based on mass production, hence centers the efforts on the technological development, aiming its continuity in the value chain and the performance improvement. This, therefore, leads to an insignificant effect of the non-technological innovations, as the industries of the sample do not hold a Marketing department or a specialized management with innovative functions in reason of the property characteristic of these firms: they are family owned.

Gunday et al. (2011) present another study concerning Turkish manufacturing firms. The research presents that the innovation development positively affects the innovative performance. This finding supports the hypothesis that shows a positive correlation among

organizational innovations with process and Marketing innovations, which focus on the importance of organizational innovations to the development of other types of innovations. There are also positive evidences that suggest process innovations are related to product innovations, which corroborates with previous findings that correlate technological innovations and improved performance in sales and export rates (D'Angelo, 2012; Roper & Love, 2002). From technological innovations, product innovations play a significant role in the firm innovative performance as well as Marketing and organizational innovations. This confirmation claims for attention on non-technological innovations, as they sustain innovative capabilities.

The EU, through The Lisbon Strategy (2000), aimed to enhance the R&D investments and the innovation development among the European nations to position Europe competitively worldwide. In furtherance of exploring the relation amid the innovation development and the firm performance, Hashi and Stojčić (2013) present evidences from the Community Innovation Survey 4, with firms from the Western Europe and from Central and Eastern European Countries, affirming that there are different levels of innovation development within enterprises from these groups. The comparative perspective presents that firms from the Central and Eastern European Countries are lagging behind. The common findings from these groups are that investments in innovation activities are related positively to new product development, which is attested with the sales proportion and the high productivity level of firms. It is also observed that Marketing and organizational innovations influence product innovation and enable the access to subsidies in innovation activities.

In the same line, Mothe and Thi (2010) analyze results from the Community Innovation Survey 4, from the period of 2002 to 2004, with firms from Luxembourg, focusing on the importance of non-technological innovations in the iterative character of innovation processes. The findings state the importance of Marketing and organizational innovations to the development of new or improved products; however, they do not present effects on the sales performance, which, therefore, is not related to a positive innovative performance.

In sum, these studies present different perspectives, attained to the country-level economic development, concerning the role of technological and non-technological innovations to the innovative performance, which may affect the firm's performance. Their main contribution lies in the supporting characteristic of non-technological innovations to the development of technological innovations. The role of the strategic management and organizational arrangements, as well as the development of a sustainable knowledge basis to conduct, among other tasks, further market researches also support the development of technological innovations. The organizational capabilities, the technology resources and the

R&D investments conduct the process innovation and the product development. This systematic approach, therefore, sustain the competitive advantage of firms in their domestic and international markets.

This section presents the innovation types, according to their nature, classified as technological and non-technological innovations. The analysis and the development pattern of product, process, Marketing and organizational innovations enables the comprehension of the innovative performance of the firm and sustains competitive advantages in their markets. Moreover, the relationship among the innovation types leads to interesting results that grounds the overall innovation development. In ideation of finding other evidences, the study of this relationship claims for further research. The next topic aims to present the clusters and business networks as promoters of the regional economic development and innovative perspectives present in these organizational dynamics.

2.6. THE GOVERNMENT ROLE FOR CLUSTERS DEVELOPMENT

Clusters and business networks play a vital role on the innovation development (Porter, 1998). The enterprises' increased innovation capacity is related directly to the strategic location of existing clusters based on innovation networks, composed by enterprises from different economic sectors, universities and research institutes that promote the exchange of knowledge and the centrality in the sharing of information. The results, arising from the knowledge exchange, are the generation of competitive advantages for the participating companies, technology and management improvements on technology and new business opportunities, which reflect the relations established among enterprises. The business ties developed among different actors are important elements for innovation, as knowledge and information diffusion occurs as the result of the proximity of the business ties (Bell, 2005).

Apart from clusters and business networks, technology centers are also forms of cooperation and collaboration defined as locations that concentrate knowledge-intensive enterprises, belonging to technology-based sectors or incubators, as well as universities and research institutes, in which the relationships among these participants aim the generation of positive externalities (Naretto, Botelho, & Mendonça, 2004). Technology centers constitute important economic flags, as they promote the visibility of their region as well as allow the

expertise mapping, thus requiring from the government public policies that support and strength partnerships among universities and research institutes. This initiative fosters the innovation progress continuity and leverages key areas of the participating enterprises, such as innovation teams and R&D. In this sense, the finality of public policies is to maintain the agglomerations' sustainability and facilitate investments of private and public institutions on innovative idealizations (Medeiros, Mattedi, & Marchi, 1990).

Oliva, Sobral, Santos, Almeida and Grisi (2011) defend the importance of the incubators of technology-based firms as means to support fledgling firms in their technological and innovative trajectory. The proposed model aims to determine the probability of innovation of technology-based firms from an incubator from the state of São Paulo. The results present that the main challenge faced by these new firms is related to lack of updated knowledge for the innovation development and that this group of firms have as main characteristic the innovative power to deal with the market trends. In this regard, the incubators of technology-based firms are important governmental agencies to foster the innovation as means of national growth.

The establishment of determined economics activities reinforces the regional economic development. In the interest of organizing and systematizing the regional industrial arrangement, the government can support and anchor the emergence of industrial districts. Thus, public policy makers are able to identify the main industrial sectors and elaborate policies to promote their stability, permanence, competitiveness and visibility. The presence of specific industrial sectors corroborates with a certain productive logic and dominates the local business structure that can uphold the emergence of SMEs, as universities' spillovers or enterprises aimed at providing services for industrial concentrations. Additionally, industrial districts demand governmental initiatives, such as business and science parks, training centers, quality control agencies and technology dissemination centers (Guerrieri & Pietrobelli, 2006).

The structural differences related to the information flow in business networks and in specific characteristics of the firms, such as size and performance, can affect the structural position of the firm in business networks and clusters. The informal ties established among enterprises within these organizational dynamics determine the internal knowledge density, which is independent of geographical proximity and focus on only a few number of enterprises. Effective support policies for clusters and business networks consider the feasibility of access for enterprises to sources of knowledge and information to promote the innovation development (Morrison & Rabellotti, 2009).

The assistance programs from the government also foster the internationalization process, providing support for managerial exporting activities and information about foreign

markets, the economic international context and market data. These supports positively influence the individual and the collective performance of SMEs in the early stages of international activities, as they provide means to the development of international activities. In addition, funding is also essential to provide SMEs' support in early stages of their international activities. The distinctive characteristic of government assistance programs for conducting international activities is the long-term positive impact on SMEs. Initially, resources and capabilities to explore international markets are limited, which means the strategic role of the governmental support is going to be perceived at the period of the organization's international integration (Shamsuddoha, Ali, & Ndubisi, 2009).

Although industrial policies are of great importance, there are mistakes concerning their formulation, such as the focus on short-term policies that privilege the exchange rate management to mitigate the currency fluctuation effects in commercial relations and on measures for commercial and trade control on the defense against external competition. The effectiveness of public policies in order to add concrete and measurable results on the innovative processes depends on the development of scientific and technology policies, regulatory adjustments, export promotion and the establishment of international networks. Thus, the results of these long-term policies are going to present an expected return after generations of enterprises benefiting from these initiatives (Mazzaro, Oliva, Grisi, Drouvot, Crispim, & Gaspar, 2009).

This section presents the important role of clusters and business networks for the innovation development and emphasizes the government intervention in order to foster the innovation dynamics in these agglomerations. The interaction among enterprises with other enterprises, Universities and research institutions also reinforces the importance of the co-innovation. The next topic aims to present the sectoral specificities and the innovative performance. This topic, consequently, draws together the evaluation of innovation in a sector-level, thus presenting the technological content and the innovative potential within a paradigm and a determined context.

2.7. THE SECTORAL SPECIFICITIES FOR INNOVATION

The understanding of the innovative environment characteristics shed light on the establishment of parameters to understand the differences concerned to the industrial sectors, focusing on the timing and direction of the technological change. According to Campos and Ruiz (2009), the economic literature presents the inter-industry differences in technological innovation focusing on different objects of analysis, the service firms and industries. The neoclassical tradition states that the technical progress is an exogenous factor to the economic phenomenon. The industrial economy perspective presents that the pace of technological change is associated with determined characteristics of the market and the evolutionary tradition affirms that the technical progress is as a phenomenon endowed with an own logic. These economic perspectives provide basis for the comprehension of sectoral differences in the technological and innovative performance.

The theoretical construct that explains the innovative performance in industries and services encompasses the technological paradigm, which refers to the existence of major technologies that create opportunities and constraints for the innovative activities and business strategies of economic agents. The technological paradigm is related to the dynamic behavior of the national system and the growth potential that radical technologies entails, thus the exploitation of the technological and the economic potentials along with established directions composes the technological trajectories. The Fordist paradigm refers to the post-II World War era. The radical technology and innovations developed during this period were based on the petrochemical technology and the internal combustion engine, which is the base for mass-producing sectors that employ these technologies on a large scale (Campos & Ruiz, 2009; Castellacci, 2008).

The ICT paradigm dates from the last decades and its main characteristic is the intensive use of the Internet and telecommunications technologies that enhance the exchange of knowledge and information, sustain the emergence of multimedia services and provide support to management systems (Dai, 2009; Sahandi, Alkhalil, & Opara-Martins, 2013). Currently, the ICTs tools are accessible to SMEs due to their low cost. The ICTs tools sustain an increasing in the organizational performance, together with other advantages, such as the adoption of new technologies, the cost reduction, the development of innovative processes and the deployment of organizational changes (Sahandi et al., 2013).

The sector-specific nature of innovation is interrelated to a historical period. The industrial sectors that have a solid knowledge base and capabilities obtain further advantages and appropriability of radical innovations and a set of opportunities, which converges to dynamic trajectories. The opposite situation circumscribes industries with a low degree of innovation development, due to a lesser degree of technology utilization and the absence of radical innovations that provoke changes in their productive systems and organizational context, converging to a less dynamic pattern of innovation (Castellacci, 2008).

In order to analyze the sectoral innovation patterns, Pavitt (1984) provides the basis to evaluate the technology utilization, the innovation development and the characteristics of the manufacturing sector. This taxonomy supports other classifications, as Castellacci (2008) presents in the study of the European firms. The taxonomy of sectoral patterns of innovation in manufacturing and service industries present different indicators to measure and assess the innovation development among groups of firms. These indicators are part of the technological regimes, which are the opportunity level and the degree of appropriateness and technological trajectories, listed as the type of innovation, the innovation expenditure and strategies, thus important to develop the taxonomy of sectoral patterns of innovation and emphasize the relationship amid the vertical chain and the technological content within the sectors. The appropriability regimes are, according to Teece and Pisano (1994, pp. 551-552):

> Appropriability is a function both of the ease of replication and the efficacy of intellectual property rights as a barrier to imitation. Appropriability is strong when a technology is both inherently difficult to replicate and the intellectual property system provides legal barriers to imitation. When it is inherently easy to replicate and intellectual property protection is either unavailable or ineffectual, then appropriability is weak.

Castellacci (2008, p. 983) presents the first group of manufacturing industries, the Advanced Knowledge Providers, defined as “great technological capability and a significant ability to manage and create complex technological knowledge”. There are two subgroups within this group that are, within manufacturing, specialized suppliers of machinery, equipment and precision instruments and within services enterprises, providers of specialized knowledge and technical solutions, like software, R&D, engineering and consultancy, also known as knowledge intensive services. Both subgroups are composed by innovative organizations; also, services enterprises provide advanced technological knowledge and technical solutions to other industrial sectors.

The second group is the Supporting Infrastructural Services, characterized to “produce intermediate products and services rather than items for personal consumption. Where they differ from advanced knowledge providers is in terms of their technological capability,

especially their more limited ability to develop new knowledge internally" (Castellacci, 2008, p. 985). There are two subgroups of enterprises in this group, the providers of distributive and physical infrastructure services and the providers of network infrastructure services. In sum, the Advanced Knowledge Providers and the Supporting Infrastructural Services are the supporting infrastructure groups. These groups have a strong knowledge base, innovative process and technological development; however, the distinctive characteristic is that in the former there is the effective development of the aforementioned capabilities, while the latter intensively uses the capabilities to enhance the quality of their manufacturing process and services.

The subsequent group is the Mass-Production Goods, defined as ". . . a key part of the manufacturing branch. They may be located at an intermediate stage of the vertical chain, since they produce both final goods and intermediate products used in other stages of the production process" (Castellacci, 2008, p. 985). Based on Pavitt (1984), Castellacci (2008) presents the sub-groups, which are the scale-intensive industries, characterized as generally possessing their own R&D facilities and developers of innovation with specialized suppliers, and the science-based sectors, defined as firms that progress in the development of technologies and innovative processes in the same pace of the academic and scientific advances. The exploitation of economies of scale assures the profitability of the Mass-Production Goods group, and the production of technologically advanced and innovative products, together with the pursuance of specialized solutions for serving the Advanced Knowledge Providers reiterates the importance of this group of enterprises for national economies.

The fourth group is the Personal Goods and Services, composed by manufacturing industries and services enterprises that have "a lower technological content and a more limited ability to develop new products and processes internally. Their dominant innovation strategy is typically based on the acquisition of machinery, equipment and other types of external knowledge produced by their suppliers . . . " (Castellacci, 2008, p. 986). The producers of personal goods and the providers of personal services are typically small and receive advanced knowledge from their suppliers, due to the absence of their internal R&D activities. The commonly strategy of this group is to maximize the implementation of existing technologies to increase the efficiency of the production process and to improve the quality of their goods and services and to enable the extension of the industry-life cycle of these manufacturing industries and service enterprises. Table 7 presents the characteristics of these taxonomies:

Sectoral Category	Sub-Groups Within Each Category	Typical Core Sectors	Major Function and Relationship to Technological Paradigms	Technological Regimes	Technological Trajectories
Advanced Knowledge Providers	Knowledge-intensive business services	Software; R&D; engineering; consultancy	The supporting knowledge base of the ICT paradigm	*Opportunity level:* very high *External sources:* users and universities *Appropriability:* know-how; copyright *Dominant firm size:* SMEs	*Type of innovation:* new services; organizational innovation *Innovation expenditure and strategy:* R&D; training; cooperations
	Specialized suppliers manufacturing	Machinery; instruments	The supporting knowledge base of the Fordist paradigm	*Opportunity level:* high *External sources:* users *Appropriability:* patents; design; copyright *Dominant firm size:* SMEs	*Type of innovation:* new products *Innovation expenditure and strategy:* R&D; acquisition of machinery; software purchase
Mass Production Goods	Science-based manufacturing	Electronics	The carrier industries of the ICT paradigm	*Opportunity level:* high *External sources:* universities and users *Appropriability:* patents; design; copyright *Dominant firm size:* large	*Type of innovation:* new products and organizational innovation *Innovation expenditure and strategy:* R&D; cooperations
	Scale-intensive manufacturing	Motor vehicles	The carrier industries of the Fordist paradigm	*Opportunity level:* medium *External sources:* suppliers and users *Appropriability:* design; process; secrecy *Dominant firm size:* large	*Type of innovation:* mixed products and process innovation *Innovation expenditure and strategy:* R&D; acquisition of machinery

Sectoral Category	Sub-Groups Within Each Category	Typical Core Sectors	Major Function and Relationship to Technological Paradigms	Technological Regimes	Technological Trajectories
Supporting Infrastructure Services	Network infrastructure services	Telecommunications; finance	The supporting infrastructure of the ICT paradigm	*Opportunity level:* medium *External sources:* suppliers and users *Appropriability:* standards; norms; design *Dominant firm size:* large	*Type of innovation:* mixed process, service and organizational innovation *Innovation expenditure and strategy:* R&D; acquisition of software; training
	Physical infrastructure services	Transport; wholesale trade	The supporting infrastructure of the Fordist paradigm	*Opportunity level:* low *External sources:* suppliers *Appropriability:* standards; norms; design *Dominant firm size:* large	*Type of innovation:* process *Innovation expenditure and strategy:* R&D; acquisition of machinery and software
Personal Goods and Services	Supplier-dominated goods	Textiles and wearing	They enhance the quality of final products and services by acquiring and embodying technologies related to different paradigms	*Opportunity level:* medium *External sources:* suppliers and end users *Appropriability:* trademarks; design; know-how *Dominant firm size:* SMEs	*Type of innovation:* process *Innovation expenditure and strategy:* R&D; acquisition of machinery and software
	Supplier-dominated services	Hotels and restaurant		*Opportunity level:* low *External sources:* suppliers *Appropriability:* non-technical means *Dominant firm size:* SMEs	*Type of innovation:* process *Innovation expenditure and strategy:* R&D; acquisition of machinery and training

Table 7: The Main Characteristics of the Various Sectoral Subgroups in the New Taxonomy

Source: Castellacci (2008, pp. 984-985).

The synthesis of the taxonomies' characteristics aims to present the sub-groups within each category, the typical core sectors, the major function and relationship to technological paradigms, the technological regimes and the technological trajectories. This framework provides the necessary clarification in order to comprehend the abovementioned groups.

This section presents the sectoral specificities and the innovative performance in industries and service enterprises. The characteristics present within the groups shed light on the comprehension of the innovative performance concerned to leading firms and followers firms in reference to the innovative performance and technology use, from different industries and services sectors. The explanation and the taxonomy perspectives provide basis to comprehend and analyze the characteristics within the categories and the elements that differ each group in the vertical chain. The next section aims to present the Dynamic Capabilities Approach, focusing on the firm's innovation development.

2.8. THE DYNAMIC CAPABILITIES FOR INNOVATION

The article of Teece et al. (1997) presents the dynamic capabilities approach. In this work, there is the conceptualization and the development of the dynamic capabilities, which are important for the comprehension of this approach. The introductory presentation of this approach is in Teece and Pisano (1994), which presents the delimitations of the dynamic capabilities, thus considering the firm-level scope of analysis. In order to comprehend the introductory as well as the advanced articles, it is first presented the context in which the dynamic capabilities approach is developed and, therefore, inserted, and the theoretical assumptions that sustain this framework.

The initial issue addressed by the dynamic capabilities approach is that, according to Teece et al. (1997, p. 509) "strategic theory is replete with analysis of firm-level strategies for sustaining and safeguarding extant competitive advantage, but has performed less well with respect to assisting in the understanding of how and why certain firms build competitive advantages . . . ". In this sense, the positioning of the dynamic capabilities approach is to provide basis to comprehend the intra-firm performance that leads to the success and to the failure, also presenting managerial practices that support the dynamic capabilities of the firm. The context

of the dynamic capabilities approach is a changing environment, described in Teece and Pisano (1994) and Teece et al. (1997) as a Schumpeterian context. This is marked by the intense innovation-based competition, the rivalry based on price and performance and the process of "creative destruction" (Schumpeter, 1976, p. 81) of existing competences and the fall and rise of firms due to the technological progress.

In order to posit the analysis of the dynamic capabilities approach in the strategic management field, Teece et al. (1997) present the previous theories from this field, which are the competitive approach (Porter, 1980, as cited in Teece et al., 1997), which focuses on the actions of the firm to create competitive advantages, focusing on industry-level forces. These forces can work for or against firms from a determined sector or subsector. Thus, the economic rents (economic profits) are at the industry level. The attractiveness of an industrial sector or subsector is according to the level of structural impediments to competitive forces. In addition, there is the strategic conflict approach (Shapiro, 1989, as cited in Teece et al., 1997), which uses tools from the game theory to explain how firms destabilize rivals and change the organizational environment through strategic actions. The effectiveness of the strategic actions is related to the sunk costs firms have to do in order to obtain competitive outcomes. These are models of strategy emphasizing the exploitation of market power.

The resource-based view, according to Teece et al. (1997, p. 510), "emphasizes firm-specific capabilities and assets and the existence of isolating mechanisms as the fundamental determinants of firm performance". The resource-based view (Penrose, 1959, as cited in Teece et al., 1997) focuses on the firms' difficult-to-imitate idiosyncratic resources. The focus of this model is "on the rents accruing to the owners of scarce firm-specific resources rather than the economic profits from product market positioning" (Teece et al., 1997, p. 513). The dynamic capabilities approach (Teece & Pisano, 1994; Teece et al., 1997) is, along with the resource-based view, models of strategy emphasizing efficiency. In this sense, Teece et al. (1997, p. 510) present the primary efforts in reference to the "dynamic capabilities" approach, in order to "to stress exploiting existing internal and external firm specific competences to address changing environments". The primary efforts of the dynamic capabilities approach aim to identify "the dimensions of firm-specific capabilities that can be sources of advantage, and to explain how combinations of competences and resources can be developed, deployed, and protected".

The definition of "dynamic capabilities", according to Teece et al. (1997, p. 516), is "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments". The internal and external competences are, in this definition,

the firm's specific and difficult-to-imitate idiosyncratic resources. The organizational routines and core competences determine the business and the production of the final good or service and the firm's distinction amid its competitors due to the difficult of replicating these factors. The factors of production are also considered; however, they are not at the firm-specific level. The firm, in this approach, is viewed as the internal organization of cooperative and learning activities, also encompassing organizational and managerial processes through integration. The capability of the firm, to be strategic, has to "be honed to a user need (so there is a source of revenues), unique (so that the products/services produced can be priced without too much regard to competition) and difficult to replicate (so profits will not be competed away)" (Teece et al., 1997, p. 517). In addition, the competitive advantages of the firm reside in the managerial and organizational processes, asset position and paths:

> By managerial and organizational processes, we refer to the way things are done in the firm, or what might be referred to as its routines, or patterns of current practice and learning. By position we refer to its current specific endowments of technology, intellectual property, complementary assets, customer base, and its external relations with suppliers and complementors. By paths we refer to the strategic alternatives available to the firm, and the presence or absence of increasing returns and attendant path dependencies. (Teece et al., 1997, p. 518).

The dynamic capabilities approach, according to Teece et al. (1997) is a model of strategy emphasizing efficiency, focusing on the firm-level unit of analysis. The strategy analysis converges to the organizational environment situation, which is dynamic and rapid changing. The competitive advantages of the firm come from the processes, the paths and the position of the firm, characterized as inherent to the firm. This orientation diverges from the models of strategy emphasizing the exploitation of market power, which means firms have competitive advantages from the industrial sector or subsector attraction and entry barriers.

Therefore, in the dynamic capabilities approach, the focus is on the firm, its resources, core competences and organizational routines, which confer to the firm sustainable competitive advantages in comparison to their competitors. The competitive advantages also rely on the managerial competence of the firm, in analyzing the organizational context to establish the strategy. The dynamic capabilities are inherent to the firm, are difficult-to-imitate and the process of achieving the internal capabilities are dependent on the firm and its knowledge management. In addition, they provide business opportunities and possibility of diversification in case of reduction of the firm's markets (Teece et al., 1997).

Makadok (2001) places the debate about the resource-picking and the capability-building mechanisms. The resource-picking mechanism states that firms have heterogeneous resources that present differentials in terms of productivity. The possession of the resources in

the resource-picking mechanism confers the firm its productivity and the decisions to acquire resources are established previously. In other words, the firm decision in acquiring a resource is due to its potential of creating rents and this process relies on the skills of the firm to acquire strategic and rent-generating potential resources. The capability-mechanism, in turn, focuses on the distinctive characteristic of a capability, which is a resource embedded in the organizational process that enables the strategic deployment of the resources due to its non-transferability, as the capability is an idiosyncratic component of the firm.

According to Eisenhardt and Martin (200), the dynamic capabilities are defined in a similar way of Teece et al. (1997). In this regard, the proposed definition is:

> The firm's processes that use resources—specifically the processes to integrate, reconfigure, gain and release resources—to match and even create market change. Dynamic capabilities thus are the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die (Eisenhard & Martin, 2000, p. 1107).

In order to exemplify the functions of the dynamic capabilities, Eisenhardt and Martin (2000) presents that dynamic capabilities integrate resources during the product development routines, this being particularly important for the innovation development, reconfigure resources when there is an organizational reconfiguration. Yet, dynamic capabilities reallocate resources in organizational processes of changing assets, coevolve, in the sense of the strategic management to redefine the business and realign organizational tasks. The dynamic capabilities are, thus, inherent to the firm and deployed according to the firm's organizational activities. The dynamic capabilities for innovation, in this regard, contributes to the innovation development, as this activity deploys internal and external competences, resources and organizational processes that converge to the innovative efforts of the firm (Guan & Ma, 2003).

This chapter presents the innovation process and the dynamic capabilities of the firm. The subsequent chapter is the Research Model. This chapter contemplates the analysis of the research questions that sustain the propositions of the research model. The research model also aims to present the identified literature gap and the contributions of this research.

3 THE RESEARCH MODEL

The third chapter aims to present the research model and the research questions. The general objective of this Dissertation is to explore the relationship between the innovation orientation and the internationalization patterns of small and medium enterprises (SMEs). This research contributes to the literature by empirically investigating what the dynamic capabilities for innovation of Brazilian technology-based SMEs are and how they drive the technological and non-technological innovation development, thus focusing on the product development. The study also contemplates the analysis of the dynamic capabilities for innovation inherent to distinct SMEs' internationalization patterns.

3.1. INNOVATION FOR THE BUSINESS INTERNATIONALIZATION

The innovation development is the core competence of technology-based firms and is among the main drivers to foster the firm's international expansion. Innovative products are competitive due to their embodied technologies that lead to their differentiation in international markets (Cerrato, 2009; Chetty & Stangl, 2010; Colovic, 2013; D'Angelo, 2012; Esteve-Pérez & Rodríguez, 2013; Gashi et al., 2014; Gerschewski, Rose, & Lindsay, 2015; Guan & Ma, 2003; Halilem, Amara, & Landry, 2014; Karadeniz & Goeçer, 2007; Kylaeheiko, Jantunen, Puumalainen, Saarenketo, & Tuppura, 2011; Loefgren, 2014; Oxtorp & Elg, 2015; Pla-Barber & Alegre, 2007; Poblete & Amorós, 2013; Rammer & Schmiele, 2009; Rodríguez & Rodríguez, 2005; Roper & Love, 2002; Sass, 2012).

The market competitive advantages of the firm arise from its innovation orientation to develop new products, supported by the generation of knowledge and the technological skills. According to Pla-Barber and Alegre (2007), Massa and Testa (2011), Sedoglavich (2012) and Li et al. (2012), high-tech firms are intensive developers of technological innovations, placing this process as the strategic asset for the continuous flow of new products' generation. The main source of revenues of technology-based firms is related directly to the markets' extension and whether the domestic market is limited, internationalization becomes strategic.

According to Kylaeheiko et al. (2011), firms focusing on the product innovation development for the international market expansion possess inherent resources that foster the

innovation process. Due to entrepreneurial motives, the firm employs and combines unused and inherent resources to foment the innovation process, which is the exploitation of economies of scope; this endeavor also triggers the formulation of internationalization strategies to foreign market expansion. Yet, SMEs that possess a strong technological appropriability regime ensures the growth and the market expansion of the firm. Considering the Penrosian theory (1959), the consolidation of the market competitive advantages of the firm lies in the firms' employment of scarce resources, such as the technological capabilities and the innovation orientation. Based on a survey with French SMEs from the biotechnology sector, Pla-Barber and Alegre (2007) affirm that high-tech firms present an early internationalization process to compete for greater market shares for the firms' innovative products and to obtain resources from foreign markets. The early internationalization of high-tech firms also aims to get the return on investment throughout the innovation process and to achieve economies of scale, maximizing the production process to serve foreign markets.

The advancements of Pla-Barber and Alegre (2007) corroborates the results of the studies of Massa and Testa (2011) and Sedoglavich (2012), with regard to the importance of technological resources and scientific and innovation development as the main sources of competitive advantages for the internationalization process of technology-based SMEs. The variable size, even if decisive for the analysis of the export performance, is a secondary variable when compared with the rare resources and skills present in high-tech firms. The export performance, therefore, is subject to the differential resulting from the development level of high-tech firms and the beginning of international projection, as radical innovations in products must reach the greatest number of markets.

According to D'Angelo (2012), from a literature review about the export intensity as resulting from the innovation development, indicators such as investments in R&D, specialized human resources and technical equipment, throughput innovation such as patents and trademarks and innovation output, the number and the type of innovations registered in a given period, presents different results among countries. This finding is based on existing differences in the organizational environment, formed by the legal system, the governmental support for enterprises and the industrial infrastructure. The export performance, when positively related to innovation, is mainly due to firms' investments directed to the R&D development, external innovation sources and the type of product and process innovation.

Thus, from a survey with Italian high-tech SMEs, D'Angelo (2012) presents that there is a strong correlation between R&D employees and the intensity of exports, as well as external sources of R&D, in particular universities and partnerships, which corroborate to the

development and exchange of knowledge between companies and universities. The results converge with other studies of the same scope of analysis (Pla-Barber & Alegre, 2007; Chetty & Stangl, 2010; Oxtorp & Elg, 2015).

Chetty and Stangl (2010) present an internationalization process model of firms from New Zealand in function of the firms' technological innovation process. The trajectory of this process is related directly to the international projection of the firm in niche markets, implying therefore in a strategic position focused on the continuous improvement of the innovation development to ensure market competitiveness. Additionally, the role of business networks positively supports the firms' international projection, since, given the geographical distance, the entry process in international markets requires the business networks' mediations. Thus, this study presents the possible combinations between the firms' characteristics of the innovation development and their internationalization process.

Chetty and Stangl (2010) present the first group, which is the group of born global firms, developers of radical innovations, which rely on multiple supporting business networks to drive the innovation development, the processes of markets' selection and the mediation in trade relations. The innovation development process of the firms' goods and services is the result of strategic alliances formed with large multinational corporations, which was, therefore, subsequent to the internationalization process. Among the main markets of this group, are the USA and the UK, distant geographically, but psychically nearby (Johanson & Vahlne, 1977; 2009). The second group also consists of born global firms, which have similar characteristics to the first group regarding the internationalization process, such as the firms' market niche and multiple business networks, composed of multinational corporations, customers and financing firms. However, this group of firms places the development of incremental technological innovations as prior to the international expansion of markets.

According to Chetty and Stangl (2010), the third group is the traditional pattern firms (Bell et al., 2003; Johanson & Vahlne, 1977). This group of firms develops radical innovations jointly with customers, reflecting a greater engagement of the firms with their networks. Although this group of firms focuses on the radical innovation development, the main obstacle to the rapid international expansion was, first, restriction of funds for this purpose. After overcoming this obstacle and the capitalization of the radical innovation development process, the firms, due to the lack of necessary information about the technological development of their industrial sector, recognized the divergence amid the estimated time for obtaining funds and the process of launching products in the market, thus resulting in competitive disadvantages for this group of firms. The fourth group of firms also present the traditional internationalization

process and focuses on the incremental innovation development, a subsequent process to entry into foreign markets. This group of firms has close relationships with their networks and multinational corporations, which support the innovation development.

In accordance with Chetty and Stangl (2010), Gerschewski et al. (2012) also present a comparative model for the traditional pattern firms and the born global firms, based on the Resource-Based View Theory and International Entrepreneurship. This model presents results consistent with the advancement of the theories, which consider three different indicators for measuring the international performance, which are the financial and operational performance and organizational effectiveness, which support positively the innovativeness and proactiveness, thus incurring in competitive advantages for firms, also related to the progress of the internationalization process. The model incorporates further factors to the abovementioned indicators, which are the "attractiveness of international markets" and "international entrepreneurial orientation", also including "perseverance" as an entrepreneurial characteristic. The study shows that organizational learning drivers and business networks are not decisive for the international performance, acting, therefore, as secondary determinants.

Oxtorp and Elg (2015) analyze the internationalization process of born global firms through strategic alliances with multinational corporations, considered essential for the exchange of technological knowledge and the firms' inclusion in promising business networks to expand the markets. Multinational corporations, major players in international markets, have increased market power, greater technological innovation and more experience in negotiations for the development of co-innovations. Born global firms, in turn, are in a lower degree on how to operate in partnerships, especially when they involve asymmetries, since, given the bargaining power of multinational corporations, there is the need to analyze how to establish partnerships for development of co-innovations, considering the strategic knowledge management within born global firms. Thus, born global firms have to evaluate how strategic alliances enable the internal innovation development process and the international expansion, without necessarily placing these firms as providers to multinational corporations. This ensures the sustainability of the relationship to the parties involved, in order to result in full compliance with customers' requirements and to sustain the innovation development process and the technology cooperation for the purposes of the partnerships.

According to Loefgren (2014), the innovation development is not represented purely as an output of the production process, in the form of products and services, but also plays a key role in the establishment of international business networks for the development of co-innovations. This view emphasizes that the intensity of the relationships between the firm and

its principal client abroad, arising from the co-innovation development, provides the international business expansion. Thus, the co-innovation development becomes the main driver for the expansion of international business networks, resulted from the relationship established between the firms and its main business client abroad. The learning process for the co-innovation development to obtain new customers and international suppliers, through the intermediation of the main client of the firm, is strategic because knowledge derived from this partnership can be applied to the product innovation development, thereby promoting the continuous innovation development in the firm.

The innovation development as a driver for the business internationalization, although considered unidirectionally, is also perceived in a bi-directional way, in order to consider the importance of the internationalization process for the firm's innovation development. In this regard, Halilem et al. (2014) argue that there is a great number of studies referred to the unidirectional possibilities, while the bi-directionality still lacks studies to investigate which determinants of the innovation development and the internationalization process positively enhance both processes. The bi-directional analysis presents important considerations about this relationship. The product innovation is related positively to the internationalization process to nearby markets, as well as inward internationalization process are related to outward process. These conclusions reflect the SMEs' internationalization process, which often initiates from imports, to the acquisition of market knowledge and business networks that support outward internationalization processes (Halilem et al., 2014), such as export modes (Grandinetti & Mason, 2012).

3.2. DEFINITION OF THE RESEARCH MODEL

This present Dissertation aims to contribute to the Business Internationalization and the Innovation Process research fields. The focus of the academic contributions lies in the comprehension of the organizational resources inherent and embedded in the firm, the capabilities, that provide sustainable competitive advantages to the firm. The term dynamic encompasses the changing organizational environment, considering the technology and market forces in the strategic analysis (Teece et al., 1997). In this regard, there are variables related to the organizational environment variable related to the relationship amid the dynamic capabilities for innovation and the internationalization patterns that are part of the data analysis,

which are not in the research model. In order to comprehend the relationship amid the Dynamic Capabilities for Innovation and the SMEs' Internationalization Patterns variables, Figure 8 presents the research model:

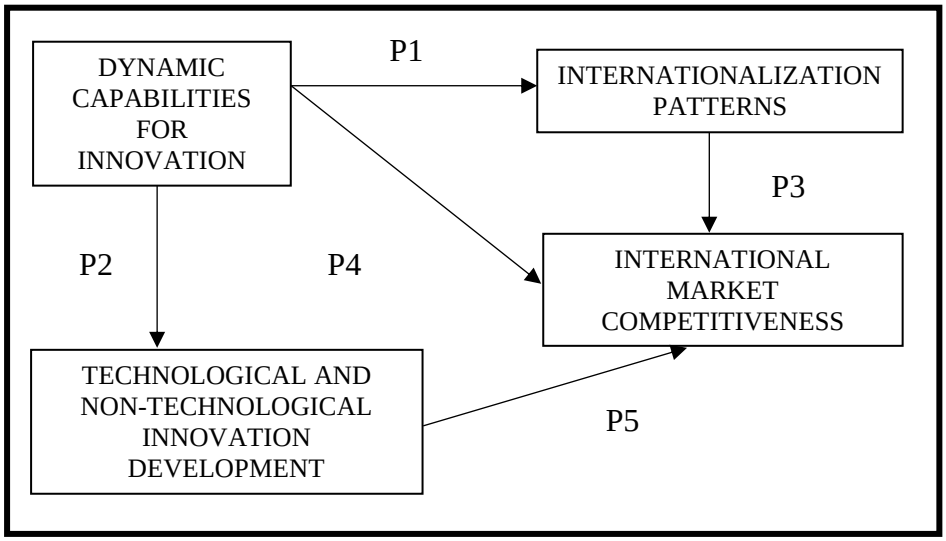


Figure 8: The Research Model

The dynamic capabilities for innovation are the technological and organizational capabilities inherent to the firm aimed to drive the organizations' innovative efforts that lead to the technological and non-technological innovation development (Barreto, 2010; Cardoso & Kato, 2015; Guan & Ma, 2003; Makadok, 2001; Zahra et al., 2006; Zollo & Winter, 2002). The focus in this group of capabilities enables the comprehension of the distinctive skills, resources and competences of the case firms that support the innovation development.

The structuring of the firm's innovation management process is important to coordinate the intrinsic capabilities of the firm for the innovation development. The dynamic capabilities for innovation sustain the technological and non-technological innovation development and foster market competitiveness (Guan & Ma, 2003; Mothe & Thi, 2010; OECD, 2005; Tidd & Bessant, 2015). Thus, the dynamic capabilities for innovation are inherent to the case firms, thus determining its innovation development. Therefore, Proposition 1 is:

Proposition 1: The dynamic capabilities for innovation are antecendents for the technological and non-technological innovation development process, which drive the internationalization patterns of the technology-based SMEs.

The strategic structuring of the organizations' skills, resources and competences aims to lead to an innovative performance. The innovation management plays a key role in determining the progress of the innovation development. The evaluation process aims to

measure the added value of the innovation output, to analyze the changes and the new functionalities of the innovative product or service for the consumer market. Yet, this process also aims to evaluate the organizational changes in order to implement the manufacturing process to develop the innovation and place the organization competitively in the market (Clark & Wheelwright, 1997; Tidd & Bessant, 2015). Considering the role of the innovation management and the dynamic capabilities for innovation as drivers for the innovation development, Proposition 2 is presented:

Proposition 2: The dynamic capabilities for innovation are inherent to the SMEs and drive their technological and non-technological innovation development.

The internationalization patterns, in turn, lead to different internationalization strategies. In order to analyze the internationalization patterns, there are criteria, concerning the market scope, the entry time in international markets, the international operation modes and the international sales intensity, which determine their distinctive characteristics. This leads to the conclusion that traditional pattern firms, born global firms, INVs and born-again global firms have different internationalization strategies (Acedo & Jones, 2007; Bell et al., 2003; Crick, 2009; Olejnik & Swoboda, 2012; Tuppura et al., 2008). Proposition 3 is presented:

Proposition 3: The SMEs' internationalization patterns direct the market competitiveness and the international market expansion.

The market scope criterion enables the analysis of the organization's market competitiveness. Born global firms and born-again global firms may present advantages compared to traditional pattern firms and INVs, due to their strategic positioning in considering a vast market scope, not taking into consideration cultural and geographical distances (Johanson & Vahlne, 1977). Instead, there are worldwide business opportunities, thus requiring organizational reshuffles to meet the requirements and demands of the foreign target markets (Hordes, Clancy, & Baddaley, 1995; Kuivalainen, Sundqvist, & Servais, 2007).

In this sense, the born global firms, the INVs and the born-again global firms expect to be more competitive not only because of their focus on international markets and because of a broad market scope, but also due to their innovative products (Bell et al., 2003). In turn, traditional pattern firms generally focus on attending international regional markets, which restrict their international market scope (Crick, 2009). Even though these enterprises focus on

these target markets, this implies that traditional pattern firms aim to reach the domestic market to further embrace the gradual international market expansion, placing this process as a long-term strategy (Johanson & Vahlne, 1977). Thus, Proposition 4 is:

Proposition 4: The dynamic capabilities for innovation of the SMEs drive the technological and non-technological innovation development processes, which lead to market competitiveness.

The technological and non-technological innovation development generate outputs that aim to achieve the market international competitiveness. This process is part of the core competences of firms that aim to expand and maintain their market shares (Guan & Ma, 2003; Mothe & Thi, 2010). Proposition 5 is, therefore:

Proposition 5: The outputs from the technological and non-technological innovation development processes lead to international market competitiveness.

This section presents the research model and its propositions of this Dissertation. The next section contemplates the research questions.

3.3. RESEARCH QUESTIONS

The research questions aim to provide ground for the research problem, as well as to sustain the propositions of the research model. The research problem delineates the general objective of the research and the research questions direct towards the accomplishment of the general and specific research objectives, as well as to sustain the propositions.

The dynamic capabilities for the innovation development are inherent to each case firm, thus linked to their resources and competences, which enable their differentiation. The specificities of the dynamic capabilities lead to the innovation development that aims the market competitiveness (Barreto, 2010; Cardoso & Kato, 2015; Guan & Ma, 2003; Makadok, 2001; Zahra et al., 2006; Zollo & Winter, 2002).

The innovation development encompasses the technological and non-technological innovation development, in other words, the technological development, innovative products,

places the firm competitively in their domestic and international market niches. The main outputs of the technological innovation development are innovative products and services that lead to market repositioning and competitiveness, also supporting its expansion (Cantisani, 2006; Mothe & Thi, 2010; OECD, 2005). The search for market competitiveness through innovative products is a distinctive characteristic of technology-based firms, as their core competence centers on the innovation development (Côrtes et al., 2005; Oliva et al., 2011; Toledo et al., 2008).

Non-technological innovations, in turn, sustain organizational changes that conduct to an improvement in the organizational performance. Marketing innovations have as main goal the competitive placement of the product in its target market (Atalay, Anafarta, & Sarvan, 2013; Gunday, Ulusoy, Kilic, & Alpkan, 2011; Hashi & Stojčić, 2013; Mannheim Innovation Panel, 2010 Mothe & Thi, 2010; OECD, 2005). The first research question is:

Research Question 1: What is the role of the radical and incremental product innovations to achieve competitiveness in international markets?

The intrinsic characteristic of the dynamic capabilities for innovation differentiate the firm among its competitors and define the innovation development process of the firm. In this regard, the dynamic capabilities for innovation, precisely for technology-based firms, drive this process. Yet, as stated by Teece et al. (1997), the organizational environment of the firm is an important variable for the strategy elaboration, also affecting the innovation development process. In this logic, the second research question is:

Research Question 2: What are the distinctive SMEs' dynamic capabilities that support the innovation development?

The internationalization patterns are the traditional pattern firms, the born global firms, the born-again global firms and the INVs. There are decision criteria that define the internationalization pattern of SMEs and the distinctive parameters converge to explain each pattern (Acedo & Jones, 2007; Bell et al., 2003; Crick, 2009; Olejnik & Swoboda, 2012; Tuppura et al., 2008). The verification process aims to analyze whether the enterprise data converges with the parameters to define the internationalization pattern of the case firms, which also contemplates how this process occurred. Thus, the third research question is:

Research Question 3: What are the internationalization patterns of the observed SMEs?

This chapter presents the Research Model and the research questions of the Dissertation. The fourth chapter, the “Research Method”, aims to present the research phases as well as to explain the process of data collection and data analysis.

4 RESEARCH METHOD

The fourth chapter presents the research method of this study. The research method chapter encompasses, in this sequence, the research characterization, placing the epistemological positioning of the Dissertation, which is the constructivism inquiry paradigm (Gephart, 1999; Guba & Lincoln, 1994). This first section of the research method chapter aims to present not only the epistemology, but also the ontology and the methodology of the research. In this logic, Gephart (1999) shows an explanatory table that aims to provide basis for the comprehension of the main inquiry paradigms for Business Management studies.

The subsequent section is the presentation of the research variables and the emerging variables. This presentation consists on delimitating the variables of the research themes under investigation. In pursuance of this purpose, the research variables are the technological innovation development, the dynamic capabilities for innovation and the internationalization process of SMEs. The emerging variables are, in this context, further variables that are part of the analysis, which also contributes for the explanation of the research problem. These variables incorporate the organizational context of the firm, which is determinant for the strategic management (Teece et al., 1997).

The case selection process aims to expose how the selection process is, presenting the criteria to select the case firms of this research. In order to precise which are the eligible firms, the criteria center on the size, the total annual turnover, the exported volume in 2014 and the technology-based sectors. This enables the standardization in the selection process of the cases. The last section concerns to present the multiple case study methodology and the data analysis process (Miles, Huberman, & Saldaña, 2014). The qualitative approach aims to bring further contributions to the literature.

4.1. RESEARCH CHARACTERIZATION

The research characterization aims to present the research basis, defining the ontology, the epistemology and the methodology of the research. Thus, the research characterization obeys this order (Creswell, 2007).

Guba and Lincoln (1994) present four paradigms for developing qualitative research, which are the positivism, the postpositivism, the critical theory and related ideological positions and the constructivism. The definition of a paradigm is "the basic belief system or worldview that guides the investigator, not only in choices of method but in ontologically and epistemologically fundamental ways" (Guba & Lincoln, p. 105, 1994). The inquiry paradigms, according to Guba and Lincoln (p. 108, 1994) define "what it is they are about, and what falls within and outside the limits of legitimate inquiry". There are three fundamental questions, which delimitate and aim to comprehend the inquiry paradigm. The first question refers to the ontological question, the second to the epistemological question and the third to the methodological question. The logic of this sequence enables the elucidation of what an inquiry paradigm is. Aiming to clarify each of these questions, Guba and Lincoln (p. 108, 1994) explain their meaning:

> 1. *The ontological question*. What is the form and nature of reality and, therefore, what is there that can be known about it? For example, if a "real" world is assumed, then what can be known about it is "how things really are" and "how things really work". Then only those questions that relate to matters of aesthetic or moral significance, fall outside the realm of legitimate scientific inquiry.
> 2. *The epistemological question*. What is the nature of the relationship between the knower or would-be-knower and what can be known? The answer that can be given to this question is constrained by the answer already given to the ontological question; that is, not just *any* relationship can now be postulated. So if, for example, a "real" reality is assumed, then the posture of the knower must be one of objective detachment or value freedom in order to be able to discover "how things really are" and "how things really work". (Conversely, assumption of an objectivist posture implies the existence of a "real" world to be objective about).
> 3. *The methodological question*. How can the inquirer (would-be-knower) go about finding out whatever he or she believes can be known? Again, the answer that can be given to this question is constrained by answers already given to the first questions; that is, not just *any* methodology is appropriate. For example, a "real" reality pursued by an "objective" inquirer mandates control of possible confounding factors, whether the methods are qualitative (say, observational) or quantitative (say, analysis of covariance). (Conversely, selection of a manipulative methodology - the experiment, say – implies the ability to be objective and a real world to be objective about.) The methodological question cannot be reduced to a question of methods; methods must be fitted to a predetermined methodology.

Yet, Guba and Lincoln (1994) present the responses of the paradigms for the three fundamental questions that characterize and differentiate the inquiry paradigms. In addition, the responses enable their comprehension and definition. Table 8 synthesizes the characteristics of the inquiry paradigms:

Item	Positivism	Postpositivism	Critical Theory et al.	Constructivism
Definition	Positivism denotes the "received view" that has dominated the formal discourse in the physical and social sciences for some 400 years	Postpositivism represents efforts of the past few decades to respond in a limited way (that is, while remaining within essentially the same set of basic beliefs) to the most problematic criti-cism of positivism	The Critical Theory is a blanket term denoting a set of several alternative paradigms, including additionally (but not limited to) neo-Marxism, feminism, materialism, and participatory inquiry. Indeed, Critical Theory may itself usefully be divided into three substrands: post-structu-ralism, postmodern-nism, and a blending of these two. The difference of each other is in the epistemology	The Constructivism denotes an alternative para-digm whose breakway assum-ption is the move from ontological realism to ontological relativism
Ontology	Naïve realism – "real" reality but apprehendable	Critical realism – "real" reality but only imperfectly and probabilis-tically apprehend-dable	Historical realism – virtual reality shaped by social, political, cultural, econo-mic, ethnic, and gender values; crystallized over time	Relativism – local and specific constructed realities
Epistemology	Dualist/Objectivist; findings true	Modified dualist/objectivist; critical trade-tion/community; findings probably true	Transactional/Subjectivist; value-mediated findings	Transactional/ Subjectivist; created findings
Methodology	Experimental/Mani-pulative;Verification of hypotheses; chiefly quantitative methods	Modified Experi-mental/Manipulati-ve; critical multi-plism ; falsification of hypotheses; may include qualitative methods	Dialogic/Dialectical	Hermeneutical/ Dialectical

Table 8: Basic Beliefs (Metaphysics) of Alternative Inquiry Paradigms

Source: Guba and Lincoln (1994, pp. 108-109).

Gephart (1999) assesses the importance of the Interpretivism and Constructivism, as well as the Critical Theory and the Postmodernism inquiry paradigms in the Management Research field, to comprehend the structures of the contemporary society and the challenges from the emergence of social groups with different characteristics and demands. The complexity of the society requires a deep analysis of the social reality where individuals are. The focus is on the comprehension of a social phenomenon through the analysis of the variations in human meanings, part of a society, and sensemaking generation that reflects differences in a social group, mainly in organizations, the core object of study of the Management Research field.

According to Gephart (1999), the focus of the Interpretivism and Constructivism, and Critical Theory and Postmodernism is the subjective meanings, based on how individuals from

a society apprehend, understand and make sense of social events and how this process leads to the characteristics and features of the social reality the individuals are inserted. This reflexivity is, therefore, the product of the individuals' sensemaking that are part, in other words, embedded (Granovetter, 1983) in this society. Gephart (1999) and Guba and Lincoln (1994) explain that this perspective of analysis focuses on the social group, which does not lead to generalizations, a characteristic of the Positivism inquiry paradigm. The perspective lies in the meaning generated from a group of individuals that are part of a society, instead of making inferences resulting from experimental and survey methods.

In order to present an evolutionary perspective, Gephart (1999, pp. 2-3) presents a table that synthesizes the main attributes of the inquiry paradigms. Table 9 enables the comprehension of further characteristics of the paradigms, to understand the structure and the delimitations, the methodological criteria and the contributions of the research. The presentation of further attributes aims to advance the explanation concerning the inquiry paradigms and provides the method of analysis, in terms of sequence and unit of analysis. The inquiry paradigm of the Dissertation is the **constructivism inquiry paradigm**, which aims to, according to Guba and Lincoln (1994, p. 113):

> . . . *understanding and reconstruction* of the constructions that people (including the inquirer) initially hold, aiming towards consensus but still open to new interpretations as information and sophistication improve. The criterion for progress is that over time, everyone formulates more informed and sophisticated constructions and becomes more aware of the content and meaning of competing construction.

According to this paradigm, knowledge is constructed based on social changes processes, considering the role of the language and social functions, advocating that this process is intentional, appropriates social representations and constructs from individual experiences, as individuals develop subjective meanings to their personal experiences from the social context (Creswell, 2003; Flick, 2009). Thus, the scientific research aims to comprehend the complexity of the social reality. This inquiry paradigm has a rigorous and critical process to establish the research to generate scientific knowledge. The researcher is responsible to establish the stages of the research that ensures the accuracy of the work, which affirms the suitability and the legitimacy of the research method to analyze the studied phenomenon (Creswell, 2003; Gavard-Perret, Gotteland, Haon, & Jolibert, 2008). Table 9, therefore, provides basis to comprehend the research method and the importance of the constructivism inquiry paradigm, as the paradigm of this Dissertation:

	Positivism and Postpositivism	Interpretivism and Constructivism	Critical Theory/Postmodernism
Assumptions	Objective world which science can 'mirror' with privileged knowledge	Intersubjective world which science can represent with concepts of concepts of actors; social construction of reality	Material world of structured contradictions and/or exploitation which can be objectively known only by removing tacit ideological biases
Key Focus or Ideas	Search for contextual and organizational variables which cause organizational actions	Search for patterns of meaning	Search for disguised contradictions hidden by ideology; open spaces for previously silenced voices
Key Theories in Paradigms	Contingency theory; Systems theory; Population Ecology; Transaction Cost Economics of Organizing; Dustbowl Empiricism	Symbolic Interaction; Ethnomethodology; Phenomenology; Hermeneutics	Develop structural or historical insights that reveal contradictions and allow emancipation, spaces for silenced voices
Goal of Paradigm	Uncover truth and facts as quantitatively specified relations among variables	Describe meanings, understand members' definitions of the situation, examine how objective realities are produced	Marxism; Critical theory; 'Radical' perspectives **Postmodernism:** Poststructuralism; Postmodernism; Deconstructionism; Semiotics
Nature of Knowledge or Form of Theory	Verified hyphotheses involving valid, reliable and precisely measured variables	Abstract descriptions of meanings and members = definitions of situations produced in natural contexts	Structural or historical insights revealing contradictions
Criteria for Assessing Research	Prediction = Explanation Rigor; internal & external validity, reliability	Trustworthiness Authenticity	Theoretical consistency Historical insights Transcendent interpretations Basis for action, change potential and mobilization
Unit of Analysis	The variable	Meaning; symbolic act	Contradictions, incidents of exploitation **Postmodernism:** the sign
Research Methods and Type of Analysis	Experiments; questionnaires; secondary data analysis; quantitatively coded documents Quantitative: regression; Likert scaling; structural equation modeling Qualitative: grounded theory testing	Ethnography; participant observation; interviews; conversational analysis; grounded theory development Case studies; conversational and textual analysis; expansion analysis	Field research, historical analysis, dialectical analysis **Postmodernism:** deconstruction**,** textual analysis

Table 9: Management Research Paradigms

Source: Adapted from Gephart (1999, pp. 2-3).

Thus, this inquiry paradigm aims to comprehend the complexity of the social reality. This inquiry paradigm has a rigorous and critical process to establish the research to generate scientific knowledge. The researcher is responsible to establish the stages of the research that ensures the accuracy of the work, which affirms the suitability and the legitimacy of the research method to analyze the studied phenomenon (Creswell, 2003; Gavard-Perret, Gotteland, Haon, & Jolibert, 2008).

The **qualitative approach** aims to bring further contributions to the state of knowledge literature about the research theme. The qualitative approach reiterates that the contributions to the theory to contemplate the literature gap has as main purposes to provide further knowledge to underexplored research problems. Therefore, the general objective of the research is to develop empirically based theories, rather than test and validate consolidated and well-known theories. The validity of the study consists in determining if the research findings are in accordance with the empirical data, or if the research methods are correctly selected and applied, as well as to verify the relevance of the findings in order to contribute to the theory of the research themes (Flick, 2009).

The research aims to explore the relationship between the innovation orientation and the internationalization patterns of small and medium enterprises (SMEs). The dynamics capabilities for innovation sustain the technological innovation development, which leads to the improvement on sales intensity and the market competitiveness. In order to reach the main research objective, according to the methodology, a **multiple case study** converges to the comprehension of the nature and the complexity of the studied phenomenon (Gephart, 1999). The case study is defined as, according to Gerring (2004, p. 342):

> . . . an intensive study of a single unit for the purpose of understanding a larger class of (similar) units. A unit connotes a spatially bounded phenomenon - e.g., a nation-state, revolution, political party, election, or person-observed at a single point in time or over some delimited period of time. (Although the temporal boundaries of a unit are not always explicit, they are at least implicit.)

The units, in other words, the cases, are the SMEs. The focus of the research is on the technological innovation development, the dynamic capabilities for innovation and the internationalization pattern, analyzed in a determined period, in other words, a transversal study. In order to obtain data for these variables, the respondents are the main responsible for these areas within the selected firms. The multiple case study allows the comparison among the cases, which brings further contributions to the theory and credibility to the research (Creswell, 2003; Eisenhardt, 1989; Flick, 2009, Miles et al., 2014).

4.2. RESEARCH VARIABLES AND EMERGING VARIABLES

The main goal of this section is to present the main studies that sustain the variables' construct. The Research Model presents the relationship between the variables, which are the dynamic capabilities for innovation, the technological and non-technological innovation development, the internationalization patterns and the market competitiveness. The variables' measurement is based on the literature review of the research theme, thus providing basis for this systematization. In order to present how the variables are analyzed, Table 10 presents the construct, the research variables, the main references and the variables' indicators:

Construct	References	Indicators
The Innovation Process – The Product Innovation Development	Baregheh, Rowley and Sambrook (2009); D'Angelo (2012); Goswami and Mathew (2004); OECD (2005); Mannheim Innovation Panel (2010).	The product innovation development from 2010 to 2012; The phases of the innovation process; The innovation novelty degree; The innovation target market; The process innovation.
The Innovation Process – The Dynamic Capabilities for Innovation	Barreto (2010); Guan and Ma (2003); Helfat (1997); Makadok (2001); Teece et al. (1997); Zahra et al. (2006); Zollo and Winter (2002).	The learning process; The structure of the R&D process; The human resources management; The innovation networks and partnerships; The manufacturing process; The Marketing structure; The strategic and the innovation management; The strengths, the weakness, the opportunities and the threats present in the internal and external organizational environment.
The Business Internationalization – The Internationalization Patterns	Acedo and Jones (2007); Bell et al. (2003); Crick (2009); Knight and Cavusgil (2004); Kuivalainen et al. (2012); Kuivalainen et al. (2007); Olejnik and Swoboda (2012).	The market scope; The international operation modes; The international sales intensity; The entry timing; The internationalization process; The international sales intensity of innovative products.

Table 10: Construct of the Variables of the Study

Source: Based on Vick (2014).

The innovation process variable focuses on the technological innovation development, placing the product innovation development as the main variable under investigation, as the case firms are exporters of technology-based and innovative products. This variable also encompasses the process innovation development, which, among its finalities, brings to the firm competitiveness through the improvement of the organizational performance. The analysis of these indicators enables the comprehension of the innovation development process of the firm.

The temporal delimitation aims to verify whether the product innovation development determines the internationalization process of the firm (D'Angelo, 2012; Pla-Barber & Alegre, 2010; Rodríguez & Rodríguez, 2005). The dynamic capabilities for innovation, in turn, encompass the resources, the competences and the routines inherent to the firm that drive the innovation process. The indicators aim to comprehend the organizational capacity of the firm, thus providing basis to comprehend the firm's differential and intrinsic characteristics. Yet, the organizational context is an important variable that is part of the strategic management (Barreto, 2010; Cardoso & Kato, 2015; Guan & Ma, 2003; Makadok, 2001; Zahra et al., 2006; Zollo & Winter, 2002).

The business internationalization variable aims to verify the case firms' internationalization processes and patterns. The internationalization process refers to the foreign trajectory of the firm (Johnson et al., 2008; Cavusgil et al., 2010). The internationalization pattern is the internationalization strategy of the firm, which are the traditional pattern firms, the born global firms, the INVs and the born-again global firms. The same decision criteria present distinctive parameters that aim to define each internationalization pattern (Bell et al., 2003; Olejnik & Swoboda, 2012; Oviatt & McDougall, 1994; Tuppura et al., 2008).

4.3. CASE SELECTION PROCESS

The state of São Paulo has the largest number of exporting firms in Brazil (Ministry of Development, Industry and International Commerce - Ministério do Desenvolvimento, Indústria e Comércio Exterior [MDIC], 2016a). The prominence of exporting firms and the technological initiatives' prevalence in the state of São Paulo are the determinant factors that directed the choice of this Brazilian state. In this sense, the classification measures of the Brazilian technology-based SMEs are:

Size	Industry		
	Number of Staff Employed	**Exported Value**	**Total Annual Turnover**
Micro-Size Enterprises	< 19	< US$ 400 thousand	Less than or equal to R$ 2,4 million
Small-Size Enterprises	From 20 to 99	< US$ 3,5 million	More than R$ 2,4 million and less than or equal to R$ 16 million
Medium-Size Enterprises	From 100 to 499	< US$ 20 million	More than R$ 16 million and less than or equal to R$ 90 million
Medium-to-Large-Size Enterprises	From 100 to 499	< US$ 20 million	More than R$ 90 million and less than or equal to R$ 300 million

Table 11: Classification of Industrial SMEs, in Terms of Number of Employees, Exported Value and Total Annual Turnover

Source: Based on MDIC (2016b), National Bank for the Economic and Social Development (Banco Nacional de Desenvolvimento Econômico e Social [BNDES] (2016) and Supporting Service for Micro and Small Enterprises (2016) (Serviço de Apoio às Micro e Pequenas Empresas [SEBRAE]).

Table 10 is central for classifying the eligible case firms for this research, as the case selection process is intentional (Eisenhardt, 1989). In addition to these criteria, the firms also obey the following criteria:

- The legal constitution of the Brazilian technology-based SMEs is national, in other words, the firm is in accordance with the Brazilian legislation. Yet, the invested capital in the firm is national;
- The exported volume of the eligible case firms in 2014 is on the export range of "Up to U$S 1 million" or "From U$S 1 million to U$S 5 million", according to the classification criteria of MDIC (2016a). The choice of these ranges is a proxy to the classification criteria adopted for this research;
- The exported values are Free on Board (FOB) values, which means that the chosen International Commerce Terms (INCOTERMS) is the FOB. The FOB INCOTERM inculcates the responsibility to the seller to deliver the merchandising in the ship that is going to be the main means of transportation of the merchandising. The merchandising complies with customs procedures;
- The operations of the technology-based SMEs are independent. However, the firm may belong to a business group, since this is a national group of enterprises;
- The firm is technology-based.

Côrtes et al. (2005) present an explanation concerning the distinctive characteristics of technology-based firms. Considering the conditions of the Brazilian economy, which are distinct from the developed nations, based on technology import and limited innovative efforts, the innovation concept has to encompass not only significant innovations, which are part of the

portfolio of radical innovations in products, but also the incremental innovations and the imitation, providing a broad scope of analysis. The distinctive characteristic of the technology-based firms is the significant technological effort. This effort has as main output the innovative product. In order to reach this technological and innovation development, concerning SMEs from developing nations, the focus of these efforts are not only centered in classical indicators of R&D intensity, focused on the internal activities of the firm and its laboratory structure, but also are part of the networks with research institutes. Therefore, the innovation development in these firms is central and the main measurement of this effort is in terms of new products, classified as a radical or incremental innovation, or an imitation. The emphasis on the product, instead of on the process, aims to differentiate the technology-based firms from firms that focus on the process innovation development to optimize the production process, thus not presenting significant changes in the product.

Considering these attributes, Côrtes et al. (2005) define technology-based firms as firms that "realize significant technological efforts and concentrate their operations in the manufacturing of "new" products". Table 12 presents the identification of technology-based firms, considering the product scope:

	Greater Product Innovation	**Lower Product Innovation**
Greater Technological Effort	Technology-based firms (high intensity and technological dynamism)	Modernized and dense firms, but they are not dynamics
Lower Technological Effort	Manufacturing firms, as an example, consumer goods	Traditional firms from mature sectors

Table 12: Identification of the Technology-Based Firms

Source: Côrtes et al. (2005, p. 87).

The novelty degree of the product and the relevance of the technological efforts are measured through the market share of innovative products, the number of patents and the in-progress projects of new products. In terms of relevance of technological efforts, indicators such as the R&D intensity, the correlated R&D activities and a skilled workforce denote the innovative pattern of the firm. This framework presents the product innovation development of the firm, which enables the comprehension of the product innovation development of technology-based firms (Côrtes et al., 2005).

Tether (1997) also presents a taxonomy that aims to classify the technology-based firms according to the scope of the product innovation, which presents the innovative efforts of the firm for the development of new or incremental products and processes. The first group of firms, the "new opportunist design concept-based firms" are innovative, but not technology-

based firms, which fundaments the innovation process on consolidated technologies in order to broaden the innovation scope and this group of firms possesses a limited technological capacity.

The second group of firms, the "new generic technology-based firms" is based on the development of new technologies. This group of firms has competitive market advantages, as there are few competitors in this market niche and the product developed by the firm presents new functionalities and characteristics. The third group, the "new, niche market, specialist technology-based firms", are firms that fundament the innovation development on consolidated technology to serve market niches. This group of firms presents a mature technological innovation development and aims to maintain the market position through incremental innovations based on the clients' feedbacks. The main threat for this group of firms are the new entrants, which provoke technological changes that can render obsolete the established firms. This taxonomy is important to comprehend the technological innovation pattern of the technology-based firms and to provide basis for the understanding of the product innovation development of each group of firms (Tether, 1997).

These two frameworks focus on the product's innovative degree of technology-based firms, which converges to enhance the main characteristics of technology-based firms, that is, the focus on significant technological efforts in order to develop product innovations (Côrtes et al., 2005; Tether, 1997). This central analysis enables the identification of the innovative pattern of SMEs, in terms of the novelty degree of their products, and the technological efforts in order to determine the continuity of the innovation process.

Seven case firms participate in this research. The selected case firms place the innovation development as their core competence to achieve market competitiveness in both domestic and international markets. The main sources of data were the interviews with key people from the case firms, additional questions via e-mail, in loco observations and the visit to the firm, the firm's portfolio of products and further documents of the firm, when available, as well as secondary data from government databases.

As examples of additional questions, enterprises were asked about the foreign sales intensity in the beginning year of the outward commercial activities and in the year 2014. Yet, further data referring to the sales' proportion in each international market in 2014 and in periods of change during the SMEs' internationalization process were requested. Data plurality is a precondition for the triangulation process (Miles, Huberman, & Saldaña, 2014). It is important to search for further sources of information to enhance the data analysis and to conflict positions, in terms of presenting convergent and divergent perspectives from multiple sources of information. Table 13 presents a synthesis of the case firms' eligibility characteristics:

	Number of Employees	Annual Turnover	Export Performance in 2014
Case Firm 1	150	More than R$ 16 million and less than or equal to R$ 90 million	Up to U$S 1 million
Case Firm 2	97	More than R$ 16 million and less than or equal to R$ 90 million	U$S 1 million to U$S 5 million
Case Firm 3	200	Correspondent to a medium-sized firm	U$S 1 million to U$S 5 million
Case Firm 4	120	More than R$ 16 million and less than or equal to R$ 90 million	U$S 1 million to U$S 5 million
Case Firm 5	400	More than R$ 90 million and less than or equal to R$ 300 million	U$S 1 million to U$S 5 million
Case Firm 6	150	More than R$ 2,4 million and less than or equal to R$ 16 million	U$S 1 million to U$S 5 million
Case Firm 7	50	More than R$ 16 million and less than or equal to R$ 90 million	U$S 1 million to U$S 5 million

Table 13: Synthesis of the Case Firms' Eligibility Criteria

Source: Research Data Analysis (2015).

The first case firm is from the Medical and Ophthalmic Equipment sector and from the Defense and Space sector. The firm had, in 2014, an average of 150 employees and an estimated total annual turnover from the range of more than R$ 16 million and less than or equal to R$ 90 million. The export performance of the firm, in 2014, is on the range of "Up to U$S 1 million".

The second case firm is from Manufacture of Refractory Ceramic Products sector. The enterprise had, in 2014, an average of 97 employees and an estimated total annual turnover from the range of more than R$ 16 million and less than or equal to R$ 90 million. The export performance of the firm, in 2014, is on the range of "From U$S 1 million to U$S 5 million".

The third case firm is from the Foods and Beverages sector. The enterprise had, in 2014, an average of 200 employees and the estimated total annual turnover corresponds to a medium-sized firm. The export performance of the firm, in 2014, is on the range of "From U$S 1 million to U$S 5 million".

The fourth enterprise is from the Manufacture of Fertilizers sector, which is within the Biochemistry sector. The enterprise had, in 2014, an average of 120 employees and an estimated total annual turnover from the range of more than R$ 16 million and less than or equal to R$ 90 million. The export performance of the firm, in 2014, is on the range of "From U$S 1 million to U$S 5 million".

The fifth case firm is from the Construction Industry sector, more specifically, the Manufacture of Ceramic Tiles. The enterprise had, in 2014, an average of 400 employees and an estimated total annual turnover from the range of above R$ 72 million. The export performance of the firm, in 2014, is on the range of "From U$S 1 million to U$S 5 million".

The sixth case firm is from the Foods and Beverages sector, more specifically, the Production of Whole Sugar sector. The enterprise had, in 2014, an average of 150 employees and an estimated total annual turnover from the range of more than R$ 2,4 million and less than or equal to R$ 16 million. The export performance of the firm, in 2014, is on the range of "From U$S 1 million to U$S 5 million".

The seventh case firm is from the Manufacture of Electric Material for Installations in Consumption's Circuits. The enterprise had, in 2014, an average of 50 employees and an estimated total annual turnover from the range of more than R$ 16 million and less than or equal to R$ 90 million. The export performance of the firm, in 2014, is on the range of "From U$S 1 million to U$S 5 million".

4.4. DATA COLLECTION TECHNIQUE AND DATA ANALYSIS

This section aims to present the data collection technique and the data analysis. The opening part of this section presents the interview guide, the main tool for data collection. The interview guide focuses on collecting data of the research variables. The subsequent part of this section presents the respondents of the research and the last part presents the structure of the data analysis.

The Interview Guide

The interview provides the main source of data for the multiple case study. The interview aims to collect data about the research themes, the Innovation Process and the Business Internationalization, considering that the respondent is the specialist in the firm about the research theme. The elaboration of the interview guide is in accordance with its main proposals. The questions of the interview guide focus on the research themes, aiming to contemplate the research variables, presenting a sequential structure that converges with the continuity of the interview (Boni & Quaresma, 2005). The interview guide for data collection is in the Annexe A.

The face-to-face interview is in loco, which offers the opportunity to collect data from the interview with the respondents from each case firm of this study. Yet, the interview aims to collect data concerning the knowledge and the experience of the respondent in reference of the research theme (Creswell, 2003; Flick, 2009, Gavard-Perret et al., 2008; Miles, Huberman, & Saldaña, 2014).

The interview guide is semi-structured, which means it contains both discursive and structured questions. This is the main characteristic of the semi-structured interview guide, which aims to collect data and provides openness for the respondent to answer on the research themes. The interview guide has as the main advantage the flexibility, as the interviewer can pose complementary questions, in case of further variables that are mentioned by the respondent. In addition, further questions also serve to reestablish the focus of the interview. The data collection planning is determinant for the success of the interview, as the respondent has to be prepared to have the appropriate time to answer properly the interview guide (Boni & Quaresma, 2005).

The interview guide to collect data on the case firms has four sections. The first section of the interview guide concerns to the General Information about the Respondent and the Enterprise and has seven questions. The second section is the Enterprise Description, with questions concerning the characteristics of the enterprise. The third section refers to the Technological Innovations, aiming to explore the product and the process innovation development of the firm (D'Angelo, 2012; Gerschewski et al., 2015; OECD, 2005; Pla-Barber & Alegre, 2007; Rammer & Schmiele, 2009). The fourth section contemplates the Dynamic Capabilities for Innovation (Barreto, 2010; Cardoso & Kato, 2015; Guan & Ma, 2003; Makadok, 2001; Zahra et al., 2006; Zollo & Winter, 2002) and the last section concerns the Business Internationalization processes and patterns (Acedo & Jones, 2007; Bell et al., 2003; Knight & Cavusgil, 2004; Kuivalainen, Saarenketo, & Puumalainen, 2012; Kuivalainen, Sundqvist, & Servais, 2007; Olejnik & Swoboda, 2012; Tuppura et al., 2008). The interview guide obeys this sequence as a warmup strategy, in order to prepare the respondent for the data collection (Creswell, 2003; Flick, 2009).

The interview guide aims to conduct the interaction amid the researcher and the respondent, providing, therefore, the aimed answers for each question. The development of the interview guide requires the standardization of the terms used to describe the variables and presents the relationship of the questions with the research themes. Table 14 presents the description of the firm and the respondents as well as the means for data collection other than the interview, applied in each case firm:

	Domain of Activity (Firm's Economic Sector)	Number of Respondents	Description of the Respondents	Educational Background	Means for Data Collection other than the Interview	Duration of the Interview	Duration of the Permanence in the Firm
Case Firm 1	Medical and Ophthalmic Equipment/Defense and Space	1	R&D&I Director	Ph.D in Physics	E-mail Firm's product portfolio Visit to the firm	2 hours	2 hours and 30 minutes
Case Firm 2	Manufacture of Refractory Products	2	Manufacturing Control manager Export manager	Bachelor Degree and a Master's Degree in Materials Engineering Bachelor Degree and a Master's Degree in Materials Engineering	E-mail Visit to the firm	1 hour	2 hours and 30 minutes
Case Firm 3	Foods and Beverages	2	Product manager International Trading manager	Bachelor Degree in Social Communication Bachelor Degree	E-mail Firm's product portfolio	1 hour and 35 minutes	1 hour and 35 minutes
Case Firm 4	Manufacture of Fertilizers	3	Export and International Trading manager; Business Management Director;	Bachelor Degree in Business Administration, with a Specialization in Human Resources Bachelor Degree in Business Administration, with a Specialization in	E-mail Visit to the firm	1 hour and 15 minutes	2 hours

			Product Development and Biological Control area	Controlling and Finance Bachelor Degree in Biology			
Case Firm 5	Manufacture of Ceramic Tiles	1	Ph.D in Geology	Director	E-mail; Interview; Visit to the firm.	1 and 15 minutes hour	2 hours
Case Firm 6	Production of Whole Sugar	1	Bachelor Degree in Finance	Chief Executive Officer	E-mail; Interview; Firm's product portfolio; Firm's certifications; Visit to the firm.	1 hour	3 hours
Case Firm 7	Manufacture of Electric Material for Installations in Consumption's Circuits	2	Bachelor Degree in Electrical Engineering Bachelor Degree	Commercial Director Commercial manager	E-mail; Interview; Firm's product portfolio; Visit to the firm.	40 minutes	1 hour and 40 minutes

Table 14: Synthesis of the Case Firms' Description

Source: Research Data Analysis (2015).

Respondents

The process of data collection aimed to interview the respondents that are the main person of the firm in charge of the Innovation Process and the Business Internationalization. Therefore, for each case firm, there are different number of respondents, which depends on the hierarchical position of the respondent and the field of specialization of the respondent. This procedure prevents biases, as the respondents are the main person in charge in the firm, thus responsible for providing data concerned to the research themes. In addition to to the interview guide, there is the diary field, which consists on describing the visit to the firm through relevant remarks and the registering of further commentaries from the respondents. Both instruments are important to the data analysis.

Data Analysis

Miles et al. (2014) provide the basis for the qualitative data analysis. The data analysis encompasses the techniques to execute as well as to present the analysis and to generate meaning from the data. The subdivision of the techniques aims to analyze the data to note the patterns of the variables, to find convergences and divergences among the cases firms and to identify possible emerging variables. This procedure has a sequential establishment that permits the analysis of the research variables, as well as, and of the same importance, the emerging variables. The first part of the data analysis is the preliminary lecture of the interview transcription. This process enables the global comprehension of the case firms, which triggers to the second and deeper lecture of the interview transcription. The subsequent part of the analysis aims to establish comparisons among the case firms. This technique is important due to the possibility of finding correlated patterns among the case firms. The last part consists on the theory development, thus aiming for further theoretical contributions.

The use of a standardized interview guide for data collection on the seven case firms has a structure that contemplates the research variables and enables different emerging variables to appear, guiding, therefore, to a singular analysis of each case firm. Therefore, the data presentation of the research variables and the emerging variables are singular to each case firm. The data analysis of each case firm enhances the singularity of this object of study.

The use of descriptive statistics, therefore, helps to understand the importance of the research variables and the emerging variables, considering the frequency of appearance. Miles et al. (2014) emphasize the use of descriptive statistics to conduct the data analysis; in addition, this methodological resource enables the comparison process among the case firms. The prevalence of similar findings, the identification of divergent findings and the possible

preponderance of a research theme, from the data analysis, are patterns that can be codified and converted into descriptive statistics.

The data analysis, therefore, is in accordance with the methodological procedures of Milles et al. (2014). The process of data analysis consists in, first, a brief reading of the transcribed interviews. After this process, a deep reading is conducted, to establish the patterns and generate categories related to the Business Internationalization and the Innovation Process of each case firm. In convergence with the main variables, there are the emerging variables, which are the further explanation provided by the respondents for the questions of the interview guide. The data analysis presentation, for each case firm, follows the respective order, which is the enterprise characterization, the internationalization process, the product innovation development and the dynamic capabilities for innovation. Finally, resulting from the comparative analysis, there is the theory development. Figure 9 presents the sequence of the research development:

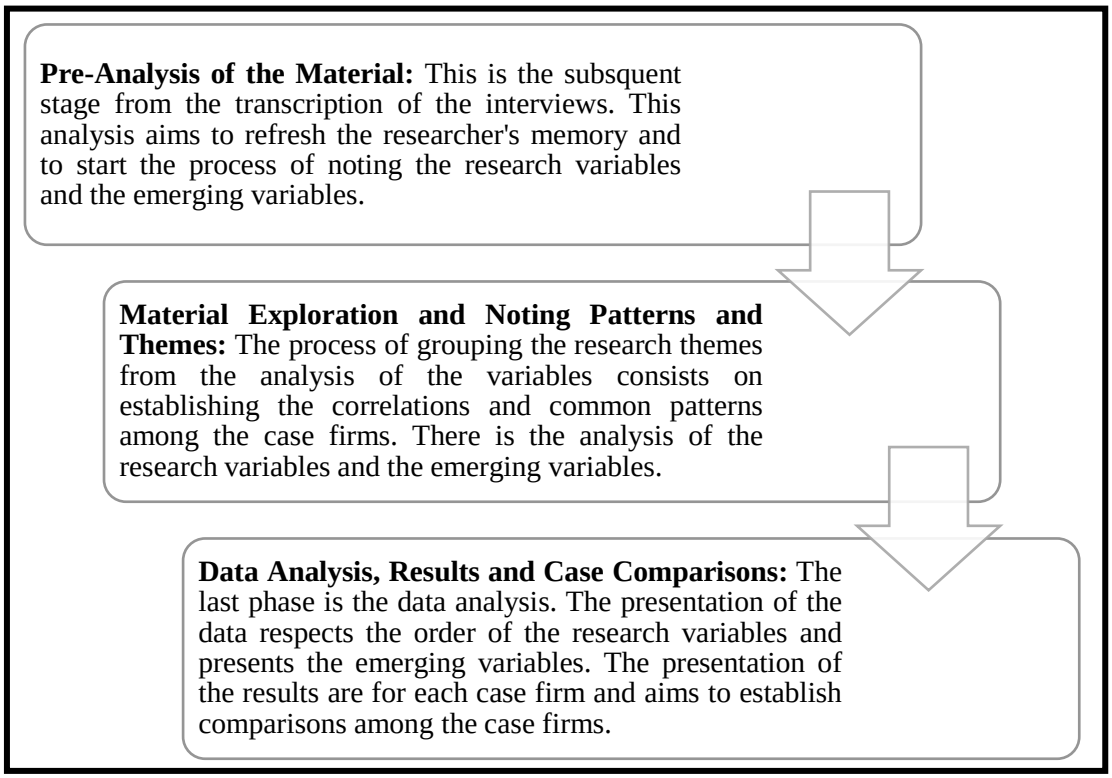


Figure 9: The Sequential Establishment of the Data Analysis

Source: Based on Miles et al. (2014).

The triangulation process is determinant for the data analysis. Due to its importance, in addition to the interview with the key actors in the case firms, responsible for the Innovation Process and for the Business Internationalization, other data foster the triangulation process. The main sources of data were the interviews with key people from the case firms, additional questions via e-mail, in loco observations and the visit to the firm, the firm’s portfolio of

products and further documents of the firm, when available, as well as secondary data from government databases.

It is also important to mention that the researcher conducted the data collection and executed the data analysis, which constitutes a limitation of the research, even though this condition aimed to preserve the data confidentiality. The presentation of the limitations of the research is part of the explanation of the research development. Regardless of these research limitations, there are validation procedures, such as the replication of the research and the research validation by the respondents, which corroborates to sustain the adopted methodological procedure of this research (Creswell, 2003; Flick, 2009; Miles et al., 2014). The validation procedure of this Dissertation is the research validation by the respondents, which was a determinant phase to ensure the validity and the reliability of the data analysis.

4.5. DATA COLLECTION EXECUTION

The choice of the state of São Paulo is due to the social and economic importance of this state in terms of technological development. According to the Secretary of Economic Development, Science, Technology and Innovation, there are important technological parks that aim to attract investments and to generate new technology-intensive and technology-based enterprises. The government initiatives support the technological parks and place the scientific and the innovation development as the main pillars for the economic and social development. There are twenty-eight initiatives of technological parks, the support to clusters and industrial districts, the technological support to cities and the incubators' networks that are among the government initiatives to consolidate the technological, the scientific and the innovation development of the state of São Paulo (Secretaria de Desenvolvimento Econômico, Ciência, Tecnologia e Inovação, 2016).

The process of selecting a location is also a differential present in technology-based SMEs. The location choice admits not only the traditional costs of infrastructure but also, and mainly, the contemporary location factors, focusing on the possibility of developing scientific and business networks with research institutes and other firms (Barquette, 2002; Bennett, Graham, & Bratton, 1999; Rasmussen, Jensen, & Servais, 2011). This prerogative fosters the open innovation development (Chesbrough, 2003), as the interconnectivity inherent to networks favors knowledge dissemination and the access to complementary technologies that

support the intra-firm innovation process (Barquette, 2002; Bennett, Graham, & Bratton, 1999; Rasmussen, Jensen, & Servais, 2011).

The first phase of the research, the data collection, was from the period of October/2014 to January/2015. This first phase had as main objective the database refinement from MDIC (2016a). This phase consisted on a sequence of stages in order to verify the eligibility of the case firms. The first phase consisted on classifying the enterprise according to the industrial sector. This classification process aimed to verify if the enterprise is from a technology-based sector. The searching process was via the enterprise's website, when available. Enterprises from other sectors than technology-based sectors were excluded from the list.

After classifying the enterprise by the industrial sector, the subsequent phase was to verify the country of origin of the enterprise. The verification process was similar from the previous phase, via the enterprise's website, when available. Subsidiaries from multinational corporations and enterprises that were acquired from, or merged with, multinational corporations were excluded from the list.

The final phase was the consolidation of the database, presenting the enterprise's sector, website, telephone and the e-mails of the Export and International Trading manager, or the R&D manager or the Director of the firm. The process of obtaining the e-mails was via telephone call. This part of the database treatment aimed to obtain the e-mails of the managers that are specialists on the research themes and that could provide further information in order to verify the previous eligibility criteria. From the list of potential eligible enterprises, 30 enterprises were excluded from the list, due to the inadequacy with the research criteria, which are the firm size, foreign-funded enterprises or subsidiaries of multinational corporations or due to the impossibility of finding the telephone number of the enterprise. One enterprise did not obey this condition.

The subsequent stage of the research was the case firm selection. After conducting this previous contact with the eligible enterprises, a previous list containing 349 enterprises was defined. This list contains the potential eligible enterprises and does not intend to be a definitive list. Among these enterprises, there might be enterprises that do not obey the eligible criteria, as 262 that did not reply the e-mail, providing further information in order to verify their eligibility. From 349 enterprises, 69 showed interest in participating in the research and 18 affirmed not to have interest in participating in the research. The selection of the case firms was intentional, also in accordance with the continuity of the interest, from the part of the firm, to participate in the research interview, which occurred during the period of September/2015 to December/2015.

The first contact with the selected case firms to participate in the interview were via e-mail, in order to send a Research Presentation Letter, explaining the research objectives, the methodological procedures and the data treatment, emphasizing the data confidentiality. This contact occurred in September/2015. The subsequent phase was the interview scheduling. The interviews were face-to-face and in loco, in other words, the interviews occurred in the enterprises and the first, the second, the fourth, the firth, the sixth and the seventh case firms granted a visit to the firm. All the respondents agreed in recording the interview. The interviews were transcribed verbatim and their average duration was 70 minutes.

The subsequent chapter, entitled as “Data Analysis”, presents the summary of the case firms, providing the necessary information in order to characterize the object of the study, thus preserving the confidentiality of the data. The presentation of each case firm follows the sequence of the interviews. Yet, the Data Analysis chapter presents the data analysis of each case firm and the results of this research.

5 DATA ANALYSIS

The fifth chapter presents the qualitative data analysis of the case studies. The adopted theoretical framework supports the analysis and the decision criteria to define the internationalization patterns of Brazilian technology-based SMEs. In addition, the innovation management, along with the dynamic capabilities for innovation, drive their technological and non-technological innovation development, thus leading to market competitiveness.

The main goal of this chapter is to first present the case summaries, explaining the characteristics of the case firms. After, there is the analysis of each case firms, focusing on the Internationalization Process, the Product Innovation Development Process and the Dynamic Capabilities for Innovation. This standardized sequence enables the comprehension of the variables of this study.

5.1. CASE SUMMARIES

The presentation and description of the case firms center in the characteristics that enable the comprehension of the internationalization patterns and processes, as well as the dynamic capabilities for innovation of the research object, the Brazilian technology-based SMEs. The characteristics are the foundation year, the company-owned characteristics, the industrial sector, according to the Brazilian National Classification of Economic Activities (Classificação Nacional das Atividades Econômicas [CNAE], 2016), except for the first case firm, which follows the classification of the Tax Incidence Chart on Industrialized Products (Tabela de Incidência do Imposto sobre Produtos Industrializados [TIPI], 2016). Yet, there are the average number of employees, the estimated total annual turnover in 2014 and the educational background of the respondents. Data plurality is an important condition for the triangulation process.

5.1.1. CASE FIRM 1: A BORN GLOBAL FIRM

Founded in 1986, the first enterprise is part of a national group of enterprises and is from the Defense and Space sector as well as from the Ophthalmic and Medical Equipment sector. The enterprise had, in 2014, an average of 150 employees and an estimated annual turnover from the range of more than R$ 16 million and less than or equal to R$ 90 million. The respondent holds a Ph.D in Physics, is one of the five owners, and is the R&D&I (Research & Development & Innovation) Director of the firm.

5.1.2. CASE FIRM 2: A BORN-AGAIN GLOBAL FIRM

Founded in 1976, the second enterprise is from the Manufacture of Refractory Ceramic Products sector. The enterprise had, in 2014, an average of 97 employees and an estimated total annual turnover from the range of more than R$ 16 million and less than or equal to R$ 90 million. The first respondent holds a Bachelor Degree and a Master's Degree in Materials Engineering and is the Manufacturing Control manager of the firm. The second respondent also holds a Bachelor Degree and a Master's Degree in Materials Engineering and was the Export manager of the firm.

5.1.3. CASE FIRM 3: A BORN-AGAIN GLOBAL FIRM

Founded in 1950, the third enterprise has a family control and is from the Foods and Beverages sector. The enterprise had, in 2014, an average of 200 employees and an estimated total annual turnover correspondent to a medium-sized firm. The first respondent holds a Bachelor Degree in Social Communication, emphasis in Marketing and is the Product manager of the firm. The second respondent is the International Trading manager of the firm and holds a Bachelor Degree. The core competences of the respondents are related to the Business Management field of work. In addition, a Marketing specialist, member of the staff, accompanied the interview process.

5.1.4. CASE FIRM 4: AN INTERNATIONAL NEW VENTURE

Founded in 1995, the fourth enterprise has a family control and is from the Manufacture of Fertilizers, which is within the Biochemistry sector. The enterprise had, in 2014, an average of 120 employees and an estimated total annual turnover from the range of more than R$ 16 million and less than or equal to R$ 90 million. The first respondent holds a Bachelor Degree in Business Administration, with a Specialization in Human Resources and is the Export and International Trading manager. The second respondent is the Business Management Director and holds a Bachelor Degree in Business Administration, with a Specialization in Controlling and Finance. The third respondent holds a Bachelor Degree in Biology and is part of the Research and Product Development and Biological Control area.

5.1.5. CASE FIRM 5: A TRADITIONAL INTERNATIONALIZATION PROCESS FIRM

Founded in 1952, the fifth enterprise has a family control; it is part of a national group of enterprises and is from the Construction Industry sector, more specifically, the Manufacture of Ceramic Tiles. The enterprise had, in 2014, an average of 400 employees and an estimated total annual turnover from the range of more than R$ 90 million and less than or equal to R$ 300 million. The respondent is the Director and the main hereditary successor of the firm, holds a Ph.D in Geology and works with Research and Product Development and Quality and Manufacturing Control. The Financial and Administrative manager of the firm also contributed with data information via e-mail, providing additional information about the research variables.

5.1.6. CASE FIRM 6: A BORN GLOBAL FIRM

Founded in 1987, the sixth enterprise has a family control and is from the Foods and Beverages sector, more specifically, the Production of Whole Sugar sector. The enterprise had, in 2014, an average of 150 employees and an estimated total annual turnover from the range of

more than R$ 2,4 million and less than or equal to R$ 16 million. The respondent has a Bachelor Degree in Finance and is the Chief Executive Officer, the main hereditary successor of the firm. In addition, an employee of the firm presented the manufacturing process and another employee of the firm, which is in charge of the Export department, presented the firm's documents related to international certifications. This employee justified the need of each certification to the control of the production process of the organic whole sugar, the firm's product, from planting to manufacturing and to the international commercial activities.

5.1.7. CASE FIRM 7: AN INTERNATIONAL NEW VENTURE

Founded in 2002, the seventh enterprise is from the Manufacture of Electric Material for Installations in Consumption's Circuits. The enterprise had, in 2014, an average of 50 employees and an estimated total annual turnover from the range of more than R$ 16 million and less than or equal to R$ 90 million. The first respondent has a Bachelor Degree in Electrical Engineering, is the Commercial Director and one of the seven owners of the firm. This respondent also participates in the decision-making process concerning the innovation development process, which is centered in the Engineering Department of the firm, the main department responsible for the innovation development. The second respondent is the Commercial manager of the firm and is in charge for the domestic and international commercial operations.

5.2. THE INTERNATIONALIZATION PROCESS OF THE CASE FIRM 1

The analysis of the internationalization process and the decision criteria to determine the internationalization pattern are in accordance with empirical criteria used for defining early and rapidly internationalizing enterprises. This framework is central for the analysis of the internationalization pattern and the comprehension of the enterprise's internationalization process. The comprehension of the internationalization pattern first centers in presenting the empirical criteria used for defining early and rapidly internationalizing enterprises to, after, compare with the enterprise's patterns. Table 15 presents the criteria:

Decision Criteria	Explanation
Time Lag (Commencement)	Early; From 3 years to 10 years after the firm's inception.
Foreign Sales Ratio (International Sales Intensity)	Percentage of international sales to total sales in the commencement year of the enterprise's outward commercial activities; Large share of foreign sales; Different definitions, usually more than 20% to 80%.
Countries (Geographic Scope)	Concurrent domestic and international expansion; Worldwide operations focusing on lead markets; Several global markets at the same time.

Table 15: Characteristics of the Born Global Firms Internationalization Pattern

Source: Based on Nessel (2013), Olejnik and Swoboda (2012, p. 487), from Bell et al. (2003), Acedo and Jones (2007), Crick (2009), Kuivalainen et al. (2012), Kuivalainen et al. (2007).

As the first case firm operates on two different sectors, two distinctive analyses is performed. The first part of the presentation centers on presenting a global perspective concerning the firm's performance in international sales to, therefore, present the Ophthalmic and Medical Equipment sector and the Defense and Space sector.

International Sales Performance

The analysis of the international sales performance aims to support the comprehension of the internationalization process of the case firms. This temporal analysis converges to provide additional data to support the classification of the case firm, according to the criteria of the internationalization pattern literature (Acedo & Jones, 2007; Knight & Cavusgil, 2004; Kuivalainen, Saarenketo, & Puumalainen, 2012; Kuivalainen, Sundqvist, & Servais, 2007). The database from MDIC (2016a) provides time series that enhance this analysis. The available period is from 2001 to 2015, which, in this case, does not contemplate the entire period of the internationalization process; notwithstanding, this period provides ground for its analysis. Table 16 presents the international sales performance, for both sectors, of the first case firm:

Period	Export Performance Range
From 2001 to 2005	Up to U$S 1 million
From 2006 to 2011	U$S 1 million to U$S 5 million
From 2012 to 2015	Up to U$S 1 million

Table 16: International Sales Performance of the First Case Firm

Source: MDIC (2016a).

From Table 16, it is important to observe that the firm experienced a de-internationalization process during the period of 2012 to 2015. The definition of the de-internationalization process is the reduction of the commercial operations in international markets. The factors that explain this process are the divestments due to the reduction of the market share, external crisis, changes in the firm's international operation mode, rupture of

strategic international alliances and the closure of the international commercial activities (Benito & Welch, 1997; Nummela, Saarenketo, & Loane, 2014; Zen & Santos, 2013). In convergence with this explanation, the first respondent mentioned the importance of the emerging variables in the internationalization process of the firm, such as the external and internal economic crisis, the seasonality and government issues that influence the progress and the development of this process.

The temporal analysis brings further contributions for the internationalization pattern literature (Acedo & Jones, 2007; Bell et al., 2003; Knight & Cavusgil, 2004; Kuivalainen, Saarenketo, & Puumalainen, 2012; Kuivalainen, Sundqvist, & Servais, 2007). Time series provide grounds for the comprehension of different international sales performance periods, which brings to the analysis of the internationalization patterns additional data that aim to present changes occurred during the internationalization process. Therefore, the classification criteria, along with the temporal analysis, enhance the comprehension of the internationalization process.

International Sales Intensity of Innovative Products

In order to verify the international sales intensity of innovative products, the first part of the presentation aims to show the volume of sales of the products to total annual turnover in 2014, for the Medical and Ophthalmic Equipment sector and for the Defense and Space sector. Subsequently, the second part of the presentation aims to present the international sales intensity of different types of products in 2014. Table 17 presents the first part of the data:

Sector	Total Sales/Total Annual Turnover in 2014 (%)
Medical and Ophthalmic Equipment	40
Defense and Space	40
Optics	20

Table 17: The Representation of the Sectors from Total Annual Turnover in 2014

Source: Research Data Analysis (2015).

The second part of the presentation focuses on the analysis of the international sales intensity of different types of products, from both sectors, in 2014. Table 18 presents the second part of the data:

Types of Products	International Sales/Total Sales in 2014 (%)
New or significantly improved products, developed during the period of 2010 to 2015	80
Unchanged or not significantly improved products	20
The resale of products	0

Table 18: International Sales Intensity of Different Types of Products

Source: Research Data Analysis (2015).

Tables 17 and 18 present the sales performance of the sectors and of the different types of products. In terms of sectoral analysis, the Medical and Ophthalmic Equipment and the Defense and Space have the same participation in the total annual turnover, in 2014, and the Optics products, which are lenses, have a lower participation, of 20% from total annual turnover. Considering the sales performance of innovative products, they correspond to 80% from the total international sales. The explanation for this participation is due to the incremental innovations in medical equipment, necessary to upgrade the products for a competitive placement in international markets. Yet, the need to develop product innovations for the Defense and Space sector, which are in accordance with the requirements of the client-nation, is also part of the innovation development.

Ophthalmic and Medical Equipment Sector

The decision criteria to determine early and rapidly internationalizing firms are presented in Table 15. Table 19 presents the internationalization pattern of the Ophthalmic and Medical Equipment sector:

Decision Criteria	Data
Time Lag (Commencement)	1987 (1 year after the firm's inception)
Foreign Sales Ratio in 1987 (International Sales Intensity)	~3%
Geographic Regions	North America – 100%
Foreign Sales Ratio in 2014 (International Sales Intensity)	~5%
Geographic Regions	Asia and Oceania – 30%; Europe – 20%; North America – 50%.

Table 19: Characteristics of the Born Global Firm for the Ophthalmic and Medical Equipment Sector

Source: Research Data Analysis (2015).

Considering the Ophthalmic and Medical Equipment sector, the first case firm presents a rapidly and early commercial expansion to foreign markets; in this case, the commencement of the international market expansion focused in North America, in other words, the main target market was the North-American market. This characteristic denotes an international market expansion to further markets, which is a distinctive characteristic of born-global firms. Yet, considering data from 2014, the firm presented an international market expansion of the ophthalmic and medical equipment, which is an indicative of the products' competitiveness in international markets and the strategic placement of the foreign commercial activities. The proxy for the foreign sales ratio of born-global firms is from 20% to 80% from total annual turnover (Acedo & Jones, 2007; Knight & Cavusgil, 2004; Kuivalainen, Saarenketo, &

Puumalainen, 2012; Kuivalainen, Sundqvist, & Servais, 2007), which, in this case, is the solely criterion that differs from the literature.

The first case firm is an exporter and has two people in charge of the International Trading and Export Department. The firm had a subsidiary, the global division in Adelaide, Australia, which focused on producing ophthalmologic and medical equipment. This international division was strategic to the firm, due to international agreements with the USA to export and to produce ophthalmic and medical equipment under the Brazilian costs of export and manufacturing. However, this subsidiary was sold and nowadays the firm receives royalties from the production of ophthalmic and medical equipment from this ex-subsidiary.

The following variables that emerged from the data analysis of the internationalization process of the first case firm are the Business Networks, the International Trade Fairs, the Country-of-Origin-Image and the Country-of-Origin on Product Image. The subsequent sections present the emerging variables in this order.

International Business Networks

The internationalization process for the ophthalmic and medical equipment sector began in 1987 and the main reason to expand internationally, through export, was due to the enterprise's business networks in foreign markets. According to the respondent, there was not a formal strategic planning to start selling abroad, which, in turn, reiterates the determinant role of business networks to provide information and support concerned to the internationalization process and foreign markets (Ghauri et al., 2003; Johanson & Vahlne, 2009; Sharma & Blomstermo, 2003; Tambunan, 2009; Tang, 2011). As stated by the respondent, the ophthalmic and medical equipment international market expansion is not only closely dependent on business networks established in foreign markets but also is correlated to the active participation of the enterprise in international trade fairs. In this case, the enterprise had strategic partners abroad that supported the international expansion. As exposed by the respondent, business networks and partnerships are vital to the international expansion and to the innovation development. In order to confirm the importance of business networks to the internationalization process, an interview extract corroborates with this affirmation:

> We recognized some opportunities in international markets because we had people there that informed us.

The strategic role of the business networks, the managers' social capital and the strategic alliances not only focuses on the achievement of different sources of knowledge for the internationalization process, but also enhances ownership practices and the innovation development. The positive outcomes of these social bonds result from the interconnection power of the participating members and the available knowledge within these networks (Granovetter, 1983; Fligstein & Dauter, 2007). In addition, Andersson and Florén (2008) integrate this argument, affirming the importance of bonds of trust established among the participants, evidenced in the first case firm, and the presence of communication channels that enable information exchange, aiming to propel the productive performance of the enterprises' activities and to provide basis to management changes. The interviewee mentioned the preponderance and the power of the international business networks over the strategic planning:

> In our case, there was not a super well planned strategic approach (to the internationalization process), right or wrong, it was not like this. We recognized some opportunities and we pursued them. It was not like: "No, we are going to conquer the international market". We are going to make a business plan. We already had, we already had, we had some that worked, we had some that did not work. Each case is different.

Ruzzier et al. (2006) synthesize the definition of the internationalization process and present the network perspective, based on Johanson and Vahlne (1990) and on Lehtinen and Penttinen (1999). Johanson and Vahlne (1990) affirm that the internationalization process consists on continuously establishing, developing and maintaining strategic networks with key actors that sustain the enterprise during this process. The main purpose of a network is, therefore, to ensure relationships that are valuable to this process, which are essential to the internationalization process of this case firm. Lehtinen and Penttinen (1999), in turn, reiterate that the internationalization process is the settlement of business networks abroad, through the phases of extension, penetration and integration. In addition, there is an emphasis on the firm's environment, as determinant for the success of this process, as the result of the manager's cognitive and attitudinal readiness, manifested in the utilization of different international activities, such as inward, outward and cooperative operations.

International Trade Fairs

In addition to business networks, international trade fairs are entrance doors to international markets. Evers and Knight (2008) state that trade fairs are temporary network hubs that mainly serve to connect buyers and sellers directly, acting as an accelerator infrastructure characterized as a neutral territory, where competitors tend to present a collective, although

independent, behavior. This aspect is especially important concerning competitors from the same country that, in a foreign environment, tend to be cooperative.

In trade fairs, there is the direct contact among participants and final clients, which enables the alignment of solutions proposals and a better communication in order to customize products, where it is possible to explain the product's characteristics, differentials and functionalities, to provide better assistance to potential clients and customers. Yet, trade fairs are important for gathering information, to enhance the enterprise's reputation and to participate in exhibits arranged by other parties, as there are common benefits for the involved enterprises. The importance of trade fairs is, thus, to promote effective commercial negotiations and business networks (Blythe, 2009; Evers & Knight, 2008). In order to reach the North American market in the eminence of the international expansion, international trade fairs played a key role in this process:

> How did we reach the North American market, there? We went to an international trade fair, representing, and it is funny because the North American (clients) are very open in this aspect. They like new things.

Considering the enterprise's strategy, international trade fairs are also meaningful to reach the domestic market, as important and potential national clients are used to visit them. Thus, its main finality is to promote effective commercial negotiations to, indirectly, strength, maintain and expand the domestic market. In this sense, this differential corroborates with the findings of Evers and Knight (2008) and Blythe (2009), in terms of reaching specific types of public to maintain an effective pitch to begin a successful commercial negotiation. The correct approach and a clear and precise communication to different groups of buyers hinder the commercial negotiation failure rates in trade fairs and promote the transition from a short-term episode to a long-term process.

Skerlos and Blythe (2000) emphasize the importance of the communication skills from the part of the trade fair organizers, as the focus is on attracting potential buyers to the stand in order to sign sales contracts. The objective is to reach the group of the wheeler-dealers, defined as people who have the potential and the intention to buy, which are experienced buyers ready to negotiate and to know the characteristics and the functionalities of the product, as they are searching for sources of supply and information (as cited in Blythe, 2009). Tafesse and Skallerud (2015) affirm that trade fairs are means for social, cultural and business exchanging experiences, which are essential for managers aiming to obtain successful return from social experiences and from information-gathering. A well-grounded business network consolidated in trade fairs brings a sense of stability in a rapid changing environment to firms. For the first

case firm, trade fairs are determinant for the internationalization strategy and are a differential for the ophthalmic and medical equipment, as stated:

> Do you want to find Brazilian doctors? Go to the American Academy of Ophthalmology. They are on vacation. So, the most famous and the most important Brazilian ophthalmologists are there. It is easier to find them there in a trade fair in the USA. Everybody goes there. . . . So, for 10 years, we exposed in the American Academy of Ophthalmology not to export mainly to the USA, but to advertise to Brazil (to Brazilian ophthalmologists and other clients).

This finding brings further contribution to the relationship Marketing literature (Blythe, 2009; Evers & Knight, 2008), enhancing the understanding of the interaction dynamics' influence in an international context, where compatriot buyers and sellers are willing to establish commercial negotiations. This market niche, the most prominent Brazilian ophthalmologists, are exigent and experienced buyers that demand high technological and innovative ophthalmic and medical equipment that embody the state-of-the-art technology, functionalities, friendly user interface and optimal solutions for ophthalmic techniques and procedures. The Annual Meeting and Exhibition of The American Academy of Ophthalmology converges to reach the expectations of this selected market niche, as equally reiterated by its slogan and by the respondent of the first case firm: "Experience the Largest Exhibition of Ophthalmic Technology, Products and Services in the World" (The American Academy of Ophthalmology, 2016). Therefore, the Annual Meeting and Exhibition of The American Academy of Ophthalmology (2016) unites a fruitful business and academic environment, in conjunction with several social networks opportunities, sustaining and clamming for the presence of worldwide participants, including prominent Brazilian ophthalmologists as well as Brazilian enterprises from this sector.

The Annual Meeting and Exhibition of The American Academy of Ophthalmology (2016) is a hub of worldwide buyers, sellers, researchers, senior and young ophthalmologists and students, lively for finding novelties from the ophthalmic area and innovative products and technologies, which promotes effective academic and business networks among the visitors, leading to a relationship reinforcement and development. In addition, there are specialized lectures and cutting-edge laboratory practices to the academic and practitioners participants that provide access to recent knowledge in the field of clinical procedures.

This specialized meeting converges in a unique event the academic and the professional backgrounds and trade objectives, providing a favorable, rich and complete environment for apprenticeship, business negotiations and employment opportunities. Sarmento, Farhangmehr and Simões (2015) present that international trade fairs participants search for product innovation in trade fairs, especially expected from high-technology industries, as trade fairs are

also pronounced spaces for launching new products. This finding converges and corroborates with the expectations and objectives of the first case firm from international trade fairs.

Country-of-Origin, Country Image and Country-of-Origin-Image

Roth and Diamantopoulos (2009) present an evolutionary perspective that aims to reach to a definition and placement of the Country-of-Origin-Image (COI) construct, reiterating the importance of this construct to the consumer's decision in buying products through the analysis of the country of origin. The Country-of-Origin (COO) and the Country Image (CI) concepts are fundamental to comprehend and to delineate the transition to the COI construct. Cerviño, Sánchez and Cubillo (2005), as cited in Souiden, Pons and Mayrand (2011), as well as Roth and Diamantopoulos (2009), present the COO concept as the representation that buyers and business people have from a product, its perceived characteristics and attributes, which are related to its country of origin. Therefore, the definition of the CI concept is "the overall perception consumers form of products from a particular country, based on their prior perceptions of the country's production and marketing strengths and weaknesses" (Roth & Romeo, 1992, p. 480). Additionally, a further concept is of equal importance concerning the performance analysis of a country in international markets, which is the Product Category Image (PCATI), defined as the image of a country's products from a particular category (Diamantopoulos, Schlegelmich, & Palihawadana, 2011). Moreover, the consumer's perception and acceptance towards a product are related directly to the COO attribute (Cerviño et al., 2005, as cited in Souiden et al., 2011; Roth and Diamantopoulos, 2009).

Roth and Diamantopoulos (2009, p.726) state that "the focus of COO research has gradually shifted from evaluating differences in product evaluations and preferences based on the mere notion of the national origin to a more complex construct, namely the image of the countries (CI) under consideration". Roth and Romeo (1992) explain the interchangeability amid the COO and the CI concepts, as the image of the country directly reflects on consumers' preferences for products from countries that are at the forefront of the product's development and the perception of the country's culture, economy and politics. This reference group influences the product evaluation, relating the country of origin of the product to the CI, thus matching the perception of the product and its country.

In order to encompass the COI construct, Diamantopoulos, Schlegelmich and Palihawadana (2011) synthesize recent arguments that surpass the importance of the COO concept, which are the irrelevance of the COO for international marketing operations, as the World Trade Organization rules do not consider the origin label of products. From the part of

the buyers, there is the inapplicability of knowing the correct COO of the products, as well as retaining such information. Thus, the measurement of the COI construct considers the CI concept as the product's origin. Instead of focusing on the product as the main reference variable to evaluate the CI concept, other elements such as the industrial and technological development level, the country's political image, the economic image and the environmental image are brought into the discussion (Souiden, Pons, & Mayrand, 2011).

Roth and Diamantopoulos (2009) present important considerations to frame the COI construct properly. The first refers to the fact that the image of the country affects the consumer's evaluation of the country's product and other outcomes, such as investments, visits and ties with a country. This signalize that the COI construct embraces further commitment, in terms of establishing long-lasting business relationships with a country, which are no longer solely related to the CI concept as product's image. The latter refers to the approach analysis to comprehend the COI construct, by the lens of the attitude theory, which not only takes into account the evaluation criteria but also the affective, which are the feelings and emotions, as well as the facets of behavioral issues. The completeness of this theory sheds light on the comprehension of the COI as a whole; as it is not restricted to the origin of the product, which is the main parameter of the CI concept, also bringing further elements into analysis.

The first case firm relates the international evaluation and the perception of the doctors concerning the Brazilian ophthalmic and medical equipment, directly related to the abovementioned COI construct. The COI of the product affects the buyers' perception of the firm's product. The COI of the product, considering the experience of the first case firm, influences on the buyers' decisions of choosing and buying a high technological product, which may also reflect the Brazilian technological development pattern (Furtado & Carvalho, 2011). The interview extract that corroborates with this affirmation is:

> There is the country brand. So, we, these equipment exported to the USA, we have, until today, an office in the USA, where they have behind (the ophthalmic and medical equipment) "Made in the USA". The last assembly part, including the final tests, are done there, in Miami.
>
> . . . So, you have this equipment here that is sold in Germany with the brand (name of the German brand), which is our partner in Germany, we had in the USA with our own brand, but it is sold as "Made in the USA".

The cognitive process to acquire a technology is long and time consuming, as the customer needs to evaluate and search for information before buying the technology. The decision process of acquiring technologies is also important in organizational situations, where opinions and points of view of all the actors involved in this process are take into account, as

well as when this acquisition involves business networks (Aarikka-Stenroos & Makkonen, 2014). Technological products are, in a broad sense, associated to developed countries, like USA, Japan and Germany. This association encompasses the COI, as, specifically considering this group of countries, the technological and the innovation development enhance the competitiveness of their high-tech products, reporting therefore for their large market niche (Souiden et al., 2011).

The participation in trade fairs in admittedly technological countries is strategic and of great importance, as presenting a high-tech product from the medical and ophthalmic sector required from the firm the participation in The Annual Meeting and Exhibition of The American Academy of Ophthalmology for ten years and the association with a partner in the USA. In addition to the partnership and the possession of the Food and Drug Administration (FDA) certificate to commercialize in the USA, the firm strategically benefited from business networks and international trade fairs to overcome the buyers's uncertainty related to the attributes of the high-tech products.

The Characteristics of the North American Clients and the Scientific Partnerships with Universities and Research Institutes

The distinctive characteristic of the North American doctors is the exigency level required from medical and ophthalmic equipment, which are associated with the profile of the North American doctors. The respondent stresses the characteristic of this public in the subsequent interview extract:

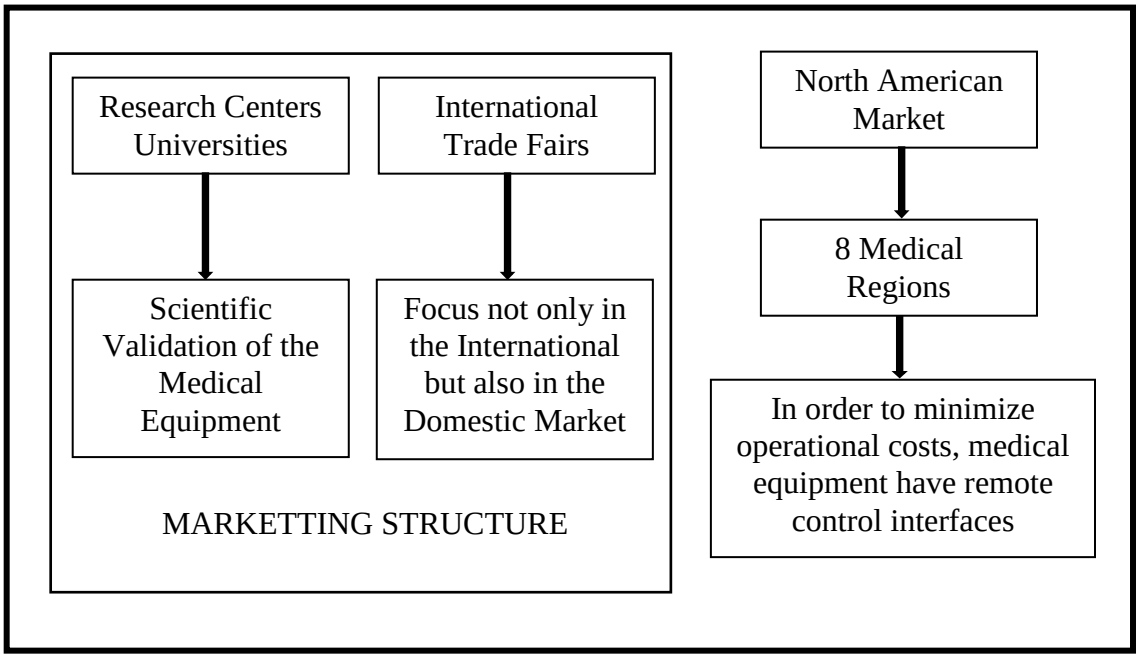
> The North American, especially for medical equipment, is super conservative. These equipment come with a suitcase, and the doctor keeps carrying it with him. The North American (doctor) carries these equipment with him. So, the equipment breaks. His work is dependent on the equipment. So, you have to have a technical assistance, rapid answer, to sell this equipment. And it is not worth if you have an office of technical assistance only in Miami, for example. You must have in the main medical regions. And there are 8. In the USA, there are 8 regions there that are respected exponents in medical terms; there must be technical assistance there.

According to this conservative profile, the respondent also stated that, as there are medical ethics protocols, the North American doctors are prudent when buying medical and ophthalmic equipment. To overcome this constraint, there are partnerships with universities and research centers that are able to use and to develop research using the medical and ophthalmic equipment. After using and publishing academic papers about these equipment, the firm establishes further commitment with other publics, which are the doctors. The Marketing structure is a determinant factor considered by the firm, as there are particularities concerning

the North American market and the medical regions to provide adequate and rapid technical assistance to North American doctors. In the USA, there are eight medical regions to supply with rapid technical assistance, which, in other words, means that the firm needs to have a strong standby power, due to, as mentioned by the respondent, the fact that North American doctors are dependent on their equipment to work.

The attentive consideration with the Marketing structure is in concordance with the contributions of Souiden, Pons and Mayrand (2011), as the first case firm comprehends the characteristics of the North American medical and ophthalmologic equipment buyers and reiterates the importance of the post-sales services. This characteristic of the North American buyers is determinant to analyze the Marketing structure of the first case firm, referring to the Medical and Ophthalmic Equipment sector, which demands the consideration of the buyers' characteristics, in other words, the relational dynamics amid the user and the product. The product's utilization is, therefore, an important variable to consider in terms of structuring the Marketing of the firm, along with the COI (Roth & Diamantopoulos, 2009) and the PCATI (Diamantopoulos, Schlegelmich, & Palihawadana, 2011).

Schema 1 presents the Marketing structure of the first case firm, thus emphasizing the role of universities and research centers to test and to validate the product, as well as the international trade fairs, to promote the product mainly to buyers from the domestic market. In addition, the medical regions in the USA are in this Schema as well, due to the importance of operating across the entire country as well as its inherent costs.



Schema 1: First Case Firm Marketing Structure

Source: Research Data Analysis (2015).

The costs to operate in the North American market are also a prevalent factor to consider in reaching this target market. In order to serve the North American market in terms of having a specialized sales team, investing in Marketing and having a rapid technical support, the firm did considerable investments to compete in this market. Even though the North American market is promising and attractive, the firm had to find alternatives besides financial investments to remain competitive in the North American market. The firm developed, around twelve years ago, a product innovation, which consists on the communication interface of ophthalmic equipment that can be accessed and repaired remotely. This enables the firm to provide rapid technical assistance, to verify and to solve possible problems of these equipment. Thus, the subsequent interview extract confirms the strategy of the first case firm to operate in the North American market and presents an example of product innovation, which is the communication interface of ophthalmic equipment that can be accessed and repaired remotely:

> We are talking about things of 10 years ago, 12 years ago, when nobody talked about this, and we access the equipment from the USA here, we see what is happening. So, we give them a support. We did a remote repair of an equipment that was in Gaza. The person called me in a Saturday, from Gaza, it was an Egyptian, a friend of ours that sells our equipment, from Gaza. And what happened to this equipment? It was a retinographer. Why did it have a problem? Because when he was crossing Gaza, the Israeli Army opened the box and dismantled the equipment, thinking that it was a bomb. They saw that it was a medical equipment and closed it. (the person) Closed it but it did not work. So the Egyptian said: "They dismantled everything here. What are we going to do?". . . We verified that remotely. Remotely. So, turn on this connector (simulation of a speech of the enterprise's technician). He turned on and the equipment worked. This was in a Saturday, using the Internet, from Gaza.

The link between the role of the trade fairs, the partnerships with universities and research centers and the role of the COI brings further contribution to the international Marketing literature (Diamantopoulos et al., 2011; Roth & Diamantopoulos, 2009; Roth & Romeo, 1992) concerning the strategy of a Brazilian technology-based SME in global markets. Additionally, it is in line with the theoretical perspective of Souiden, Pons and Mayrand (2011) that bring to the analysis the CI, COI on product image, the buyers' aspiration, uncertainty and purchase intention variables. The CI and the COI on product image are determinant variables that direct the causal relationship of the buying decision of the North American doctor, thus aiming at reducing the buyers' uncertainties, at the same time enhancing and strengthening the buyers' aspiration and purchase intentions. Therefore, the analysis of the competitiveness of the medical and ophthalmic equipment encompasses the role of the trade fairs, the partnerships, the CI and the COI on products, considering the buyers' aspiration, uncertainty and purchase intention and the Marketing structure of the firm.

Defense and Space Sector

The subsequent market is the Defense and Space Sector. The main characteristic of this market concerns to the product and the process innovation development. Considering the first type of innovation, the firm is contractually obliged to follow the development methodology of the client-nation. In this sense, the internationalization process of the Defense and Space sector is by projects, which are regulated by the client, as each nation has norms and regulations that govern this sector. The products are, therefore, highly innovative and developed according to the client-nation contract's requirements, in order to prevent and reduce risks to the government. The firm works in cooperation with the Brazilian Army and develops international cooperation projects for the Defense sector. The internationalization process for this sector began in 1989 and has the following pattern, presented in Table 20:

Decision Criteria	Data
Time Lag (Commencement)	1989 (3 years after the firm's inception)
Foreign Sales Ratio in 1989 (International Sales Intensity)	~10% - This is a partial value, as the project was interrupted due to constraints from the organizational environment
Geographic Regions	Middle East – 100%
Foreign Sales Ratio in 2014 (International Sales Intensity)	10% - This is a partial value, as the project is on-progress
Geographic Regions	Africa – 100%

Table 20: Characteristics of the Born Global Firm for the Defense and Space Sector

Source: Research Data Analysis (2015).

Considering the Defense and Space sector, the first case firm presents a rapidly and early commercial expansion to foreign markets; in this case, the commencement of the international market expansion focused in the Middle East region. This characteristic denotes an international market expansion to further markets, which is a distinctive characteristic of born-global firms. Yet, considering data from 2014, the firm presented an international market expansion of the Defense and Space products, which is an indicative of the products' competitiveness in international markets and the strategic placement of the foreign commercial activities. The proxy for the foreign sales ratio of born-global firms is from 20% to 80% from total annual turnover (Acedo & Jones, 2007; Knight & Cavusgil, 2004; Kuivalainen, Saarenketo, & Puumalainen, 2012; Kuivalainen, Sundqvist, & Servais, 2007), which, in this case, is the solely criterion that differs from the literature.

The subsequent sections are The Product Innovation Development Process and The Dynamic Capabilities for Innovation. The main objective is to present the technological innovation development process of the first case firm, thus highlighting its differentials and characteristics. The last section presents the dynamic capabilities for innovation, which

emphasizes the technological and organizational capabilities inherent to the firm that support the product innovation development, thus corroborating with market competitiveness.

5.2.1. THE PRODUCT INNOVATION DEVELOPMENT PROCESS

The analysis of the product innovation development process focuses on presenting the technological innovation development of the firm, from the period of 2010 to 2012, aiming the evaluation of the innovation performance and the competitiveness of the firm in both national and international markets. This indicator is an important parameter to evaluate the product innovation development and to measure its effect on sales intensity, since innovation is a path dependent process that takes some time to manifest its effects on the firm's activities. In this sense, the time lag from the product innovation development to the international sales intensity is two years, as the data concerned to the latter variable is from 2014 (D'Angelo, 2012; Pla-Barber & Alegre, 2007; Rodríguez & Rodríguez, 2005). This analysis aims to verify whether there is a correlation amid the product innovation development and the international sales intensity, as shown on Tables 13 and 14 from the International Sales Intensity of Innovative Products section. The descriptive statistics for this analysis provide further support to verify this correlation, supported by the interview extracts, presented during the data analysis.

The Product Innovation Development

During the period of 2010 to 2015, the enterprise developed and launched eleven innovative products from the Ophthalmic and Medical Equipment sector, based on continuous improvement, in other words, mainly incremental innovations in order to remain competitive in the market. This number includes innovative products from the Defense and Space sector, which are satellite cameras, thermal sights and components of missiles, such as seekers. The product innovation development of the Defense and Space sector is based on contractual terms, which direct this process and ensures the accomplishment of the manufacturing process.

The Product Innovation Development Process of the Ophthalmic and Medical Equipment Sector

The Ophthalmic and Medical Equipment sector presents a portfolio of products focused on the diseases of the human eye. The portfolio of laser equipment for retinal and ophthalmic

treatment and ophthalmic surgeries embodies a sophisticated technology that is part of the innovation process trajectory of the firm. The firm, in its first years of existence, was the first firm in the South hemisphere to produce a type of laser. In the subsequent years, the firm developed industrial applications through the utilization of this type of laser. This core competence of the firm on Physics and Optics led to the development of medical and ophthalmic equipment.

The product innovation development of the firm, for this sector, is based on the core competences developed by the firm on Physics and Optics applied on Ophthalmology. The product development process of medical and ophthalmic equipment converges with the medical treatment finalities of the product, as each product uses a type of light and laser control directed to a medical treatment or surgery. The research development on Physics and Optics, the core competences of the firm, confers the product's competitive characteristics, not only for this sector, but also for the Defense and Space sector. Yet, the ophthalmic and medical equipment obeys ergonomic conditions to provide safe and correct conditions of use for users.

The distinctive competence in Physics and Optics and the continuous research development on this field of research in the search for further applications on the medical, ophthalmic, industrial and aerospace areas direct the firm's competitiveness in the domestic and international markets. In addition, the industrial structure, equipped with high-tech machinery, devices and equipment, the R&D staff and the laboratories sustain the continuous innovation development process and its improvement, thus conferring the firm the pioneering in the development of ophthalmic and medical equipment. The focus on the product's quality, the firm's certification to operate both domestically and abroad and the firm's innovative performance direct the market expansion of the firm, in order to reach target markets that are strategic for the firm.

The enterprise fundaments the project of the product development and the coordination of the innovation management phases for the Ophthalmic and Medical Equipment sector on the PMBOK – Project Management Body of Knowledge, from the PMI – Project Management Institute, which provides guidelines to project management. The finality of the PMBOK is to show the body of knowledge in project management that is widely recognized as "Good Practices" and to provide standards and indicators to conduct the development, the implementation and to monitor the phases of the project. The PMBOK (2013, p. 1) defines a project as a "temporary effort invested in creating a product, a service or an exclusive result. The temporary nature of a project indicates that projects have a defined beginning and final

date". The PMBOK also standardizes the terminologies, in order to provide a clear comprehension and application of the guide (PMBOK, 2013).

The Product Innovation Development Process of the Defense and Space Sector

Notwithstanding the measurement of the innovation effects on international sales intensity requires a time lag, the respondent considered the time scope of 2010 to 2015. The consideration of this time scope can be explained due to the international cooperation project from the Defense sector, in 2014, which pushed the product innovation development to attend this project. The product innovation development for the Defense and Space sector has to follow specific doctrines and parameters in order to contemplate the requirements from the client-nation. The development process for this product innovation, therefore, demands high-specialized personnel. In addition to the technological innovation development and the dynamic capabilities for innovation, the respondent mentioned that there are further emerging variables that influence in the innovation development process and in the internationalization process, such external and internal economic crisis and seasonality, which reiterates the importance of the emerging variables' analysis.

The Defense and Space sector occurred during the subsequent years of existence of the firm, as a result from the continuous innovation development in Physics and Optics for the development of devices for image precision. In reference to this sector, there are specific doctrines to base the product development. Considering the product development for the Defense sector destined to the Brazilian Army, the enterprise has to obey methodologies and systematization parameters to prevent and reduce risks to the government, as specified in the contract. The respondent explained the norms of the contracts inherent to the product development projects for the abovementioned sectors and exemplified this issue:

> So, in the specific case of products to the Army, we have to obey the doctrine of the Army. They have a methodology that we are contractually obliged to follow. Due to questions related to risk reduction. And it is not risk reduction to the company, it is a risk reduction to the government. And this is an important point.

In addition to the risks' reduction for the product innovation development, the respondent mentioned the major importance of the contract confidentiality for the product and process innovation development. The emphasis on the confidentiality for the product innovation development for the Defense sector appears in the following interview extract:

> So, depending on certain contracts that we sign, there is a confidentiality contract that we cannot publish anything. So no one knows exactly with what we work.

The Defense and Space sector concentrates strategic process innovations due to intrinsic characteristics of this sector. The innovation development, especially for the military area, is confidential, which means that the enterprise that develops products for military divisions is obliged to maintain the innovation development in secret, because of the legal terms of the contract and due to confidentiality requirements from national Armies. In addition to the confidentiality criterion, there are international boycotts that constraint the innovation development. Consequently, the respondent explained that there are components and equipment that are not available for the firm to develop product innovations for the Defense and Space sector. Due to this unavailability, the firm has to develop other solutions to have further advances in product development in this sector. This confidentiality criterion implies that the innovation development for national strategic sectors pursues the closed innovation process, mainly dependent on internal ideas, or at most as a result of partnerships with the national Army R&D laboratory, and has low labor mobility. An example of an industry that strongly relies on the internal innovation development, according to Chesbrough (2003), is the nuclear reactor industry. In order to test and to do essays, the firm invested on the necessary infrastructure to simulate space conditions to test the products and to do research, as there are constraints, due to confidentiality criteria, in accessing the findings and advances from the Defense and Space areas.

This obligates the firm to develop processes and solutions that serves for the purpose of the product development for the military area. The new findings are confidential and the innovation process is continuous in this sector, as there are constant improvements in technology and solutions applied to military products. In this sense, even though there are advanced solutions developed by other national Armies, as explained by the respondent, the enterprise does not have access to this information and this condition obligates the firm to find alternative solutions, through research, essays and tests with different components. The product and solutions development for the military area are, as emphasized by the respondent, confidential. Yet, in multidisciplinary firms, there are innovation processes that serves for both sectors, which support and enhance the product innovation development.

The funds for developing the product innovation in this sector are the private capital, the financed capital and the contracts. Concerning the Defense and Space sector, since 2012 the enterprise did not establish new contracts with the Brazilian government, continuing only with the projects that were previously established. The stagnation of the Defense and Space sector contributes to explain the restructuration of the enterprise's organizational structure and the reduction of the number of employees. In 2010, the enterprise had an average of 500 employees.

Due to this organizational restructuration, the enterprise had an average of 150 employees in 2014.

Scientific Partnerships for the Innovation Development

According to the characteristics of technology-based SMEs, the role of the partnership with universities, research institutes and other enterprises is central for the innovation development (Côrtes, Pinho, Fernandes, Smolka, & Barreto, 2005). Technology-based firms are from sectors that place the innovation as the essence of their competitive strategy and core competencies, thus characterized for the development of technological products, the employment of skilled workforce from scientific and technological fields of knowledge and are firms that invest a considerable part from total annual turnover in R&D (Financiadora de Estudos e Projetos, 2016). Toledo, Silva, Mendes and Jugend (2008, p. 119) define the technology-based SMEs as "engaged with the design, development and production of new products and/or processes, characterized by the systematic application of technical and scientific knowledge, serving specific market niches, usually not target by large corporations".

Ancillary to the scientific partnerships, there are government initiatives that support the innovation development of the enterprises. Among these initiatives, there are the Innovative Research in Small Business (Pesquisa Inovativa em Pequenas Empresas [PIPE], 2016) and the Support Research Program in Partnership for the Technological Innovation (Programa de Apoio à Pesquisa em Parceria para Inovação Tecnológica [PAPPE], 2016) under the responsibility of the Research Support Foundation of the State of São Paulo (Fundação de Amparo à Pesquisa do Estado de São Paulo [FAPESP], 2016).

According to Vick (2014), initiatives from funding agencies for research for the innovation development and the exchange of researches in enterprises are fundamental mechanisms to enhance the knowledge generation within the enterprises, providing substantial knowledge exchange to not only foster the innovation development, but also to find solutions to organizational problems. Yet, similar to FAPESP, there is also an important government research fund, the Funding of Research and Studies (Financiadora de Pesquisas e Estudos [FINEP], 2016), from which this case firm receives funds to develop research and innovation. There are interviews extracts that corroborates with the role of the scientific partnerships to the innovation development, considering as partners the universities and research institutes, the clients, market-related people and ex-employees, presented in this order.

> Who risks in buying a new equipment? The universities and the research institutes. So, we are going to establish an agreement with the university, do a conference, participate in a conference, sponsor some of their research, and they are going to find things, they are going to publish.
>
> . . . you have to keep the bonds with the market. So we participate in fairs, we participate in conferences, we have agreements with universities, agreements with research institutes, agreements with doctors. We are keeping contact with the market. And then you are searching for information in these markets. You search, you talk to someone, you talk to another person, and you realize you have an idea. The fact is that you must be in contact with the market.
>
> You must have bonds with frank and honest people from the market that are going to tell you: . . . "Oh, this is cool, do it".
>
> Do we keep bonds (with ex-employees)? Yes, we do. Sometimes I ask something and they inform me.

According to the sectors and the staff's characteristics of the enterprise, two determinant characteristics differentiate and contribute to the Scientific Partnerships for the Innovation Development research theme. Côrtes et al. (2005), D'Angelo (2012) Massa and Testa (2011), Pla-Barber and Alegre (2007), Sass (2012), Toledo et al. (2008) state that high-tech firms or technology-based firms are from sectors characterized for the intensive technological and innovation development, thus demanding specialized staff endowed with scientific knowledge. This firm has twenty percent of the total staff dedicated to the R&D, from which, eight employees hold a Doctorate Degree and twelve employees hold a Master's Degree. In addition, the firm fosters and encourages the employees to invest on academic degrees, as there are agreements with the University of São Paulo (USP) in Masters and Doctorate Programs to graduate the staff.

The latter characteristic complements the Technology-Based Firms literature (Côrtes et al., 2005; Oliva et al., 2011; Toledo et al., 2008), bringing to the analysis the importance of the exchange process with universities' Post-Graduate programs. This contribution not only converges with the characteristics of the technology-based firms as endowed with scientific personnel, but also places the scientific partnerships with universities in addition to the innovation development, with the establishment of exchange programs to graduate the staff. In conclusion, this elevates the number of specialized personnel to work directly on R&D and enhances the innovation development.

5.2.2. THE DYNAMIC CAPABILITIES FOR INNOVATION

The analysis of the dynamic capabilities for innovation focuses on the Knowledge Management, the Human Capital and the Recruitment Process, the Manufacturing Process, the Strategic Decisions concerning the Innovation Development, as well as the Business Environment and the Industrial Capacity of the Firm, which are embodied throughout the analysis. These dynamic capabilities encompass the main areas of an organization and are important for the innovation process and for the development of technological and non-technological innovations (Guan & Ma, 2003; Mothe & Thi, 2010; Nonaka & Takeuchi, 1997; Rowley & Sambrook, 2009).

The Knowledge Management

In terms of knowledge management and the strategic role of multiple sources of information, the firm has one employee, with a Ph.D Degree in Information Management that contributes to organize and systematize the knowledge and the information flows within the organization's boundaries. However, even though the knowledge management and systematization are important to keep the records of the organization's advances and failures within the strategic areas, such as R&D (Nonaka & Takeuchi, 1997), the respondent affirmed that the knowledge management and systematization is not determinant for the innovation development:

> We have here, we have a manager here that is specialist in this (knowledge management and systematization), he holds a Ph.D in this subject, in information management. . . . We have specialized servers for this, we have a specific methodology for this, everything works well but at the same time, it needs to be refined, we have, it is essential, no. . . . It is good because it registers what is done, but it is not, au contraire, it fosters the innovation, we did not fell that. What fosters the innovation is the contact with the client and the liberty to create a different solution.

The prevalence of the business networks appears again as an important variable for the innovation development. Indeed, this variable overlaps the knowledge and information management importance for the innovation development as well as the strategic planning for the internationalization process and the conventional procedures of the recruitment process. Partnerships, in a broad sense, including business networks (e.g. clients and suppliers) and scientific partnerships (e.g. universities and research institutes) are vital to the organization's sustainability in the market. The importance of partnerships for the first case firm strengths the

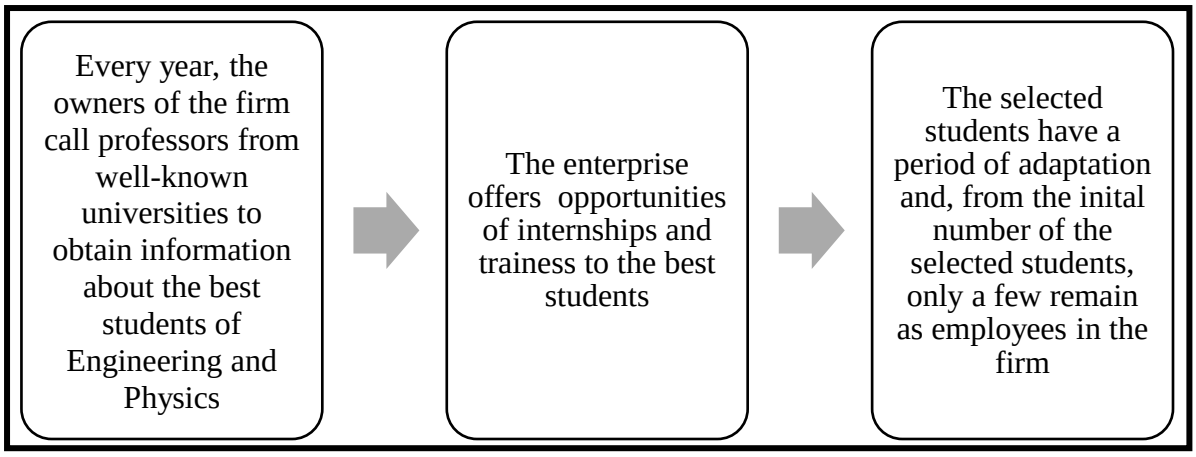
Technology-Based Firms literature theme (Côrtes et al., 2005; Oliva et al., 2011; Toledo et al., 2008). According to the sectors and the staff of this firm, there are determinant characteristics that differentiate and contribute to the Scientific Partnerships for the Innovation Development research theme. Due to the importance of partnerships, government initiatives have to be placed to foster the partnership's generation among enterprises, research institutes and universities. Clusters and industrial districts are drivers that sustain the partnership generation for the innovation development, due to the local proximity (Colovic, 2013).

The geographic proximity of enterprises positively supports the innovation development, which, consequently, leads to the improvement of the organizational performance. Nowadays, the interconnectivity among organizations also plays a key role in the process of innovation development, as the interconnectivity enables the exchange of information and knowledge, as well as provides business networks opportunities with universities, research institutes and other enterprises (Amato Neto, 2009; Porter, 1998). The Information and Communication Technologies (ICTs) support the interconnectivity among organizations and provide sources of scientific knowledge for the development of technological and non-technological innovations, which, therefore, is no longer solely dependent on geographical proximity (Colovic, 2013).

In relation to the intellectual property domain, the first case firm has an extensive number of patents, mainly from medical and ophthalmic equipment, registered in Brazil at the National Institute of Industrial Property (Instituto Nacional da Propriedade Industrial [INPI]) and in the USA, in the United States Patent and Trademark Office (USPTO). Due to the commercial interest in the USA and the facilities concerning the patent registering, in terms of record time, the first case firm also has North American patents.

Human Capital and the Recruitment Process

The recruitment process of the first case firm differs from the conventional recruitment process, as it is linked to the networks the owners have with universities. This distinctive characteristic is singular and places the organization in a privileged position, as it is given access to strategic information about the best students, from the third year of the Bachelor Degree in Engineering and Sciences, which can be the potential future interns. This strategic information comes from professors, which are from universities from the states of São Paulo and Rio Grande do Sul. The owners of the enterprise, including the R&D&I Director, are responsible for the recruitment process of the Engineering staff. Thus, the recruitment process follows the sequence presented in the Schema 2:



Schema 2: The Recruitment Process of the First Case Firm

Source: Research Data Analysis (2015).

The conventional recruitment process applied in private enterprises involves phases such as the job opportunity opening, the curriculum selection, the interview and the process of hiring the employee. The human resources management aims to, subsequently from the recruitment process, develop the competences, skills and abilities of the employee, ensuring the accomplishment of the professional activities and duties and the value of every occupation for the organization. The human resources management also has to present the guidelines and the trajectories of the professional career, which enables the joint development of the employee and the organization. Yet, in order to enhance this objective, the organizational focus should also be to place the employee to deal with challenging and complex situations (Dutra, 2010). The main differentials of this firm concerning the recruitment process are:

> We have a great team, we have the methods, the question is, our differential is that we have a great team, with well-graduated people, so our differential is in the recruitment process of these people. We never hire the person that knocks our door. We never did one announce, we need engineers. We never did. Our recruitment process of the best students is done this way. We follow the best students from University of São Paulo, from the State University of Campinas. So, in the third year, I call my friends there, which are professors until today. . . . like we say: "How is the harvest?" . . . "No, this year there are some good people" (simulation of a speech of the professors). So, there are some good people. So we hire these good people, we offer an internship and we follow this person.

The networks with the universities are an advantage for the first case firm, in terms of the possibility of hiring the best students. This close bond with universities converges with the foundational attributes of the firm and with the characteristics of an academic spin-off. According to Bigliardi, Galati and Verbano (2012, p. 180), an academic spin-off "involves the transfer of a core technology from an academic institution into a new company, and whose

founders may include the inventor academic who may or may not be currently affiliated with the academic institution".

The role of scientific partnerships with universities is determinant not only for the innovation development, but also for the employees' academic background development and for the recruitment process. This differential leads to great implications for this firm, as intensive scientific partnerships with universities aim to promote competitiveness and lead to academic and market acknowledgement. The interview extracts that corroborate with this affirmation are:

> That is why our big secret is: we have access to this privileged information of who the best people are. We are the University of São Paulo's group. It is the University of São Paulo's group because that is where we have bonds with the information providers.

Even though the academic degree is a valorized asset for the first case firm, there is a strategic issue concerning the employees from the Defense area. The Defense area has long-data employees that do not hold Post-Graduate titles, which are kept in secrecy wittingly. These employees are responsible for strategic projects from the Defense and Space sectors, have large experience in the field and are unknown in the market. The explanation for this lies in the confidentiality of the contract's terms for projects from the Defense and Space sectors, which hinder the publication of results, as well as the strategic role they have within the firm, as they are experienced employees that are essential for the Defense and Space sectors.

In conclusion, the networks the firm has with universities are determinant for the success of the recruitment process. This enhances the importance of the partnerships with enterprises and universities to obtain strategic information to achieve competitive advantages. The career management also has particularities, especially concerning the employees of the Defense and Space sector. The distinctive confidentiality criterion assists the enterprise in maintaining these strategic personnel.

The Manufacturing Process

The certification of the manufacturing process of medical and ophthalmic products is mandatory and the Brazilian organization that regulates this process is the National Health Surveillance Agency (Agência Nacional de Vigilância Sanitária [ANVISA]). The development process of a product has a validation phase, which is the verification process to determine if the product has the approval of the requirements to, after, transfer it to the manufacturing. The transference process to the manufacturing may take years and it requires training and specific

tools. The enterprise has also the Food and Drug Administration (FDA) certificate to develop medical and ophthalmic equipment.

The Good Manufacturing Practices Certification is under the responsibility of the Product's Inspection Coordination, which is responsible for the sanitary inspections of the good manufacturing practices of health devices from ANVISA. This coordination realizes national inspections in industries, from importers to distributors, besides realizing international auditing to verify the sanitary conditions from the materials manufacturers, equipment and "in vitro" diagnosing products (ANVISA, 2016). The certification for the enterprise to produce medical devices is under the responsibility of this division. The process to obtain the certification is extensive, as the enterprise has to obey a series of procedures in order to obtain the certification.

As previously mentioned, the enterprise has the FDA certification that enables the enterprise to commercialize products to the USA. The FDA has the Center for Devices and Radiological Health (CDRH), which is responsible for the medical device certification. The core function of this division is to "to advance regulatory science, the science of developing new tools, standards and approaches to assess the safety, efficacy, quality, and performance of medical devices and radiation-emitting products" (U.S. Food and Drug Administration, 2016).

The firm has to follow the rules from both Brazilian and North American government organisms to manufacture the products. The ANVISA and the FDA certificate the production process, checking the design control of the products, the test of the manufacturing process and the possibility to correct mistakes during the production process. In other words, the Good Manufacturing Practices Certification controls the production process of medical devices.

There are also certifications for the Defense and Space areas that the enterprise has to accomplish, such as the European Space Agency. This certification presents the norms and specifications for the manufacturing process and the quality control of aerospace products. In addition, the European Space Agency engineering staff coordinates the project's inspection in order to verify the utilization security of the aerospace products and the risks involved in space projects (European Space Agency, 2016).

Strategic Decisions Concerning the Innovation Development

In terms of appropriating opportunities from the market, the respondent emphasized the role of the strategic choices to decide the direction of the enterprise in terms of the efforts for the innovation development. This is due to the limited financial resources the organization has to invest on innovation projects, which obliges the board's strategic choice. This choice leads to a rapid movement of the enterprise to develop the product innovation before its competitors.

Concerning the decisions for the innovation development and the selection process of innovative ideas, the respondent mentioned that there were efforts in the sense of disciplining the decision-making and the innovative ideas' selection. However, even though the enterprise had a Ph.D specialist in Decision-Making Methodologies, the staff did not succeed in disciplining and applying methodologies to a better innovative ideas' selection. The following interview extract presents the efforts in disciplining the innovative ideas' selection:

> So, that is a tough answer. Because we rely a lot on intuition, there are many assumptions, there are assumptions. We tried, some years ago, to discipline a little bit and put some methodologies. We had a trained person on this, that did the Doctorate Degree in the USA and it did not work. It did not work and these methodologies of choosing and improvisation ended with no results. It is very imponderable. There is a luck degree on this, imponderable.

In order to surpass the assumptions factors, the firm relies on business networks and the contact with the market. As presented, the business networks also play a key role in providing information about market trends to ameliorate the decision-making process of innovative ideas' selection. In addition, an important factor is the investment required to develop the chosen innovative idea. According to the respondent, the decision-making process to choose what the priorities are, in terms of ideas selection for the innovation development, is based on a short-term period, thus prioritizing incremental innovations instead of radical innovations.

The Dynamic Capabilities for Innovation and the Internationalization Pattern of the First Case Firm

The analysis of the first case firm presents its differentials and brings further contributions for the literature, for the literature of the internationalization pattern (Acedo & Jones, 2007; Knight & Cavusgil, 2004; Kuivalainen, Saarenketo, & Puumalainen, 2012; Kuivalainen, Sundqvist, & Servais, 2007) and the dynamic capabilities for innovation (Barreto, 2010; Cardoso & Kato, 2015; Guan & Ma, 2003; Makadok, 2001; Zahra et al., 2006; Zollo & Winter, 2002). The first case firm presented an early and rapidly internationalizing process, which converges with the internationalization process of firms from high-tech sectors (D'Angelo, 2012; Gashi et al., 2014; Pla-Barber & Alegre, 2007; Rodríguez & Rodríguez, 2005). This convergence indicates the need of rapid market expansion of high-tech products in order to obtain competitiveness in international markets. The dynamic capabilities for innovation are determinant and drive the internationalization pattern of the first case firm, as the focus of the firm is on developing high-tech products to compete in both national and foreign markets.

In addition to the dynamic capabilities for innovation of the first case firm, which are the Knowledge Management, the Human Capital and the Recruitment Process, the Manufacturing Process, the Strategic Decisions concerning the Innovation Development, as well as the Business Environment and the Industrial Capacity of the Firm, which are embodied throughout the analysis. The Industrial Capacity of the Firm is in terms of operational conditions to develop and manufacture products and how the firm maintains the strategic management of the innovation development. The firm has the innovation development among its core competences, as it is the main driver for the competitiveness in the firm's markets. The dynamic capabilities for innovation and the entire organizational structure of the firm focus on sustaining the innovation development.

Referring to the strategic management of the internationalization process, the firm maintains, for the ophthalmic and medical equipment sector, the business networks, a suitable Marketing structure and the reliance on partnerships to promote the product competitively in international markets. The internationalization strategy is, therefore, also linked to the dynamic capabilities for innovation, as the firm extensively relies on its innovative capacity to place the products in international markets. It is important to note that emerging variables, such as the business environment of the first case firm, affects both its innovation development process and internationalization pattern and process.

This section presents the data analysis of the Internationalization Process, the Product Innovation Development Process and the Dynamic Capabilities for Innovation of the first case firm. The subsequent section shows the data analysis of the second case firm.

5.3. THE INTERNATIONALIZATION PROCESS OF THE CASE FIRM 2

The analysis of the internationalization process and the decision criteria to determine the internationalization pattern is in accordance with empirical criteria used for defining born-again global firms. This framework is central for the analysis of the internationalization pattern and the comprehension of the enterprise's internationalization process. The subdivision in significant periods of the internationalization process of the second case firm enables the comprehension of the major changes occurred during this process. The second case firm is from the Manufacture of Refractory Ceramic Products sector. Thus, the comprehension of the

internationalization pattern first centers in presenting the empirical criteria used for defining born-again global firms to, after, match with the enterprise's pattern. Table 21 present the criteria:

Decision Criteria	Explanation
Time Lag (Commencement)	Late
Foreign Sales Ratio (International Sales Intensity)	Percentage of international sales to total sales in the commencement year of the enterprise's outward commercial activities; Large share of foreign sales; There is no specific range of foreign sales.
Countries (Geographic Scope)	Internationalization triggered by critical incident; No initial global focus; Radical and committed internationalization; Several markets at the same time.

Table 21: Characteristics of Born-Again Global Firms Internationalization Pattern

Source: Based on Olejnik and Swoboda (2012, p. 487), from Bell et al. (2003), Acedo and Jones (2007), Crick (2009), Kuivalainen et al. (2012), Kuivalainen et al. (2007).

The reference Table 21 enables the criteria conceptualization of born-again global firms. Table 22 presents the internationalization pattern of the second case firm:

Decision Criteria	Data
Time Lag (Commencement)	1984 (8 years after the firm's inception)
Foreign Sales Ratio in 1984 (International Sales Intensity)	15-20%
Countries (Geographic Scope)	Latin America – 100%
Foreign Sales Ratio in 2000 (International Sales Intensity)	30%
Geographic Regions	South America – 93%; North America – 7%.
Foreign Sales Ratio in 2014 (International Sales Intensity)	70 - 75%
Geographic Regions	Africa – 5%; Europe – 12%; Middle East – 3%; North America – 42%; Oceania – 2%; South America – 36%.

Table 22: Characteristics of the Born-Again Global Firm from the Manufacture of Refractory Ceramic Products Sector

Source: Research Data Analysis (2015).

The second case firm is a born-again global firm, according to its internationalization pattern and due to the convergence with the born-again global firms' criteria (Bell et al., 2003). From a traditional sector, the second case firm began its internationalization process in 1984, focusing on the Latin American market, due to the opportunity recognition from the neighboring countries that, like Brazil, imported refractory ceramic products from Italy. Therefore, the strategic planning to the internationalization process focused on the market need of the Latin American countries.

Other important factors contributed to this international expansion, such as the linguistic proximity amid Spanish and Portuguese, the culture and the way of doing business similarities. These variables are part of the Uppsala Internationalization Model (Johanson & Vahlne, 1977) and explain the traditional internationalization process. In addition to these variables, the Export manager, which is the second respondent, mentioned a new important variable. This respondent stated that buyers from neighboring countries are flexible in terms of accepting products that have minor differences in technical requirements, in other words, the acceptance level of these buyers is higher, compared to buyers from other countries. Yet, due to this way of doing business, these buyers are also flexible in terms of negotiation. In opposition to Latin American countries, this is a mandatory condition for other countries, like the USA. This new element brings further contributions for comprehending the incremental internationalization models (Andersen, 1993; Johanson & Vahlne, 1977) and the born-again global firms (Bell et al., 2003). The flexibility in accepting products that are not in exactly conformity with the technical requirements, the culture and the way of doing business similarities amid the exporter and the importer countries contribute to surpass possible problems of trade negotiations and products' conformities and requirements.

Considering the history of the firm, the creation of the enterprise was due to a domestic market need, as the refractory ceramic products were imported from Italy. The elevated costs for importing products favored the emergence of the national industry, serving not only the domestic but also the international neighboring countries that faced the same situation. The market need, the way of doing business and the facility of buying products from a closer market favored the international commerce amid Brazil and Argentina, Chile and Uruguay, which placed the exigency of the product's technical requirements as a secondary demand. The Export manager, the second respondent, proves this affirmation:

> The main markets were the closer markets. Argentina, Uruguay and Chile. Yes, the markets from here, the MERCOSUL (Mercado Comum do Sul). Also due to a facility issue for you to treat the things in Spanish was easier, the culture is closer, the requirement level was not so high, everything was very Latin. So, much easier.
>
> That was the beginning. Logically, after that you migrated to other markets, then the requirement level, of market treatment, that you say: "No, check this, the tolerance (product requirement) is more or less one, and you send me more or less two". Here in South America this is acceptable, more or less two it is acceptable. However, in the USA: "Did you not tell me that it is more or less one? However, it came as more or less two. So, I am sending your product back. And I am not going to pay you. Au contraire, you are going to pay me the time I was inactive" (simulation of a speech of the North American client). So, this is another market level. Another business level.

In contemplation of the characteristics of this born-again global firm, the second case firm presents an internationalization pattern that partially differs from the literature (Bell et al., 2003; Olejnik & Swoboda, 2012). The internationalization pattern of the born-global firm follows, in the beginning, the traditional internationalization process, which means that the enterprise's commitment with international operations abroad is incremental. Afterwards, due to the innovation development and the application of technologies, from managerial and organizational transformations, the enterprise embraces a radical internationalization commitment (Bell et al., 2003). Characteristics such as governance change, associated with capital inflows and the intensive application of technology to promote the product innovation development in order to expand the target markets and to increase sales revenues does not explain the internationalization pattern of this firm.

The second respondent mentioned that the internationalization cycles are explained by the internal economic crises Brazil experiences in certain periods. The economic dynamism engenders changes in the strategic planning, which oscillates between the domestic market intensification and the international expansion. This variable, economic transitions, explains and reflects the internationalization process of the second case firm, as, according to the respondent, there were no considerable changes in terms of managerial transformations that led to a great international commitment. However, the economic transitions, specifically mentioning the crises, are the main reason for the rupture from a traditional and incremental foreign market expansion to an intensive commitment with multiple markets. This latter aspect is, thus, convergent with the literature (Bell et al., 2003). The interview extracts that sustain this finding are:

> That is because, in the end of the 70's, beginning of the 80's, Brazil experienced a ceramic boom. So, the demand for the ceramic market was enormous in Brazil. So, 90% was for the internal market, the export rate was minimum, 5, 10%. Then, it was growing. But it was around 15, 20% maximum, until 2000.
> And we kept growing (after 2000). We were opening new markets and the enterprise always had an export level of 45%, more or less. This year is that is completely unbalanced (the enterprise is at an export level of 70%).
>
> So, there we some events. The severe crisis that we have, I think it was in 99, 2000, this year, that forced us to explore new markets overseas. So, after, we had one (crisis), it was in 2000, 2001? . . . We were also in a recessive cycle, of adjustments, of tax adjustments, the enterprises suffered a lot. This is what pushed us to search for new markets.
>
> After we had an event that was in 2006, 2007, that made us to search for Turkey. . . . Because Turkey became a great supplier of the European market. Turkey grew a lot in that time, in the last 12 years, and then, I am always referring to the ceramic sector. So Turkey became, excluding China, a great producer of floors, mosaics, ceramic tiles, toilets, and this made us to search for exporting to Turkey. And then, my first trip to Turkey was in 2006. I went there, I visited several clients, it was more or less this, half of 2006, and then we sent the samples of the

> final product in 2006, in 2007 I traveled back to follow the samples, and then we began to sell to Turkey.
>
> And then the sales (in 2001) was to Mexico, USA, South Africa, Turkey, Australia, Spain. . . . Then it left the 10% to the 45-50% level.
>
> The reason is that, it seems that every 10 years the country experiences a crisis. The reason was survival. The domestic market extinguished. It extinguished and stopped (in reference of the current crisis), because the recession came and then you had to find new markets. And then, what took us to export was this, search for, we had a production capacity that we could have been producing the double of what we are producing nowadays. We do not have (markets). So we are occupying 55% of our capacity. From this 55%, 70% is for export. So, if we had only the domestic market, we would have been occupying 15, 20% of our capacity.

The enterprise has an International Trading department composed by four people, which are two engineers, specialists in sales, and two administrative assistants. In addition to this staff, the enterprise has international sales representatives and distributors in the USA, Colombia, South Africa, Turkey, Iran and Spain. Even though the enterprise has a solid brand in the international market, there is a Marketing initiative to revitalize the enterprise's brand using social medias, aiming to place the name of the enterprise in a prominent position. The enterprise also participates in international trade fairs. The main goal of this action is to promote and diffuse the products of the firm, with a specialized staff that knows the technical characteristics and the functionalities of the product and are able to trigger the enterprise to execute projects for potential clients that are in trade fairs. Considering the main international competitors, the second respondent mentioned two important players, a Chinese group, the most aggressive player, and a French group, that has industries in Hungary, Spain and Tailand. Yet, an Italian group is a secondary player in this market.

International Sales Performance

The database from MDIC (2016a) provides time series that enhance the analysis of the internationalization process of the second case firm. The available period is from 2001 to 2015, which, in this case, does not contemplate the entire period of the internationalization process; notwithstanding, this period provides ground for its analysis. Table 23 presents the international sales performance of the second case firm:

Period	Export Performance Range
From 2001 to 2003	Up to U$S 1 million
From 2004 to 2015	U$S 1 million to U$S 5 million

Table 23: International Sales Performance of the Second Case Firm

Source: MDIC (2016a).

Table 23 reinforces the internationalization pattern of the second case firm. The firm maintains the same export performance since 2004, which denotes that the foreign commercial operations have an important position in the market strategy of the firm. Moreover, this table justifies the placement of the interview extracts that aim to explain the internationalization process and the periods of international market expansion.

International Sales Intensity of Innovative Products

In order to verify the international sales intensity of innovative products, the first part of the presentation aims to show the volume of sales of the products to total annual turnover in 2014. Subsequently, the second part of the presentation aims to present the international sales intensity of different types of products in 2014. Table 24 presents the first part of the data:

Types of Products	Product's Total Sales/Total Sales in 2014 (%)
New or significantly improved products, developed during the period of 2010 to 2012	15
Unchanged or not significantly improved products	70
The resale of products	15

Table 24: Products' Sales Intensity in 2014

Source: Research Data Analysis (2015).

The second part of the presentation focuses on the analysis of the international sales intensity of different types of products in 2014. Table 25 presents the second part of the data:

Types of Products	International Sales/Total Sales in 2014 (%)
New or significantly improved products, developed during the period of 2010 to 2012	15
Unchanged or not significantly improved products	70
The resale of products	15

Table 25: International Sales Intensity of Different Types of Products

Source: Research Data Analysis (2015).

The prevalence of unchanged or not significantly improved products in international sales is due to the characteristics of the product innovation development in the manufacturing process of refractory ceramic products. According to the first respondent, the Manufacturing Control manager, this industrial sector is conservative in terms of product innovation development. However, the second case firm has as main characteristic the agility to customize products. This, au contraire of the industrial sectoral pattern, denotes the innovative profile of the firm, thus contributing to the improvement of the international sales of products that suffered incremental modifications, such as format, design, functionalities and standard of the product and in the characteristics of the ceramic mass.

The subsequent sections are The Product Innovation Development Process and The Dynamic Capabilities for Innovation. The main objective is to present the technological innovation development process of the second case firm, thus highlighting its differentials and characteristics. The last section presents the dynamic capabilities for innovation, which emphasizes the technological and organizational capabilities inherent to the firm that support the product innovation development, thus corroborating with market competitiveness.

5.3.1. THE PRODUCT INNOVATION DEVELOPMENT PROCESS

The enterprise launched, during the period of 2010 to 2012, seven incremental product innovations that converge with the characteristics of the sector, which focuses on incremental rather than radical innovations. The enterprise developed three service innovations, which are planned to serve the client better. The product innovations, as explained by the first respondent, do not aim to change the ceramic mass or the main physic characteristics of the product. The innovations are incremental, as the enterprise aims to customize the product to the client, which means that there are modifications in the format of the product, to adequate to specific technical conditions according to the client's requirements. The interview extract of the first respondent that confirms this affirmation is:

> For our clients the innovations are much faster, but then we are talking about tendencies, that you can have a toilet in a different shape. . . . All this demands from us not a change in the product, on the ceramic mass, on the characteristic, but it demands the adaptation on the product's geometry, to support these new tendencies.

This characteristic converges with the technological development pattern of the sector. Thus, the innovation development is based on innovative activities that support the customization of the product. The narrow concept of innovation is extended to understand other dimensions of equal importance, such as the technological effort, the management of the innovative activity and the accumulation of technological capacity. This broad comprehension of the innovative activities contributes to identify characteristics present in the innovation development process and in the organizational context and resources. This approach ensures the understanding of business' strategies that determine the firm's technological and innovative efforts (Red Iberoamericana de Indicadores de Ciencia y Tecnología, 2011).

5.3.2. THE DYNAMIC CAPABILITIES FOR INNOVATION

The analysis of the dynamic capabilities for innovation of the second case firm focuses on the Ability of Providing a Rapid Answer to the Market and Clients, the Importance of the Trade Fairs and the Role of the Business Networks. The dynamic capabilities are, as explained by Barreto (2010) the potential of the enterprise to solve problems systematically, due to its propensity to perceive opportunities and threats, to make correct decisions aiming to serve the market and to alter its resource base, which reflects the position of the organization in its market.

The Ability to Provide a Rapid Answer to the Market and to Clients

The second case firm has the International Organization for Standardization Certification, the ISO Certification, for the standardization of organizational processes. The ISO certification provides strategic tools and guidelines to organizations, in order to reach competitiveness in the global market. The most important benefits perceived from this certification are the cost savings, as the ISO help firms to optimize operations to reach improvements in the bottom line; enhances the customer satisfaction, as firms improve the product's quality to reach customers' satisfaction and to increase sales. The certification also provides access to international markets, as they help preventing trade barriers and conceives entrance to foreign markets; supports the increasing in market shares, due to productivity gains and competitive advantages and promotes the reduction of negative impacts to the environment (ISO, 2016).

Due to this standardization, the second case firm has an established product development management, based on the product's customization. The phases of this process are the prospection of ideas, the project selection, the prototype development, the production planning and the continuous monitoring and evaluation (Tidd & Bessant, 2015). The exemplification of this process is based on the product development for a Turkish client. According to the second respondent, this client demanded a new product form to a refractory support to optimize its internal production system. This in loco visit pushed the product development that followed the abovementioned phases: the idea came from this in loco visit, to after develop a prototype suitable to the client's need and specifications. The development process occurred in Brazil and the final product was exported to Turkey. The process of monitoring and evaluating the client's needs and perceptions is constant and provides feedbacks to the enterprise. The first respondent showed how this systematic is:

> So, normally, the life cycle of a new product's birth, that was born from the client's needs, let us say like this, it does not occur in less than ten months, that is the period. Then, he approves this, within our systematic here from the systematic of the project department, we write here in the file that he received the project's file, that he had the process monitoring, and then there is a field phase there, where the responsible for the project, in this case me, I give the OK. The product is approved. Or reproved. That is how it works.

Therefore, the main distinctive characteristic of the second case firm is the ability to provide rapid answer to the clients in terms of product customization. The first respondent explained this differential:

> So, the enterprise works really close to our clients. We have, even internationally, we have periodical visits, every year, during the semester, we have a schedule of visits to these clients, we are always close to them, and asking where are the needs of development. . . . Our client demands from us the development. So, we are how I say, a tailor. We really do that, with the size the client wants, in the shape the client wants, everything according to what he wants. And if the next month he asks for a new, an adjustment, we are going to change the project, we discard what we have here, do something new, and that is something that happens all the time.

> Our competitors today are Italian, European, Chinese enterprises, they are in the market competing with us, with (name of the enterprise), bigger enterprises, and we, what we claim to do, we deserve to be in this market, with this client. So, we are not afraid of being an enterprise that faces the challenges and is not afraid of the competitors, let us call like this. We know their sizes, but we know ours as well.

The constant development of customized products leads to competitive advantages for the firm, as this process of developing solutions for a client can be also replicated for another client. The information repository of the firm is strategic and plays a key role in providing rapid advances in the product development for the clients. The first respondent emphasized the firm's competencies in customizing products in a pre-determined time. Even though there might be considerable changes in the firm's production process to attend a determined demand for a client, this mobilization is valid, as the firm is dependent on the clients' demands. The customization is a Marketing differential for the firm, which supports the competitiveness in both domestic and foreign markets and promotes the client's loyalty, as the continuous monitoring process also engenders the product development. Yet, the firm has a repository of the developed molds to manufacture products, which is also important to follow the development process of the products.

In addition to the enterprise's product development, the first respondent mentioned that the product development is also based on the analysis of the competitors' products. As stated, the firm makes analysis of the competitors' material for the search of better inputs, better additions, to make improvements in the conduction of the manufacturing process, for process optimization and to reduce losses. This strategy aims to foster the product innovation

development. Even though the firm has a great customization capacity, the first respondent affirmed that the enterprise recognizes its production capacity and its limits to develop a product. This information is convergent with the second respondent statement:

> . . . and our product is also in a big problem that is the technological evolution to another product class. And this product class we do not produce. And we do not have conditions to produce. It requires new technologies and a series of other things. What we do is that we have a strategic partnership that we represent in various countries a German producer of this new product class. This was a way for us to aggregate business, to aggregate turnover, to aggregate sales, because the cordierite product has limitations and I would say that it is not a product that it is going to die, but it is going to be reduced.

The enterprise capacity to produce this product class depends on the technological advances that exists and has to be available in the market. Even though in this time the firm does not have conditions to manufacture this new-generation product, the strategic solution proposed is to be a sales representative of a German producer, in order to reach higher profit margins.

The Importance of International Trade Fairs and the Role of Business Networks

The first respondent reiterated the importance of the international trade fairs to diffuse the products. As stated, the enterprise participates in international fairs in order to reach new clients and to present its products abroad. This process is part of the agenda of the Export manager, as, due to the personal technical background, this respondent is able to establish not only negotiations, but also to explain the technical characteristics of the product. The international fairs of this sector occur in China, every year, in Italy, every two years and in Germany, every three years.

Concerning the business networks, the enterprise keeps close contact with the clients. The clients are the strongest knot in the enterprise's networks. In addition to the clients, there are suppliers and external consultants that help the firm in the upgrading process of the internal manufacturing and organizational processes. The research institutes are partners for the innovation process development. The first respondent explained the importance of business and scientific networks:

> We have a very strong relationship with the suppliers of inputs, with consultants as well. Last year (2014) we brought a Spanish consultant that stayed here with us, that guided us in the innovation development. We search for information, for consulting, we are always searching for research institutes in São Carlos, use of the suppliers, some suppliers have also competent people that helps us in the development. So we have these searches, these information for (the innovation) development.

The enterprise's agility and the connections with the market support the competitiveness in international markets. This differential, therefore, promotes the international expansion to the firm, which is the most important market nowadays.

The Dynamic Capabilities for Innovation and the Internationalization Pattern of the Second Case Firm

The analysis of the second case firm presents its differentials and brings further contributions for the literature, for the literature of the internationalization pattern (Bell et al., 2003) and the dynamic capabilities for innovation (Barreto, 2010; Cardoso & Kato, 2015; Guan & Ma, 2003; Makadok, 2001; Zahra et al., 2006; Zollo & Winter, 2002). Concerning the internationalization process, the firm presents the born-again global firm internationalization pattern. This pattern is typical from firms from low-medium or medium-high technology industries that present an innovation development pattern sustained mainly by incremental innovations (Bell et al., 2003). This characteristic is in convergence with the firm's innovation development, which is centered on incremental innovations based on product customization to serve both domestic and international clients. The product innovation development, more specifically, the characteristics and the technical requirements of the product, is a prominent factor in the international commercial activities of the firm and deserves further attention.

This factor presents divergences when considering different market niches, in other words, in terms of comparing the Latin American markets and the North American market. The flexibility of the products' acceptance and for commercial negotiations with neighboring countries, i.e., the Latin American markets, confers the firm competitiveness due to not only this factor but also due to the geographical and cultural proximity. This important factor, the product specification requirement, is distinctive and contributes to explain the gradual internationalization process (Johanson & Vahlne, 1977) of the second case firm, as Latin American markets are more flexible and prone to accept products that present minor divergences in terms of product technical requirement.

Yet, the firm has the born-again global firm internationalization pattern, which first begins with incremental and gradual international commercial activities and, due to a significant organizational rupture; there is the intensification of international commercial activities and the strengthening of the international market share (Bell et al., 2003). Considering the case of the second firm, the intensification of international commercial activities is based on organizational environmental conditions, such as economic transitions, in this case, economic crisis. This important factor is distinctive and provides basis to understand the intense commitment in

international commercial activities (Bell et al., 2003). In this sense, considering the born-again internationalization pattern as a whole, the technical requirements of the product and the economic crisis are considered in the analysis of the internationalization process and pattern of this firm, thus bringing further contribution to the born-again global firms' literature (Bell et al., 2003).

The dynamic capabilities for innovation also converge and sustain the internationalization process of the firm. The firm has, as the main dynamic capability for innovation, the ability to provide rapid answer to the clients' demands through the product customization. The product customization, along with the characteristics of the product, confers the market competitiveness of the firm. The product customization capacity plays a key role in determining the firm's competitiveness and the maintenance of the firm's clients. This dynamic capability for innovation is central to comprehend the product innovation development process and how this leads to the international market competitiveness.

This section presents the data analysis of the Internationalization Process, the Product Innovation Development Process and the Dynamic Capabilities for Innovation of the second case firm. The subsequent section shows the data analysis of the third case firm.

5.4. THE INTERNATIONALIZATION PROCESS OF THE CASE FIRM 3

The analysis of the internationalization process of the case firm 3, from the Foods and Beverage Sector, follows the born-again global pattern. The internationalization process of the third case firm began in 1998, forty-eight years after the firm's inception, and this process was intensified due to the entrance of the current International Trading manager, which is the second respondent. Before the entrance of this manager, the firm had indirect exports, in a small-scale, mediated by a trading company, to Portugal and Chile. These selected countries were due to the networks the trading company had at the time. The considerable experience of the International Trading manager in large corporations was an important asset for the internationalization process of the firm. This manager began to work at the firm in 1998 and started a committed and intense internationalization process, with the establishment of the Export department, also formalizing the export permission to the firm. The firm is, thus, from a traditional sector and has two people in charge of the International Trading and Export Department.

In the same period of the manager's entrance in the firm, the former Brazilian ex-president, Fernando Henrique Cardoso, decreed that *cachaça*, the main product of the third case firm, was a genuine Brazilian product. The geographic name "Brazil" is the geographical indication for *cachaça*, in terms of promoting the product internationally (Decreto Nº 4.062, de 21 de Dezembro de 2001, Palácio do Planalto, 2016). The vast experience of the International Trading manager, along with the establishment of the name of the product, promoted the international expansion of the firm. Nowadays, the firm operates in more than forty countries, in all the five continents.

The third case firm is a born-again global firm, according to its internationalization pattern, due to the convergence with the born-again global firms' criteria from Table 18 and the literature, as the third case firm had a managerial rupture that enabled and sustained its international market expansion (Bell et al., 2003). The Export manager explains the international market expansion of the firm through the following interview extract:

> Well, in 98, when I came here in the enterprise, I realized that the external market was not very explored. I, with my experience of 40 years in International Commerce, not that time, 30 and something, passing through several large corporations . . . I took the initiative to open the market of *cachaça* outside Brazil, that was in its beginning. Like I said, Fernando Henrique Cardoso created an Act, denominating *cachaça* as the product that it is going to be explored overseas. I took the initiative, and started to work here in the firm opening these markets. How did I do this? (I) Visited the market. In 98, for example, I will say 99 because it was the entire year, 98 was just part of it, I visited at least 25 countries.

The enterprise has the FDA, the European and the Japanese certifications. The certifications ensure the export process of the product. The international certifications are mandatory for the exporting commercial activities of the firm, due to international requirements of quality and standard patterns that the import countries demand from the enterprise. The product standardization is also a requirement in international markets, as there are different sizes of bottles as well as the labels' languages, which have to be in conformity with the requirements from each consumer market. The enterprise also has national certifications, such as the ANVISA, and is regulated by the Ministry of Agriculture (Ministério da Agricultura). The national certifications are mandatory to commercialize the product in Brazil. The enterprise does not have subsidiaries in international markets, as the distribution system of the product is under the responsibility of the importer. For each country, the enterprise has one distributor, except for the USA, where the firm has three distributors.

International Sales Performance

The database from MDIC (2016a) provides time series that enhance the analysis of the internationalization process of the third case firm. The available period is from 2001 to 2015, which, in this case, does not contemplate the entire period of the internationalization process; notwithstanding, this period provides ground for its analysis. Table 26 presents the international sales performance of the third case firm:

Period	Export Performance Range
From 2001 to 2003	Up to U$S 1 million
From 2004 to 2005	U$S 1 million to U$S 5 million
From 2006 to 2007	Up to U$S 1 million
From 2008 to 2015	U$S 1 million to U$S 5 million

Table 26: International Sales Performance of the Third Case Firm

Source: MDIC (2016a).

Table 26 reinforces the internationalization pattern of the third case firm. The firm maintains a constant same export performance since 2004, with the exception of the period of 2006 to 2007, which denotes that the foreign commercial operations are important for the market strategy of the firm. The punctual decrease on international sales may be due to internal and external organizational environmental variables. Moreover, Table 26 aims to explain the internationalization process and the periods of international market expansion, also sustaining the explanation presented in the interview extract.

International Sales Intensity of Innovative Products

In order to verify the international sales intensity of innovative products, the first part of the presentation aims to show the volume of sales of the products to total annual turnover in 2014. Subsequently, the second part of the presentation aims to present the international sales intensity of different types of products in 2014. Table 27 presents the first part of the data:

Types of Products	Product's Total Sales/Total Sales in 2014 (%)
New or significantly improved products, developed during the period of 2010 to 2012	02
Unchanged or not significantly improved products	98
The resale of products	0

Table 27: Products' Sales Intensity in 2014

Source: Research Data Analysis (2015).

The second part of the presentation focuses on the analysis of the international sales intensity of different types of products in 2014. Table 28 presents the second part of the data:

Types of Products	International Sales/Total Sales in 2014 (%)
New or significantly improved products, developed during the period of 2010 to 2012	01
Unchanged or not significantly improved products	99
The resale of products	0

Table 28: International Sales Intensity of Different Types of Products in 2014

Source: Research Data Analysis (2015).

The prevalence of unchanged or not significantly improved products in international sales is due to the *cachaça*'s characteristics, a commodity. *Cachaça* is a traditional product, manufactured in a large scale, thus obeying the industrial production scale that has, as basic inputs, sugar, alcohol and water. The actual formulation of the product is the result of an intensive research process the enterprise did until nowadays, to obtain the type of sugar, the soil and the plantation conditions that confer the product its uniqueness. The product holds an industrial secrecy at the INPI that protects the composition of the product. The product is a commodity, which explains the predominant market participation of unchanged or not significantly improved products in the domestic and international markets. The innovation development in the third case firm is focused on the Marketing, mainly in significant changes to the aesthetic design or packaging, which confers the product an identity and a market positioning in the domestic and international markets.

The following variables that emerged from the data analysis of the internationalization process of the third case firm are the International Trade Fairs, the Country-of-Origin-Image, and the Country-of-Origin on Product Image. The subsequent sections present the emerging variables in this order.

International Trade Fairs

The International Trading manager of the third case firm, in accordance with the respondents of the first and the second case firms, emphasized the role of the trade fairs to promote the firm's product, in this case *cachaça*, as a Brazilian product and to consolidate the name of the product and the firm's brand worldwide. The main international fair aimed to promote alcoholic beverages is the Bar Convent Berlin.

The Bar Convent Berlin (BCB) unites the most important industries from the Beverages Sector, promoting a worldwide hub of bar and beverages representatives that are in a leading international trade fair gathering to make new contacts, to discover new product innovations and to attend seminars to deepen their expertise. Besides these advantages, the trade fair promotes visibility not only to large corporations but also to SMEs, as there is space to promote

market trends from new market entrants (Bar Convent Berlin, 2016). The second respondent emphasized the plurality of this fair, mentioning that there is a great number of worldwide producers exhibiting alcoholic beverages from their home countries.

The diversity of this trade fair promotes a fruitful business environment, which also enables the meeting of worldwide producers of alcoholic beverages, promoting, therefore, business alliances amid producers and consumers. Even though there are other trade fairs, such as the International Food Exhibition (Salon International de l'Alimentation [SIAL]), in France, and the General Food and Related Products Exhibition (Allgemeine Nahrungs Und Genußmittel Ausstellung [ANUGA]), in Germany, these trade fairs are not specific for alcoholic beverages, as the focus also includes foods and alimentation. Therefore, the BCB is the most important trade fair for the firm, as the focus is exclusively on alcoholic beverages.

Country-of-Origin-Image and the Country-of-Origin on Product Image

The third case firm perceives advantages from the COI to promote the product. Not only the internal consumer market recognizes that there is a positive association of the COI and the product image, due to the abovementioned Act, but also, and mainly, the quality of the product determines the market competitiveness of the firm.

The first respondent stated that the Brazilianness of the product is a positive advantage for the firm. The Brazilianness concept, from the Brazilian Portuguese "*brasilidade*", refers to the distinctive characteristics that are intrinsic to the Brazilian culture, which encompass the lifestyle of the Brazilian citizenships and the arts, literature, music and gastronomy of the country (Cardoso, 2012; Sutter, Mac Lennan, Tiscoski, & Polo, 2015). This concept may be attached to the COI of the product and, therefore, may have a positive effect on placing the firm's product strategically and competitively in international markets (Sutter, Mac Lennan, Fernandes, & Oliveira Jr., 2015).

The product *cachaça* permeates the Brazilian culture since the Colonial Period of the Brazilian history. The sugarcane plantation began in 1532. The sugar, the "white gold", the main product of the Colonial Period, sustained the Brazilian economic development during this period as the first national industry. The product *cachaça*, like it is known nowadays, is the result of the fermentation process to produce the sugar and the storage of this brew produced an alcoholic beverage, called first as *cagaça*, which was served to the animals, to after become *cachaça* (Feitosa, 2005).

The historical context of *cachaça*'s production and rise was during the Brazilian Colonial Period. The sugarcane plantation in Brazil in this period was in large extensions of

farms, the mills, called as *engenhos*, where the production process of *cachaça* was in large scale. The history of *cachaça* is part of the colonization period of Brazil, as the main alcoholic beverage of slaves and workers, due to its popularity. During the Colonial Period, there were attempts, from the Portuguese Court, to terminate the production of *cachaça*; however, the production process was established in the mills, in the period of 1533 and 1534. The condition of the *cachaça* in the Colonial Period of Brazil as a typical beverage of slaves and workers reflects the social structure of the period, the division amid social classes of slaves and workers and farmers (Feitosa, 2005).

According to Soares (2009), the analysis of the paintings of Frans Post, a Dutch painter that lived in Brazil during the government of Maurice, the Prince of Orange (1637-1644), enables the characterization of the *engenho*, in which the sugarcane was produced. The analysis of the Post's paintings united in the collection done by Lago and Lago (2009) furnishes fifteen variables that illustrate the *engenho*. The variables are the sloping terrain, the large house above the mill, running water in the surroundings, double ceiling, ventilation on ceilings, furnace fire, the milling, the water wheel, channel to drain water, a balcony to dry, to knead and to pack the sugar, sugarcane stalks to be processed, wood for the furnace, the sugarloaf, male slaves in the milling and female slaves carrying the processed sugarcane.

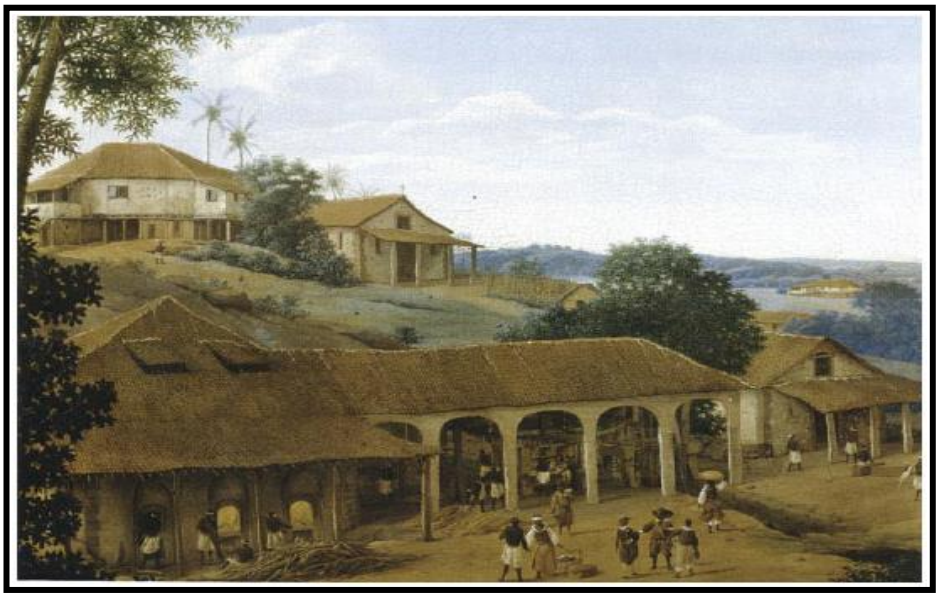


Figure 10: Engenho {47} (Post, 1660).

Source: Retrieved from Soares (2009, p. 66) from Lago and Lago (2009, pp. 188-189).

The history of *cachaça* as a traditional product has changed significantly. Nowadays, the product repositioning of *cachaça* as a finest product has reached different markets niches, due to the variety of compositions and national producers that aim the market differentiation of this product (Feitosa, 2005).

Aiming to expand the firm's brand and the product repositioning, the third case firm launched two different types of bottles of *cachaça* to place the product in the retailing luxury market. This strategic Marketing innovation aims to position *cachaça*, a traditional product, in the Brazilian luxury market with new consumer proposals, without losing the focus of the largest and the core consumer market, which is the traditional consumer market, composed by the low and middle-income consumers. Indeed, the first respondent affirmed that these traditional consumers are conservative and resistant to minimal modifications in the product, referring to the alcoholic graduation, and changes in the bottle, such as the presence of certification seals that were not stamped in the bottles previously, which affirm the characteristics of the consumer behavior of *cachaça* in conventional bottles.

In order to explain the characteristics of the consumer's behavior, Heidenreich and Kraemer (2015) present the types of consumer resistance to innovations, which are the active and the passive innovation resistance. Based on Heidenreich and Handrich (2014), Heidenreich and Kraemer (2015, pp. 134-135) explain the types of consumer resistance to innovations:

> . . . (1) active innovation resistance which represents a negative attitude toward a new product that is caused by psychological and functional barriers during the evaluation of new products and (2) passive innovation resistance which refers to a predisposition to resist innovations due to an individual's inclination to resist change and status quo satisfaction that already forms rather unconsciously prior to new product evaluation.

This last type of consumer resistance to innovations is inherent to the traditional consumers of *cachaça*, the firm's largest market, which is the consumers' predisposition to resist to innovations, which previously includes an unconsciously evaluation process prior to the product innovation evaluation (Heidenreich & Handrich, 2014; Heidenreich & Kraemer, 2015). In this case, in reference to minimal changes in the product of the third case firm. Yet, the Marketing innovation, along with the COI concept, supported the domestic and the international market expansion of the firm during the period of 2010 to 2014. The first respondent, the Product manager, explained the firm strategy of market repositioning:

> The strategy of the (name of the firm) is not to sell a large volume of this product (*cachaça* in sophisticated bottles), it is to innovate with a product with premium characteristics. With a greater degree of sophistication for you to be present in another channels. And not only in the conventional commodities channel that is high consumption of *cachaça*, which are popular bars. So, we aimed to transmit, through a more sophisticated bottle, that the brand is alive, that the brand is innovating all over the years searching for other market niches.

The focus of this Marketing strategy is the domestic market, the largest consumer market of the firm. The firm explores the Brazilianness of the product in its slogan and this constitutes an asset in international markets. According to the respondents' perception, the

Brazilianness concept encompasses the social and the personal life of the Brazilian citizenships, as well as the Brazilian culture and national festivities. There are several studies concerning the Brazilian culture theme, among of which there are the researches of DaMatta (1998; 2001) (Sutter, Mac Lennan, Tiscoski, & Polo, 2015). DaMatta (1998; 2001) presents a parallel amid the Brazilian festivities, among which figures the Carnival, and the social life, concerning both the private and the public sphere. DaMatta (1998, p. 84) characterizes the Carnival festivity as a ritual, focusing the explanation of this national holiday on the dynamics of the social relations and the social meanings inherent to the Carnival, mainly focused on dualities. The explanation for the dualities centers on the analysis of social events that are part of the Carnival, which are, therefore, not part of everyday life of Brazilian citizenships. National celebrations and religious manifestations constitute the national holiday calendar, which are intrinsic and distinctive of the Brazilian nation and are part of the Brazilian cultural perception by indigenous and others. Concerning the Brazilianness, the first and the second respondent, respectively, mentioned how this concept promotes *cachaça* internationally:

> Opportunities, I think that, mainly in the export market, we have, we still have a market that is very avid for the consumption of *cachaça*. So it is a market that I think that still have, it is growing, . . . there are positive factors that is the Brazilianness of the product, the fact that it is a product, the input let me say, the sugarcane you do not find everywhere.

> There is the happiness theme. . . . It is the Brazilian way of celebrating, of commemorating, and overseas this is important, and we, Brazilians, we have an image of happy people, content, and this for them: "Oh, it is from Brazil! Oh, it is Carnival, it is the beach" (simulation of a speech of foreign clients and customers), so there is the soccer, and this for them it is a characteristic of festivity, of happiness, and they have interest in consuming, and this helps a lot.

The Brazilian Trade and Investment Promotion Agency (Agência Brasileira de Promoção de Exportações e Investimentos [Apex-Brasil], 2016) and Invest & Export Brasil (2016) explore the characteristics of the Brazilian identity. According to the abovementioned governmental studies, the appreciation of the Brazilian culture favors and differentiates national products in international markets, due to the idiosyncrasy of the Brazilian culture. The third case firm explores this dimension, as both respondents affirmed that the multifarious composition of the Brazilian culture and festivities are assets to place strategically the product in foreign markets. The firm relies on the Brazilianness of the product, on Marketing innovations and on the product standardization, in other words, the specifications in terms of the size and the type of the bottle; this last factor determinant for the commercialization of the firm's product overseas. Due to the importance of this adjustment, the respondents also

emphasized the need to develop research about the international target markets before starting the internationalization process.

Apex-Brasil (2016), aims to promote and support the internationalization of the Brazilian through sectoral initiatives. The sectoral initiatives also aim to consolidate the presence of the industrial sectors in key markets, in order to maintain the internationalization process of these firms. In this sense, there are initiatives to promote diversified industrial sectors abroad, under a brand and a slogan that characterize and differentiate the Brazilian products. The sectoral initiative also fosters the development of clusters and industrial districts. The promotion of the sectoral internationalization requires, from the enterprises, the adjustments in the product standard and investments in the manufacture process in order to achieve a large-scale production. This enterprise's configuration is the first step for the internationalization process, as the product adjustment is the necessary criteria to export (Apex-Brasil, 2016). Figure 11 shows some of these brands:

Figure 11: Brazilian Brands for the Sectoral Internationalization Process

Source: Apex-Brasil (2016).

The subsequent sections are The Non-Technological Innovation Development Process and The Dynamic Capabilities for Innovation. The main objective is to present the technological innovation development process of the third case firm, thus highlighting its differentials and characteristics. The last section presents the dynamic capabilities for innovation, which emphasizes the technological and organizational capabilities inherent to the firm that support the product innovation development, thus corroborating with market competitiveness.

5.4.1. THE NON-TECHNOLOGICAL INNOVATION DEVELOPMENT PROCESS

During the period of 2010 to 2012, the firm focused on the development of differentiated bottles, which aimed to place the organization in new consumer markets strategically, in other words, the luxury market. This core competence of the third case firm, the Marketing innovation, is an unprecedented innovation in the sector, according to both respondents (Leifer, McDermott, O'Connor, Peters, Rice & Veryzer, 2000; OECD, 2005; Veryzer Jr., 1998).

In addition, the first respondent mentioned the importance of meetings with suppliers to monitor the development of this differentiated bottle and the strategic perception of the International Trading manager, who brings from the international market trends in terms of package, design and artistic appeal. This affirmation also reinforces the interconnectivity within the firm (Nonaka & Takeuchi, 1997) and the importance of the non-technological innovation development for market competitiveness (Mothe & Thi, 2010). The suppliers are also key informants for the development of sophisticated bottles. The first respondent presented the alignment of the Marketing innovation with both the traditional and luxury consumer markets, along with the importance of the product pricing:

> So, we searched for a new clothing to be able to show that the *cachaça* that is there it is the *cachaça* (name of the luxury brand), the (name of the popular brand), the content does not change. The content does not change. However, we search for a more sophisticated package. A new clothing. And how did we do that? For this (the name of the second respondent) helps us a lot. We are always tuned on the international market. Everything that is a trend overseas is what we bring here. So, this search for novelty, sophistication, logically what is part of our scope, that it is being close to our public, we cannot forget that we are selling *cachaça*, a low added value product. So, we sell *cachaça*, not Scottish whisky, so you have to have this concern to balance the investments, the values, to enable the product economically, and the cost is absorbed by your consumer.

5.4.2. THE DYNAMIC CAPABILITIES FOR INNOVATION

The analysis of the dynamic capabilities for innovation of the third case firm focuses on the Marketing Innovation, the Marketing of the Product, the Manufacturing Process, the Structuring of the Organization and the Main Competitors. The dynamic capabilities are, as explained by Zollo and Winter (2002), a learned and stable pattern of collective activity through which the enterprise systematically rearranges its operational routines to obtain great efficacy.

Marketing Innovation

The third case firm presents Marketing differentials that aim to reposition the product *cachaça* in both domestic and international markets as a finest product, placing this Marketing innovation as strategic to the organization. The product remains the same; however, this core competence of the third case firm, the sophisticated bottles of *cachaça* for positioning the product in luxury retail channels, is an unprecedented Marketing innovation of the firm and the sector, according to both respondents (Leifer et al., 2000; OECD, 2005; Veryzer Jr., 1998). Marketing innovations are, for this case firm, the strategy to obtain market competitiveness and the improvement in sales intensity (Atalay, Anafarta & Sarvan, 2013; Gunday, Ulusoy, Kilic & Alpkan, 2011; Hashi & Stojčić, 2013; Mothe & Thi, 2010; OECD, 2005). In addition, this Marketing innovation converges with the firm's philosophy, which praises the conception and the development of technology-based differentiated products, in order to achieve market competitiveness.

The process for the Marketing innovation development was inspired in the Cosmetic and Perfumery sector. The respondents visited, in 2005, a Cosmetic and Perfumery trade fair and had the idea to assimilate this Marketing trend from the Cosmetic and Perfumery sector to the Beverages sector, to the bottle of *cachaça*. The respondents perceived an opportunity in developing sophisticated bottles from the assimilation of the main characteristics of the Cosmetic and Perfumery sector, which are the elegance, the refinement, the quality and the technology of the packages directed to the market niche the product aims to serve (Fritz & Souza, 2006). This innovation led to a market movement, as the traditional consumer, responsible for the largest market share, as well as the other types of consumers and the competitors, perceived that the product *cachaça* is not only consolidated in the traditional market niche, but is also advancing to other market niches, in other words, the luxury market.

After visiting this Cosmetic and Perfumery trade fair, the firm invited a multinational enterprise that develops packages to produce the bottle. The decoration of the bottle was made by an organization that decorates the perfume's packages. This process of developing sophisticated bottles of cachaça took two years, from 2010 to 2012, and was the answer for the firm's market evaluation. The results aimed are the market repositioning of the *cachaça*, the exploration of luxury retail channels, the market niche expansion and the promotion of the *cachaça* as a finest product in the firm's luxury market niche.

This firm's differential leads to further theoretical contributions. Even though the development of the Marketing innovation occurs in the firm, the inspiration came from a distinct sector that has multiple Marketing differentials, such as luxury and designed packages

(Fritz & Souza, 2006). The utilization of this concept to a traditional product, a commodity, brought transformations not only for the firm, but also for the sector, as competitors accompanied this new tendency brought by the firm. Despite of the largest market share comes from the *cachaça* bottled in conventional bottles, both nationally and internationally, this Marketing innovation supported the market expansion and the repositioning of the firm's product, which aims to place a product classified as a commodity in a luxury market niche. This innovation led to an improvement in the business model of the company, which aimed to serve not only the main consumer market of the firm, but also further consumer markets. Thus, the firm preserved the inner characteristic of the product bottled in conventional bottles, destined to the mass consumption, also placing the *cachaça* in luxury retail channels.

This Marketing innovation is found in products from large corporations, such as Coca-Cola, which develops attractive and commemorative packages for the same product, the traditional Coca-Cola and for the other products from the portfolio, such as Coca-Cola Light, which is a variation of the traditional version of the product. This Marketing appeal serves not only to fix the brand in the consumers' minds, but also serves to promote the development of the enterprise's Marketing to attend contemporary tendencies, reaching different publics (The Coca-Cola Company, 2016).

The Manufacturing Process

The firm has environmental sustainable actions, such as the sterilization and the reutilization of conventional bottles for the manufacturing process. The enterprise has four factories and the production process of the *cachaça* is industrial, which means that it is a large-scale production. There are separated factories for each type of bottle used in the bottling process of *cachaça*. The bottling process of *cachaça* in the new types of bottles, resulted from Marketing innovations, involves the staff from the factory responsible for the operational systems. The bottling process in sophisticated bottles requires adjustments in the manufacturing process, which has an enchained sequence that is supervised by the industrial staff.

The first respondent, supported by the industrial staff, is responsible to verify the viability of the production process using sophisticated bottles. The process of transferring the product creation to the manufacturing involves a series of procedures inherent to the production process. The first respondent explained that in Brazil the firm has to specify the phases of the production process, which are the type and the size of the bottle, the size of the label and the type of the bottle's dispenser. The specification of the labelling part of the production process is determinant to guarantee the suitable label to the correct size of bottle. Thus, in relation to

the transference process, there is a constant interconnection amid the industrial staff, which are the engineers and the workers of the factory, to ensure the process of the product development. The problem-solving dynamics is an essential process that involves the whole staff in order to verify and check for solutions for the manufacturing process.

The firm has the ISO 9000 and the SGS (Société Générale de Surveillance) certifications. The certifications are necessary to develop the organizational capacity for the manufacturing process, in terms of controlling the security of the workplace, the hygiene conditions of the manufacturing process, the *cachaça*'s quality, the maturing process of *cachaça*, the allocation of internal spaces in the factory, the production flow, the quality control and the conformities of the beverages' bottles. Yet, there are internal and external audit processes to verify whether the conformity standards are according to the ISO and SGS norms. In addition to the organizational systematization, the firm's sector, which is the Foods and Beverages sector, is regulated by the ANVISA norms of quality control and product recall. The organizational changes from the adoption of the ISO and SGS certifications led to an improved internal control of the product's quality, in order to certify that the production process is in conformity with national and international patterns of products' quality control. The first respondent mentioned the importance of implementing international standard norms to improve the organizational performance:

> We understood the following (referring to the organizational capacity): we had to install systems and internal norms. And it was from this (need) that we convinced the Board of Directors to do so, to implant the SGS and the ISO 9000. . . . So we created this system here in the enterprise, based on the SGS and ISO norms, which meant that the firm had an upgrade in the organizational dynamic, which helped (the firm). Because we started selling this product (the recently organizational dynamic), for us to plant this like a seed in the factory staff.

The first respondent mentioned that, even though there were great progress in terms of organizational performance and the improvement of the internal dynamics, there was resistance from the workers of the factory. The security norms, which involve the use of safety equipment, were focus of resistance from the part of the workers that were not used to use the required safety equipment during work. The use of safety equipment is a security norm required in the industrial process to produce *cachaça*.

The Structuring of the Organization

The explanation for the structuring of the organization lies in how the firm allocates the staff for launching new products and the role of establishing accords with universities for verifying and testing the control quality of the product and the bottles. In relation to the staff

allocation, the first respondent mentioned that the firm has to allocate extra temporary commercial professionals to launch the product, such as promoters, sellers and press officer employees. The recruitment process is outsourced, which means there is an enterprise specialized in hiring specialists that is responsible for the recruitment process of the required competences. Even though this process is outsourced, the firm is also part of the selection process, being responsible for coordinating the schedules of these surplus personnel. The Human Resources Department of the firm is responsible for the hiring process of the manufacturing workers. The Industrial Directorship of the firm determines the workers' profiles of this group and establishes the schedules, whether it is permanent or temporary, and the periods of working hours.

The firm has its own laboratory to collect samples of the product, which is an advance that is from the same period of the adoption of international standards certification. The internal analysis of the product also receives support from other laboratories from universities and governmental institutes, which are responsible for the quality control and the analysis the organoleptic characteristics of the product, which are the color, the scent, the flavor and the texture, as well as the control of the bottle's characteristics. The first respondent mentioned the importance of the external laboratories to conduct this research process of the product. This explanation is in this interview extract:

> Today we have our own laboratory, that did not exist, a laboratory that select the sample, analyze the organoleptic characteristics of the product, which is not done internally, we search for external laboratories, we have some agreements, for example, with the University of Piracicaba, . . . it is a group from USP . . . that makes the analysis of the products for us, sometimes when we need to know how it (the product) is, to know how our production is. It is also for internal certifications, we need to know how it is going on (the production process), what is the mix variation of the product we are having. And what we do not have internal conditions to do, we have agreements with laboratories today, with the Technological Institute of Aeronautics (Instituto Tecnológico da Aeronáutica [ITA]) and we have these contacts also to make the probability analysis of the bottle's contamination.

The first respondent mentioned that significant changes occurred in the firm and in the factory in a period of four to five years ago, which institutionalized the procedures based on norms and certifications. The organizational changes are, thus, necessary for the product development, the quality control and the organizational systematization.

The Main Competitors

The respondents mentioned the role of the competitors and the market dynamism. The firm has two regionalized brands and one national recognized brand of *cachaça*. Nevertheless,

the product is the same for all the three brands. The Beverage sector has a strong presence of multinational corporations that are players not only in the *cachaça*'s market, but also in other alcoholic beverages' markets, which are substitute products for *cachaça*. Due to their substantial market share, these enterprises are aggressive players that compete direct with the third case firm. Yet, the firm, due to its strong presence in several regions of Brazil, has been sought to be bought or to participate in joint ventures by other corporations. This, as mentioned by the first respondent, serves as a sign that the *cachaça*'s market has growth potential to be explored further:

> So until, in a matter of three years ago, you never heard of a multinational interest in buying a *cachaça*'s firm. However, this is all because, during these last years, the work (the Marketing innovations) we have been doing raised interest.

The Marketing innovations of the firm are central drivers to explain the crescent interest for the *cachaça*'s industry. The trend perception from international markets and suppliers, the assimilation of the Cosmetic and Perfumery sector design and refinement in packages of perfumes converted into bottles of *cachaça*, as well as the role of the suppliers in developing bottles are the enterprise's differential in the last five years. Specifically, the Asian beverages industries, as well as the European producers, consider the package an asset to the product, as explained by the second respondent. This trend perception, which came with the international expansion of the firm, was determinant for the market expansion. The interview extract presents the importance of searching for ideas present in the market for the development of sophisticated bottles of *cachaça*:

> The Japanese and the Chinese they have tremendously beautiful packages. They give plenty of value to the package. . . . Package considering the Eastern side. And we are more from the Western side, we seek to see more the European market and the North American (market).

The Dynamic Capabilities for Innovation and the Internationalization Pattern of the Third Case Firm

The analysis of the third case firm presents its differentials and contributions to comprehend the dynamic capabilities for the innovation development and their impact on the internationalization pattern of the firm. The development of Marketing innovations, the key dynamic capability of this firm, aims to place the firm competitively in both domestic and international markets. The non-technological innovation development, in this case, sustains the market expansion of the firm (Mothe & Thi, 2010). Even though the focus of the international market expansion is based mainly on the product innovation development (D'Angelo, 2012; Pla-Barber & Alegre, 2007; Rodríguez & Rodríguez, 2005), considering this specific case, the

market expansion occurred through the Marketing innovation, as the product, characterized as a commodity, does not suffer major changes over time. The convergence of this dynamic capability with the market expansion brings further contributions to the innovation development for international market expansion literature (Pla-Barber & Alegre, 2007; Chetty & Stangl, 2010; D'Angelo, 2012; Gerschewski, Rose, & Lindsay, 2015; Halilem, Amara, & Landry, 2014; Loefgren, 2014; Oxtorp & Elg, 2015; Rammer & Schmiele, 2009; Rodríguez & Rodríguez, 2005). The role of the non-technological innovation development, for this case firm, is determinant for its market expansion and competitiveness.

The most important event in the internationalization process timeline of this firm was the entrance of the International Trading manager. Due to the vast experience of this manager in international trading and exporting, the firm, in 1998, in conjunction with the Act that decreed *cachaça* a genuine Brazilian product, begun the international commercial activities. The internationalization process, sustained by this act, occurred through the manager's visits to international markets to explore and to evaluate potential worldwide consumer markets of cachaça. This triad, the vast experience of the International Trading manager, the Act and the visits to foreign countries sustained the internationalization process. In addition, there was also the process of regulating the firm to be an exporter, also triggered by this manager's initiative. The international market expansion is strategic for the case firm. The main dynamic capability for the innovation development of this case firm, the development of Marketing innovations, drives and enhances the internationalization process of the firm. Yet, the firm also participates in international trade fairs to diffuse the product. Yet, the firm largely benefits from the COI of the product, which, in this sense, corroborates to promote the foreign market expansion and to sustain the firm's competitiveness.

This section presents the data analysis of the Internationalization Process, the Non-Technological Innovation Development Process and the Dynamic Capabilities for Innovation of the third case firm. The subsequent section shows the data analysis of the fourth case firm.

5.5. THE INTERNATIONALIZATION PROCESS OF THE CASE FIRM 4

The analysis of the internationalization process and the decision criteria to determine the internationalization pattern is in accordance with empirical criteria used for defining INVs,

as shown in Table 29. This framework is central for the analysis of the internationalization pattern and the comprehension of the enterprise's internationalization process. The comprehension of the internationalization pattern first centers in presenting the empirical criteria used for defining INVs to, after, compare with the enterprise's pattern.

Decision Criteria	Explanation
Time Lag (Commencement)	Early; From 3 years to 10 years after the firm's inception.
Foreign Sales Ratio (International Sales Intensity)	Percentage of international sales to total sales in the commencement year of the enterprise's outward commercial activities; Large share of foreign sales; Different definitions, usually more than 20% to 80%.
Countries (Geographic Scope)	Concurrent domestic and international expansion; Worldwide operations focusing on lead markets; Several foreign regional markets at the same time.

Table 29: Characteristics of the INV Internationalization Pattern

Source: Based on Olejnik and Swoboda (2012, p. 487), from Bell et al. (2003), Acedo and Jones (2007), Crick (2009), Kuivalainen et al. (2012), Kuivalainen et al. (2007).

The reference Table 29 enables the criteria conceptualization of INVs. The fourth case firm is from the Biochemistry sector, specifically classified in the Manufacture of Fertilizers. Table 30 presents the internationalization pattern of the fourth case firm:

Decision Criteria	Data
Time Lag (Commencement)	2001 (6 years after the firm's inception)
Foreign Sales Ratio in 2001 (International Sales Intensity)	3,5%
Geographic Regions	Latin America – 100%
Foreign Sales Ratio in 2014 (International Sales Intensity)	8%
Geographic Regions	Latin America – 100%

Table 30: Characteristics of the International New Venture from the Biochemistry Sector

Source: Research Data Analysis (2015).

The fourth case firm presents a rapidly and early commercial expansion to foreign markets; in this case, the commencement of the international market expansion focused in South American markets. This characteristic denotes an international market expansion to closer markets, which is a distinctive characteristic of international new ventures. Yet, considering data from 2014, the firm increased its international market participation in South America, which is an indicative of the products' competitiveness in international markets and the strategic placement of the foreign commercial activities. The proxy for the foreign sales ratio of international new ventures is from 20% to 80% from total annual turnover (Acedo & Jones, 2007; Knight & Cavusgil, 2004; Kuivalainen, Saarenketo, & Puumalainen, 2012; Kuivalainen, Sundqvist, & Servais, 2007), which, in this case, is the solely criterion that differs from the literature.

The firm has two people in charge of the International Trading and Export Department, along with the technical and commercial teams that support the export process. The Export and International Trading manager, the first respondent, explained the internationalization process of the fourth case firm, which began in 2001. During this period, the firm was an importer of inputs from Chile, Bolivia and Argentina and an exporter to Bolivia and Paraguay. Interesting to note that there are both buyers and sellers from Bolivia, which reiterates the commercial importance of this country. The choice of Paraguay and Bolivia as the first target markets to start selling abroad was due to the logistics conditions that favored the product transportation. In addition, the limited productive capacity of the firm, in 2001, did not allow an intense international commercial expansion.

The import and export international operations are important for the fourth case firm, as the manufacturing process of biological fertilizers is dependent on the inward commercial operations. The main reason for the internationalization process of this firm was due to the need of market expansion and the favorable costs of the imported inputs, when compared to the costs from the domestic inputs. The internationalization process, according to the evaluation of the second respondent, the Business Management Director, did not suffer international sales decreases, which means that the firm places the international commercial activities as a prior strategy. In order to reiterate the importance of the international commerce of the fourth case firm, the second respondent illustrates this condition through the analysis of the career path change of the first respondent:

> So before, for you to have an idea, 3 years ago, (the first respondent) was in charge for the HR (Human Resources), PD (Personal Department), import and export, part of the Finance, so (the first respondent) was a kind of joker. So we were alleviating a little bit for (the first respondent) to be able to focus on import and export.

The interview extract not only provides basis to comprehend the role of the first respondent, but also highlights a prior management characteristic of SMEs, which is the overlapping of positions and functions, thus assuming the importance of multitask employees within SMEs. The presence of this type of employee in family business, the ownership type of the fourth case firm, strengthens the decision-making process of strategic areas and directs the internationalization pathway of the firm (Kontinen & Ojala, 2012). The second aspect concerning the importance of international commercial operations is to maintain the hedge of the dollar. The second respondent explained that the firm has to import inputs in dollars, which is the currency for international commercial operations and, at the same time, exports products. In order to maintain the stability of the dollar exchange, the firm aims to intensify the export.

The dynamics of the hedge, therefore, has as the main objective to equilibrate the internal financial balance, which means, the imports and the exports. The interview extract that confirms this affirmation is:

> What would be this financial strategy? We import plenty of products and the great majority is in dollar. So, for us to do a natural hedge, which is a natural lock of the dollar, the best way is to export. You import a quantity and export this same quantity in the same currency (in dollars), so you do a natural lock. That is, when you need to pay this import duplicate, your client will pay this one that you sold. So, due to this, both are in dollar that is independent on the Brazilian exchange rate.

The firm has the register in the Ministry of Agriculture, which allows the suspension and/or the reduction of taxes, such as the Social Integration Program (Programa de Integração Social [PIS]), Contribution to Social Security Financing (Contribuição para Financiamento da Seguridade Social [COFINS]) and Tax on Movement of Goods and Services (Imposto sobre Circulação de Mercadorias e Prestação de Serviços [ICMS]), to import inputs to produce biological fertilizers for exporting. In addition to the suspension and/or reduction of these taxes, the second respondent emphasized the progressive international expansion, focusing on a new international target market for each year and the planning to expand the international operations to Uruguay and Angola. In order to achieve this goal, the firm is realizing studies about these target markets.

International Sales Performance

The database from MDIC (2016a) provides time series that enhance the analysis of the internationalization process of the fourth case firm. The available period is from 2001 to 2015, which, in this case, contemplates the entire period of the internationalization process. Table 31 presents the inward internationalization process of the fourth case firm:

Period	Imported Volume
From 2001 to 2009	Up to U$S 1 million
From 2010 to 2012	U$S 1 million to U$S 5 million
From 2013 to 2014	U$S 5 million to U$S 10 million
In 2015	U$S 1 million to U$S 5 million

Table 31: Imported Volume of the Fourth Case Firm

Source: MDIC (2016a).

Table 31 enables the comprehension of the internationalization process of the fourth case firm. The firm began its internationalization process through inward operations, importing inputs from foreign markets, as previously mentioned, Chile, Bolivia and Argentina. It is important to note that the inward internationalization process is continuous, which means the firm extensively relies on this commercial activity.

The first respondent explained that the exported volume to Paraguay and Bolivia was low in 2001 and, as explained by the second respondent, the firm has strategic partnerships with international resellers to sell the firm's product with the brand of the reseller. Table 32 presents the international sales performance of the fourth case firm, in order to comprehend the outward internationalization process:

Period	International Sales Performance
From 2001 to 2009	No Data Available
From 2010 to 2012	Up to U$S 1 million
From 2013 to 2015	U$S 1 million to U$S 5 million

Table 32: International Sales Performance of the Fourth Case Firm

Source: MDIC (2016a).

Tables 31 and 32 provide basis to explain the internationalization process of the fourth case firm and strengthens the explanation of the second respondent concerning the hedge of the dollar the firm maintains. The data absence for the exported volume during the period of 2001 to 2009 can be explained due to:

- The low exported volume in 2001, the commencement year of the outward international activities;
- The commercialization process may had been made under the brand of the resellers, which does not count as the firm's product, but as the resellers' products and, therefore, does not appear in the database of MDIC (2016a);
- The firm may have had conducted commercial transactions under other INCOTERM than the FOB, which does not appear in the database of MDIC (2016a).

Interesting to note that the temporal analysis contributes to the comprehension of the internationalization process as a whole, sustains the interview extracts and the explanation of the respondents. Yet, the first respondent stated that the firm is evolving gradually in terms of international sales performance, which strengthens the firm's brand and the appearance of the firm in the MDIC (2016a) database since 2010. The interview extracts that respectively confirm this explanation are:

> Our entrance door was through partnerships. We go, we choose the great resellers of a country and we enter as their partners. So, we made products with their brands, with their labels . . .

> It is satisfactory (the international sales performance), however, on the external scenario, with the valorization of the dollar and the political instability, we were focusing strongly on the export issue as a financial strategy.

International Sales Intensity of Innovative Products

In order to verify the international sales intensity of innovative products, the first part of the presentation aims to show the volume of sales of the products to total annual turnover in

2014. Subsequently, the second part of the presentation aims to present the international sales intensity of different types of products in 2014. Table 33 presents the first part of the data:

Types of Products	Product's Total Sales/Total Sales in 2014 (%)
New or significantly improved products, developed during the period of 2010 to 2012	20
Unchanged or not significantly improved products	30
The resale of products	50

Table 33: Products' Sales Intensity in 2014

Source: Research Data Analysis (2015).

The second part of the presentation focuses on the analysis of the international sales intensity of different types of products in 2014. Table 34 presents the second part of the data:

Types of Products	International Sales/Total Sales in 2014 (%)
New or significantly improved products, developed during the period of 2010 to 2012	80
Unchanged or not significantly improved products	20
The resale of products	0

Table 34: International Sales Intensity of Different Types of Products in 2014

Source: Research Data Analysis (2015).

The prevalence of new or significantly improved products, developed during the period of 2010 to 2012, is due to the adaptations the firm has to do in order to adequate the biological fertilizers to the soil and climatic conditions where the firm operates. In this sense, the product innovation development is incremental, as there are changes for the product's adaptations. The capacity to adapt the product in conformity with the demands of the clients places the firm competitively and enables the international market expansion of the firm, like reiterated by the second respondent as a strategic objective of the firm. This characteristic converges with the industrial sectoral pattern, which denotes that industries from this sector place the innovation development among the core competences of the firm (Castellacci, 2008).

The following variables that emerged from the data of the internationalization process of the fourth case firm are the Business Networks and the International Trade Fairs, as well as the Product Customization for International Markets. The subsequent sections present the emerging variables in this order.

Business Networks and the International Trade Fairs

The business networks were important for the beginning of the internationalization process of the fourth case firm. As explained by the first respondent, the International Trading and Export manager and the second respondent, the Business Management Director, the firm consolidated partnerships to begin the internationalization process with neighboring countries.

The main strategy of the firm is to select resellers from foreign countries to sell the firm's products with the brand of the reseller and to expand the market share of the firm. The good acceptance of the Brazilian products in Paraguay and Bolivia also fostered the international expansion to these target markets.

In order to reach these markets, the firm has an established commercial staff that operates both nationally and internationally. The main seller of the firm, which supported the international expansion of the firm, is responsible for the geographic region of Bolivia and Paraguay. This seller had previous experience in international trading with these countries and brought to the firm this expertise and the networks to start expanding to Bolivia and Paraguay, along with the adaptations of the product, in terms of its characteristics, as well as the development of brands and packages.

The international trade fairs are also important to sustain the internationalization process of the firm. The first respondent mentioned that the firm participates in trade fairs in neighboring countries from the MERCOSUL. The fairs are, as explained by the second respondent, entrance doors for the firm. In conclusion, the firm participates in international trade fairs where there is market participation, such as in Bolivia.

Product Customization for International Markets

The fourth case firm, as well as the second case firm, has the product customization as a differential to remain competitive in international markets. The product, biological fertilizers, are adapted to the climatic conditions of the foreign market, as well as it occurs in the domestic market, as there are different climatic conditions and a great biodiversity in Brazil, due to the country's geographic extension. The customization of the product, therefore, remains in adapting the product to the soil and climatic conditions of the region. The innovation development process focuses on the product adaptations to the characteristics of the region, also considering the development of new portfolios of biological fertilizers. This capacity of adapting and making incremental modifications in the product is an innovative differential of the second and the fourth case firms.

The subsequent sections are The Product Innovation Development Process and The Dynamic Capabilities for Innovation. The main objective is to present the technological innovation development process of the fourth case firm, thus highlighting its differentials and characteristics. The last section presents the dynamic capabilities for innovation, which emphasizes the technological and organizational capabilities inherent to the firm that support the product innovation development, thus corroborating with market competitiveness

5.5.1. THE PRODUCT INNOVATION DEVELOPMENT PROCESS

The fourth case firm developed, during the period of 2010 to 2012, fifteen product innovations and one service innovation. The product innovations are in accordance with the customization process the firm has to comply with the buyers' requirements of the biological fertilizers. The customization capacity is the core competence of the firm, the same found in the second case firm. The development of biological fertilizers of the fourth case firm has to obey the specifications of the clients to be able to be commercialized. The R&D and the product development area of the firm conduct the elaboration process of this product in order to obtain suitable solutions for the clients' needs. The service innovation, as explained by the second respondent during the visit to the factory, is part of the firm's Marketing innovation portfolio, developed to attend the specifications of a Paraguayan client. The client required the formula specification for the biological fertilizer, part of the product development, and the package's customization with the client's brand. In order to consolidate the sales process, the design area of the firm developed on time the package for the Paraguayan client. As explained by the respondent, the strategic partnership with foreign clients enables the market expansion.

The third respondent, part of the Research and Product Development and the Biological Control area emphasized the environmental sustainability of the biotechnology in the product development of biological fertilizers. According to Bull, Holt and Lilly (1982, p. 18), biotechnology is "the application of scientific and engineering principles to the processing of materials by biological agents to provide goods and services". This definition encompasses the disciplines of microbiology, biochemistry, genetics and chemical engineering and the application of this science enables the product development of the firm. The utilization of microorganisms in the manufacturing process of biological fertilizers not only provides the solution for the client, in terms of the needs of the plantation and the climatic conditions, which varies widely in Brazil and in the international markets, but also enables the development of a clean production system. In addition to the biotechnology, the firm has also the water treatment and the waste recycling as part of the environmental sustainability actions.

In terms of process innovation, the firm is constantly working on the standardization of the process to obtain the optimization of the production flow. The firm applies routine techniques to formalize the production process, to reduce losses and to obtain indicators of productivity and quality control, considering the performance of the inputs in the product and the sales indicator of this product. This organizational manufacturing control results in the

improvement of the production process and converges to the product innovation development, as the study of the inputs, the application of the biotechnology and the application of routine techniques provide basis for the market competitiveness. Even though this organizational systematization is part of the ISO norms and standards, the firm does not have international certifications. The first respondent explained that, in the present moment, the priority resides in implementing the culture of systematization in the firm, instead of applying for the certification. This enables the adoption, from the part of the whole staff of the firm, of the rules and norms referred to this standardization, to, after, apply for and settle a certification.

In this sense, the organizational culture is "the culture, perceived as a group of values and beliefs shared among the members of the organization, has to be consistent with other organizational variables, such as the structure, technology and leadership style. From the consistency of these various factors depends the organizational success" (Fleury, 1987, p. 10). In order to enable the analysis of the the organizational culture, Hofstede, Neuijen, Ohayv and Sanders (1990) present the dichotomous dimensions of the organizational culture. The first dimension is the Process-Oriented versus Results-Oriented, the first referring to establishment of technical and bureaucratic routines and the latter focusing on the results and goals of the organization. In the Employee-Oriented, the focus of the organization is on the job performance and the Job-Oriented encompasses not only the job performance and the results achieved, but also the quality of life at the workplace. The Parochial refers to professionals that have a greater connection to the organization versus the Professional, which presents the opposite situation, as professionals have a closer identification to their profession than to the organization.

The Open System versus Close System refers to the communication processes and how the organization manages and integrates new members on the staff. In the Loose Control versus the Tight Control, the control level is in terms of schedule accomplishment that is related to the organizational technology deployment, also referring as part of the economic activity of the firm, as there are firms that lead to a straight control in opposite to others that lead to a looser control. The last dimension, the Normative versus Pragmatic, refers to the firm's scope of activity, which aims to differ firms that perform pragmatic activities, like sales, to firms that perform other activities, like the application of laws. This dimension aims to explain how the firm behaves in its organizational environment (Hofstede et al., 1990).

5.5.2. THE DYNAMIC CAPABILITIES FOR INNOVATION

The analysis of the dynamic capabilities for innovation of the fourth case firm focuses on the Product Customization for the Domestic and the International Markets, mainly on the product development, the knowledge management and the partnerships for the innovation development. Zollo and Winter (2002) state that the dynamic capabilities support the rearrangement of the enterprise's resources and routines according to what it is established by the main decision-makers of the organization. In this sense, the fourth case firm centers the product innovation development process on the product customization.

Product Customization for the Domestic and International Markets

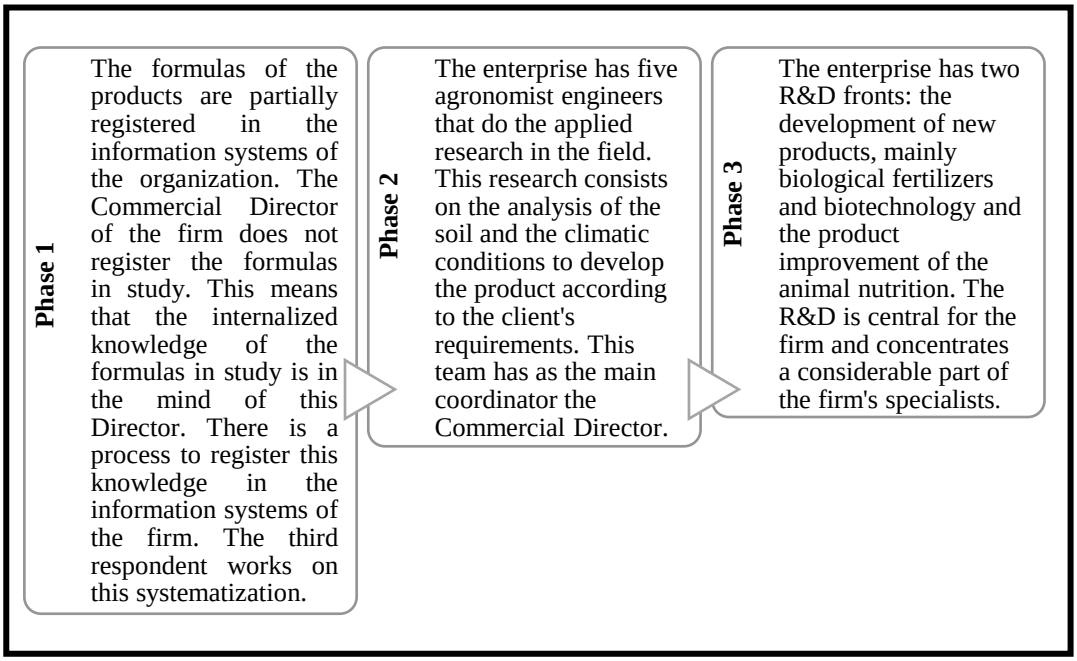
The distinctive characteristic of the fourth case firm is the product customization for the domestic and international markets. The product development is in conformity with the buyers' requirements. The requirements for the product development are according to the climatic and the soil conditions of the buyers' plantation. The sequence of the product development has this order, which also encompasses the knowledge management of the production process of biological fertilizers.

The production process of the fourth case firm has two driving fronts for the innovation development. There is the applied research developed by the field team and applied research developed by the Commercial Director and the firm's R&D staff. The applied research and the specialists of the firm, which are engineers, biologists and technicians in agriculture, reinforce the product customization process and the development of the product innovation. The incremental innovation in products has a specific dynamic, which is the improvement of the competitors' products and the improvement of the products from the firm's portfolio. The second respondent confirmed the strategic role of the firm's R&D in this interview extract:

> Our R&D has two fronts. The innovation line, the creation of new products, and the line to improve existent products. . . . So, if the enterprise innovate every year, even if it is one product per year, you assure the perpetuity of the firm. So, every innovation generates more value to that product until that product is commercialized by everyone. So you have to be always innovating to make the competitors chasing after you, not you to chase the competitors.

The industrial structure of the firm converges with the innovation development process. The firm has a laboratory in the factory to perform the quality guarantee evaluation of the inputs and of the firm's product and another laboratory in the main office to conduct the innovation development process. In addition, the industrial structure, the factory, has automated production

systems to produce biological fertilizers, which are mixers and reactors. The production process of the animal nutrition uses salt that, due to the sodium chloride, may provoke the roof's corrosion. According to the second respondent, the firm has to do permanent repairs in the roof of the factory, due to this chemical composition. The manufacturing repair is an important practice to ensure the firm's securities norms. In order to illustrate the product development, Schema 3 presents its phases:



Schema 3: Phases of the Product Development

Source: Research Data Analysis (2015).

The firm has partnerships with universities and other enterprises to develop technological innovations. The main universities are from the state of São Paulo and other educational foundations from other states of Brazil, mainly from the Midwest region. In addition, the firm has partnership with trade associations to data collection about market trends. The associations are the Brazilian Association of Technology in Vegetal Nutrition Industries (Associação Brasileira das Indústrias de Tecnologia em Nutrição Vegetal [ABISOLO]) and the National Association for Fertilizers' Diffusion (Associação Nacional para Difusão de Adubos [ANDA]).

Among the main objectives of the ABISOLO, there are the technical consulting services and the support to events and technical meetings promoted by the sectoral chambers of commerce. These actions contribute to enhance the data collection about this market and this industrial sector (ABISOLO, 2016). Among the mission guidelines, the ANDA aims to support actions that converge to elevate the sector's participation in the agribusiness. Yet, this association acts through strategies and actions that aim to diffuse and promote the product,

biological fertilizers, in all the phases of the production process and captures the buyers' evaluation and perception of the evolution of products and services from the biological fertilizers sector (ANDA, 2016).

The Dynamic Capabilities for Innovation and the Internationalization Pattern of the Fourth Case Firm

The analysis of the fourth case firm presents its differentials and contributions to comprehend the dynamic capabilities for the innovation development and their impact on the internationalization pattern of the firm. In this case, this firm is an INV, which means that this firm had an early and rapidly internationalization process, focusing on foreign regional markets to start the international expansion. The explanation for this market focus, on the internationalization process beginning, recalls for the limited production capacity the firm experienced in 2001, the commencement year of the outward internationalization process. The product customization capacity of this case firm, the main dynamic capability for innovation, enabled the international market expansion.

The product customization is a fundamental requisite in the biological fertilizers sector. The capacity to adapt the biological fertilizer to the conditions of the buyers' plantations is an asset that is explored extensively for this case firm. This firm has an internal R&D and product development area that deals specifically with the development of applied research that aims to obtain information about the conditions of the soil and the plantation and to know the climatic conditions of the rural areas. This applied research involves the scientific personnel of the firm, as they are responsible for the continuous innovation development process. This customization capacity, in line with the core competences of the firm, sustains the firm's market expansion and competitiveness.

This section presents the data analysis of the Internationalization Process, the Product Innovation Development Process and the Dynamic Capabilities for Innovation of the fourth case firm. The subsequent section shows the data analysis of the fifth case firm.

5.6. THE INTERNATIONALIZATION PROCESS OF THE CASE FIRM 5

The analysis of the internationalization process and the decision criteria to determine the internationalization pattern is in accordance with empirical criteria used for defining traditional pattern firms. This framework is central for the analysis of the internationalization pattern and the comprehension of the enterprise's internationalization process. The comprehension of the internationalization process first centers in presenting the empirical criteria used for defining the traditional internationalization process of SMEs to, after, compare with the enterprise's patterns.

Decision Criteria	Explanation
Time Lag (Commencement)	Late.
Foreign Sales Ratio (International Sales Intensity)	Not the main characteristic; Small to medium share of foreign sales.
Countries (Geographic Scope)	Domestic expansion first; Successive international expansion in psychically and/or geographically close markets; Single market at a time.

Table 35: Characteristics of the Traditional Internationalization Process

Source: Based on Olejnik and Swoboda (2012, p. 487), from Bell et al. (2003), Acedo and Jones (2007), Crick (2009), Kuivalainen et al. (2012), Kuivalainen et al. (2007).

The reference Table 35 enables the criteria conceptualization of the traditional internationalization process. The fifth case firm is from the Industry Construction sector, more specifically, the Manufacture of Ceramic Tiles. Table 36 presents the internationalization pattern of the fifth case firm:

Decision Criteria	Data
Time Lag (Commencement)	2005 (53 years after the firm's inception)
Foreign Sales Ratio in 2005 (International Sales Intensity)	Small to medium share of foreign sales, as the focus in on the domestic market
Geographic Regions	Focus on the Latin American markets, which received 80% of the total exported volume. 20% of the total exported volume was pulverized to other countries.
Foreign Sales Ratio in 2014 (International Sales Intensity)	Small to medium share of foreign sales, as the focus is on the domestic market
Geographic Regions	Africa – 1%; Central America – 60,4%; Europe – 0,18%; North America – 6%; South America – 33%.

Table 36: Characteristics of the Traditional Pattern Firm from the Construction Industry Sector

Source: Research Data Analysis (2015).

The fifth case firm is a traditional firm, according to its internationalization pattern and due to the convergence with the criteria for the traditional internationalization process (Bell et al., 2003; Johanson & Vahlne, 1977). From a traditional sector, the fifth case firm began its internationalization process in 2005, focusing on the Latin America market, due to the opportunity recognition from the neighboring countries, especially the Chilean market, which was the largest buyer from the firm's product. The Chilean market had its importance decreased during the first decade of 2000, due to the entering process of Chinese players to compete in the Ceramic Tiles market and the ascension of the Ceramic Tiles industry in the country.

The firm has three people in charge of the International Trading and Export Department. In addition, the firm has sales representatives that are key actors to capture Marketing trends, especially in the domestic market, where there is a considerable preference variation for ceramic tiles. The beginning of the internationalization process of the firm relied on international strategic alliances. The importance of the business networks for the internationalization process, in this sense, is similar to the first and the fourth case firms.

International Sales Performance

The database from MDIC (2016a) provides time series that enhance the analysis of the internationalization process of the fifth case firm. The available period is from 2001 to 2015, which, in this case, contemplates the entire period of the internationalization process. Table 37 presents the international sales performance of the fifth case firm:

Period	Export Performance Range
From 2005 to 2006	Up to U$S 1 million
From 2007 to 2010	U$S 1 million to U$S 5 million
From 2011 to 2013	U$S 5 million to U$S 10 million
From 2014 to 2015	U$S 1 million to U$S 5 million

Table 37: International Sales Performance of the Fifth Case Firm

Source: MDIC (2016a).

Table 37 reinforces the internationalization pattern of the fifth case firm. The internationalization process of the fifth case firm presents a differential from the traditional internationalization process. This firm maintains, since 2007, two years after the beginning of the commercial international expansion, a crescent export performance. This characteristic of the firm differs from the literature of the traditional internationalization process, based on the Uppsala Model (Johanson & Vahlne, 1977). The progressive international market expansion, from neighboring countries to further countries and the late commencement of this commercial activity converge with the literature (Bell et al., 2003; Olejnik & Swoboda, 2012). The differential is on the foreign sales ratio, which is constant and does not present a gradual rising.

Nevertheless, this differential is in convergence with the exported value classification criterion of industrial SMEs, which is the proxy of up to US$ 1 million or from US$ 1 million to US$ 5 million. The possible explanation for this differential resides in the size of the firm, which is a medium-to-large-sized firm, thus converging with the classification criteria, in terms of number of employees, but not in terms of total annual turnover (BNDES, 2016; MDIC, 2016b; SEBRAE, 2016).

This differential leads to the analysis of the internationalization pattern of this medium-to-large-sized firm, which differs in terms of the international sales intensity progression, a characteristic of the Uppsala Model (Johanson & Vahlne, 1977). The fifth case firm presents a traditional internationalization process, based on the Uppsala Model, which states that the firm starts the international expansion to neighboring countries, considering the "establishment chain" (Johanson & Wiedersheim-Paul, 1975) of the international operation modes and the progression of the international sales intensity. The analysis of the internationalization process of this Brazilian case firm leads to further contributions to the Internationalization Pattern theory (Bell et al., 2003; Olejnik & Swoboda, 2012), specifically concerning the international sales ratio. The international sales ratio, for this case firm, is an important indicator to analyze the internationalization pattern. The absence of gradual progression on the share of foreign sales is in disagreement with this pattern; however, the small to medium share of foreign sales is in agreement with the Internationalization Pattern theory.

In this sense, a suggested indicator of international sales ratio, for this medium-to-large-sized firm, would have to consider mainly the size of the firm in terms of total annual turnover. Therefore, the differential of this case firm resides in the analysis of the total annual turnover and the international sales ratio, which, thus, converges with the characteristics of the traditional internationalization process, as the firm has a small to medium share of foreign sales. In other words, the export range of the firm in 2014 is of "From US$ 1 million to US$ 5 million", therefore, a small to medium share of foreign sales from total annual turnover, which is more than R$ 90 million and less than or equal to R$ 300 million. A proposal to standardize the share of foreign sales for the traditional internationalization process is up to 20% from total annual turnover. This criterion standardization is based on the born global firm's pattern. The born global firm has a large share of foreign sales, which, according to the literature, varies from the range of 20% to 80% from total annual turnover (Acedo & Jones, 2007; Knight & Cavusgil, 2004; Kuivalainen, Saarenketo, & Puumalainen, 2012; Kuivalainen, Sundqvist, & Servais, 2007). As this criterion corresponds to a large share of foreign sales, it is correct to consider that a small to medium share of foreign sales from total annual turnover would be up to 20%.

The size classification criterion, for this case firm, plays a key role in the analysis of its internationalization process and pattern.

Yet, in order to prove the internationalization pattern of the fifth case firm, the respondent mentioned the importance of the domestic market. This statement converges with the decision criteria of the traditional internationalization process, which firstly focus on the domestic market to obtain the largest market share. The interview extract that sustains this affirmation is:

> So, the reality of the civil construction is to produce and sell in your country. The demand is always higher in the internal market. And it will be. Brazil is a country that is growing, so all the civil construction industries are looking at Brazil.

International Sales Intensity of Innovative Products

In order to verify the international sales intensity of innovative products, the first part of the presentation aims to show the volume of sales of the products to total annual turnover in 2014. Subsequently, the second part of the presentation aims to present the international sales intensity of different types of products in 2014. Table 38 presents the first part of the data:

Types of Products	Product's Total Sales/Total Sales in 2014 (%)
New or significantly improved products, developed during the period of 2010 to 2012	25
Unchanged or not significantly improved products	75
The resale of products	0

Table 38: Products' Sales Intensity in 2014

Source: Research Data Analysis (2015).

The second part of the presentation focuses on the analysis of the international sales intensity of different types of products in 2014. Table 39 presents the second part of the data:

Types of Products	International Sales/Total Sales in 2014 (%)
New or significantly improved products, developed during the period of 2010 to 2012	100
Unchanged or not significantly improved products	0
The resale of products	0

Table 39: International Sales Intensity of Different Types of Products

Source: Research Data Analysis (2015).

The totality of new or significantly improved products in international sales is in accordance with the characteristics of the firm's innovation development. The distinctive characteristic of the fifth case firm is the investment in technology and machinery to the development and improvement of the characteristics of the ceramic tiles, in terms of format and design changes. This also converges with the dynamic capabilities of the firm for the innovation development, based on the continuous improvement of the manufacturing process of ceramic tiles. The international market of ceramic tiles is based mainly on market trends from Italian

producers, which are worldwide known for the development of ceramic tiles. The second respondent of the second case firm and the respondent of the fifth case firm mention the prevalence of Italian producers in the ceramic sector. The respective interview extracts, from the respondent of this case firm, which corroborate this affirmation, are:

> Technology, basically in our market, today it is of a public domain, it was born mainly in Italy, Italy was always the vanguard of the ceramic, and not only the ceramic product, but also the equipment for the manufacturing, all this peripheral system of suppliers, inputs, equipment.
>
> Italy is the cradle of the ceramic technology.

According to Meyer-Stamer, Maggi and Seibel (2001), Italy concentrates the largest industries of ceramic tiles, qualified design professionals and the Italian machine producers furnish the greater quantity of capital goods to the ceramic tiles industry to the world. The success of the Italian ceramic tiles industry is explained by the expertise of the Italian workers, concerning the knowledge acquired during the development of the Italian ceramic tiles industry and the manufacturing upgrading during the 90's. The Italian workers of the ceramic industry possess the tacit knowledge accumulated during the evolution of this industry, referring to the equipment adjustment, the preparation of the ceramic mass, in terms of chemical composition, to create the aimed appearance of the ceramic tiles. This know-how is tacit, is spread within the Italian industry, and is improved throughout the product innovation development, considering the design, the format, the composition and the aesthetic market trends of the ceramic tiles.

The Italian ceramic tiles industry largely benefits from the COI concept (Diamantopoulos et al., 2011; Roth & Diamantopoulos, 2009; Roth & Romeo, 1992), as the production chain of the ceramic tiles has the "Made in Italy" brand. This distinctive remark enhances the international sales performance of the Italian ceramic tiles, which affirms the quality of the product, the contemporary design and the specialized sales force of these industries. This combination sustains the Italian competitive advantage in this sector. Considering the COI concept and the "Made in Italy" brand, the respondent affirmed the differentials of the Italian products:

> They (the Italian producers) have the ceramic tiles "Made in Italy". So they produce the entire product with all the criteria of beauty, of technical quality, to be able to maintain that brand, for the competitiveness of the country.

However, there are constraints related to the development of the Italian industry of ceramic tiles. The production costs of the country are elevated, the environmental norms are severe and there are barriers to this industry to grow. The burn of the ceramic tiles in the production phase brought an environmental impact in the 90's, which shifted to strict

environmental norms from government regulatory agencies. The Italian market is saturated, which means that industries are searching for other locations to establish manufacturing plants. The competition with the Spanish producers of ceramic tiles is an important factor as well, as the Spanish industry has a distinctive characteristic, which is the scientific knowledge embedded in the industrial and control processes. Meanwhile the suppliers that provide capital goods and inputs drive the Italian industry of ceramic tiles; the Spanish industry brings further scientific knowledge for this process (Castellacci, 2008; Meyer-Stamer, Maggi & Seibel, 2001; Pavitt, 1984).

The subsequent sections are The Product Innovation Development Process and The Dynamic Capabilities for Innovation. The main objective is to present the technological innovation development process of the fifth case firm, thus highlighting its differentials and characteristics. The last section presents the dynamic capabilities for innovation, which emphasizes the technological and organizational capabilities inherent to the firm that support the product innovation development, thus corroborating with market competitiveness.

5.6.1. THE PRODUCT INNOVATION DEVELOPMENT PROCESS

The firm developed, during the period of 2010 to 2012, one product innovation, which was the incremental improvement of the ceramic tiles format, from forty centimeters square to sixty centimeters square. The acquisition of a digital printer, the digital serigraphy, aims to broaden the portfolio of the ceramic tiles and is part of the product innovation development, as this technology brought product modifications, in terms of improving the product's characteristics and design. According to the explanation of the respondent, this incremental product innovation development also aims to improve the quality of the product.

The incremental innovation on the ceramic tiles, the changes in the product format, involves the manufacturing process of the firm. The respondent explained that the modifications in the size of the ceramic tiles are related to improvements in the ceramic mass, part of the granulating and grinding phase and in the manufacturing technologies, which are the pressing machine and the serigraphy system. The adjustments also involve the workforce training. In this sense, the improvement of the ceramic tiles, in terms of size modifications, demands further implementations in the manufacturing process. The respondent mentioned that the preparation

of the ceramic mass is the dry grinding. The product from this production process absorbs from 6% to 10% of water and has better energy efficiency, as it has lower water consumption, compared to the wet grinding.

According to Meyer-Stamer, Maggi and Seibel (2001), the characteristics of the production process are the preparation of the ceramic mass, through the process of granulating and grinding. The main inputs of the ceramic mass are clay, feldspar and quartz. In some preparation process, there is the salt addition to provide special visual effects. The product resulted from this intermediate phase, the granulated, is pressed to form the ceramic tiles. Subsequently, this product is covered by the ceramic dye, the chemical ink, which determines the design of the ceramic tiles, in terms of color and surface. The subsequent phase is the firing process and the ceramic tiles remain in kilns for approximately one hour. The subsequent phase is the inspection of the ceramic tiles and the classification in different quality levels. The final phase is the package process. There is the production process of ceramic tiles that includes more than one phase of ceramic coloring, which depends on the visual appearance aimed for the product. The product production process of the firm follows this dynamic. The firm also has the digital printer that is part of the product production process. The interview extract that contributes to explain the production chain of the ceramic sector is:

> So, there are the supplier of inputs, the ceramic glaze suppliers, . . . there are the ceramic dye producers, different from the ceramic glaze, so there are producers only for the ceramic dye, in the case of the digital serigraphy, some producers emerged to produce the ink for the digital serigraphy. Before the digital serigraphy the ceramic industry used, still use rolls, serigraphy screens or serigraphy rolls, which means a kind of stamp, to make the impression of the ceramic dye in the piece (ceramic tiles), and then there are other industry that produce this screen, that produce this serigraphy roll. And the mechanic industry that produces the equipment, the pressing equipment, the digital machine, the serigraphy machine.

5.6.2. THE DYNAMIC CAPABILITIES FOR INNOVATION

The analysis of the dynamic capabilities for innovation of the fifth case firm focuses on the Technological Capacity of the firm, emphasizing the environmental sustainability, the knowledge management and the partnerships for the innovation development. Aiming to corroborate with this firm's differential, Eisenhardt and Martin (2000) state that the dynamic capabilities are the strategic and the organizational routines, from which enterprises establish new configurations of resources, while there are substantial changes in the market. Therefore, the fifth case firm centers on the technological capacity for the product innovation development.

The Technological Capacity

The main characteristic of the ceramic tiles industry is the integration of the production chain to supply the ceramic tiles industry. The main suppliers are the suppliers of inputs, ceramic ink and ceramic glaze as well as the machinery industries, such as the mechanic industry that provides the pressing equipment. The digital serigraphy is also a recognized industry for this sector. In other words, this industry contributes for the product innovation development, in terms of the improvement of the product's characteristics, such as the design.

The production process of ceramic tiles of the fifth case firm is the dry grinding. The dry grinding consists in producing the ceramic tile through the pressing equipment. In order to modify the size of the ceramic tile, the respondent mentioned that the firm improved three phases of the production process. The first phase is the improvement of the inputs of the ceramic mass of the product, which means that the final product has environmentally sustainable qualities and is the result of improved techniques. The ceramic mass is the base of the product. The subsequent phase is the investment in granulating and grinding equipment to develop an enhanced ceramic mass. The last phase is the investment in pressing equipment to produce larger ceramic tiles. The technological barrier to produce larger ceramic tiles, according to the respondent, is on the granulating and grinding equipment, which are not available for the industry. Therefore, to surpass this technological barrier, the respondent mentioned that there is the search of equipment in countries specialized in equipment for the ceramic industry. The main country, in this case, is Italy. The respondent mentioned that there are also North American and German equipment for the ceramic industry.

The Italian producers are, according to the respondent, the main market trends providers. In other words, the Italian producers are specialists in developing ceramic tiles in different sizes and designs, which contributes to sustain their competitive advantage worldwide. According to Meyer-Stamer et al. (2001), ninety percent of the productive capacity of the ceramic sector is in the Emilia-Romagna region, where 80% of the firms are concentrated in ten cities of the Modena province and the other part is in the neighboring province, the Reggio-Emilia. The prominence of this region is due to the artisanal tradition of the ceramic workers. The enterprises of this region were created after the II World War, as there was a great need of ceramic tiles to the civil construction industry. The availability of clay in rural areas was determinant for the appearance of this industry sector. During the 70's and the 80's, the enterprises from the Sassuolo cluster had upgradations in the production system, in terms of machinery, due to the integration with the mechanic industries of the region and the development of technological innovations, the production process improvement and the product

differentiation. Yet, Marketing innovations are also a remark of this cluster, as the firms have well-trained sales workforce. Due to these reasons, Italian producers are worldwide leaders.

In this sense, the Italian prominence in the ceramic sector, along with the crescent Spanish industry, dictates the market trends and the product innovation development. The respondent mentioned that the Italian producers determine the product design worldwide. As an example, the interview extract confirms the core competences of the Italian producers:

> So, if Italy starts saying that a big product is a posh product, a more beautiful product, automatically all the countries of the world are going to have to follow this tendency.

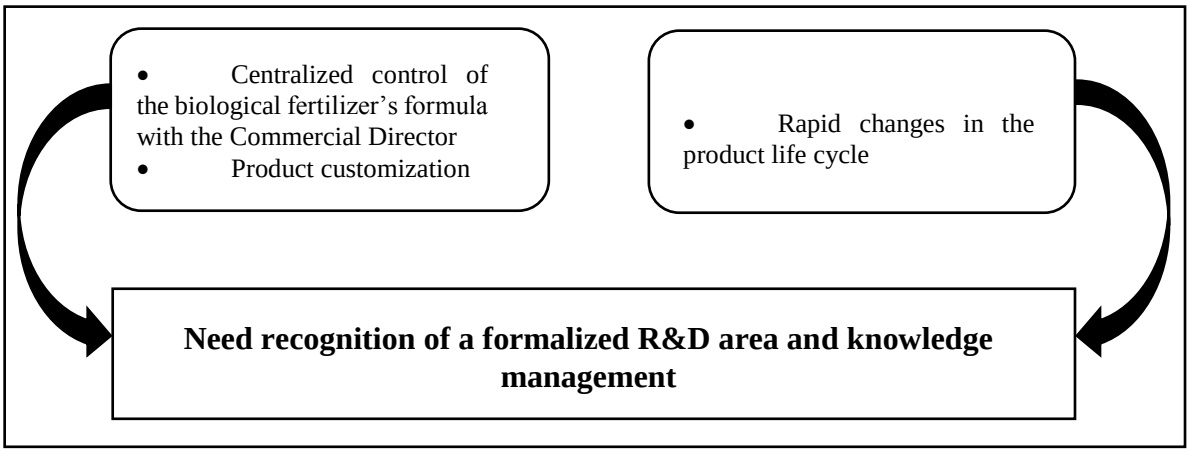
Converging with this statement, the respondent mentioned that the improved ceramic tiles serves both the domestic and the international markets. Yet, the international sales ratio of new or significantly improved products, developed from 2010 to 2012, reflects the importance of the technological upgrading of the production process of the fifth case firm. The environmental sustainability is aligned with the product competitiveness, as the production process optimization enables the reduction of energy costs and the improvement of the product's characteristics. In addition, the respondent mentioned that among the environmental sustainable actions, the firm has water treatment and there are efforts to reduce the dust emission from the traffic of trucks.

The Brazilian Association of Ceramic (Associação Brasileira de Cerâmica [ABCERAM]) (2016) states that the regions that have the most developed ceramic industry in Brazil are the South and the Southeast. The factors that explain this development are the high population density, the greater industrial and agriculture activities, the infrastructure, the income distribution, associated with facilities in accessing raw materials, energy, research centers, universities and technical schools.

Considering the partnerships for the innovation development, the respondent mentioned important aspects concerning the scientific partnerships with universities. The first aspect is the use of laboratories' infrastructure to conduct essays to characterize, analyze and test the ceramic mass. This positive collaboration amid the enterprise and the university results in applied research for the enterprise and for academic works, as there are researches involved in essay processes. This positive partnership converges with the findings of the first, second, third and fourth case firms, as they also have positive experiences from scientific partnerships with universities and research institutes. Yet, there are technical institutes that are important for the innovation development, in terms of providing trained workforce for the ceramic sector. In opposition to this positive aspect, the respondent also mentioned that, due to the rapid changes

related to the automation management, the process control and the product modifications that happen in the ceramic industry, there are considerable differences from the working dynamics of the industry and of the university.

The dynamism of the ceramic industry, the short life cycle of the product and the direct application of the innovation development leads to imbalances, concerned to the ceramic industry and the academic working dynamics, in terms of the learning time and knowledge application. This factor deters not only the direct application of the scientific knowledge but also the register of the generated knowledge from this continuous improvement process. This aspect presents similarities with the fourth case firm. The absence of a formalized knowledge management in the fourth case firm is due to the possession of the biological fertilizer's formulation in the mind of the Commercial Director and due to the product customization. In the fifth case firm, this is due to the rapid changes from the innovation development to promote new product life cycles. In both cases, this factor leads to the recognition, from the part of the respondents, of the importance of the R&D area in the firms. Schema 4 presents the realities of these two case firms:



Schema 4: Similarities amid the Fourth and the Fifth Case Firms

Source: Research Data Analysis (2015).

The Dynamic Capabilities for Innovation and the Internationalization Pattern of the Fifth Case Firm

The analysis of the fifth case firm presents its differentials concerning the internationalization pattern and process of this firm. Even though the firm has a traditional internationalization process (Johanson & Vahlne, 1977), the export range performance is the same since its beginning until nowadays, which means the firm does not present a continuous improvement in international sales intensity; instead, the firm maintains a constant international sales performance. This differential brings further contributions to the Internationalization

Pattern literature (Acedo & Jones, 2007; Bell et al., 2003; Knight & Cavusgil, 2004; Kuivalainen, Saarenketo, & Puumalainen, 2012; Kuivalainen, Sundqvist, & Servais, 2007), as this medium-to-large sized firm presents a continuous export performance.

This may be explained considering the size of the firm, in terms of the total annual turnover. The firm concentrates its main market share in the domestic market, placing the export activities as a secondary market share. The total annual turnover of the firm is equivalent to a medium-to-large sized firm and its largest share comes from the domestic market. Even though the international markets are not the main market share of the firm, the international sales intensity is significant, as the firm has an elevated total annual turnover. In this sense, this variable is also part of the comprehension of the internationalization pattern of this case firm.

The main dynamic capability of the firm, its technological capacity, sustains the firm's market competitiveness. Investments on the technological capacity to improve the format and the design of the product are determinant for the firm's placement in both domestic and international markets. Due to the prevalence of Italian producers of ceramic tiles, the firm is attentive to the market trends that these producers bring worldwide. The consideration of this market trend is important for placing the firm competitively, as the consumer's perception of this product is based on fashion tendencies that come from the Italian producers. In this regard, investments on the technological capacity are drivers for the internationalization and market expansion of the firm.

This section presents the data analysis of the Internationalization Process, the Product Innovation Development Process and the Dynamic Capabilities for Innovation of the fifth case firm. The subsequent section shows the data analysis of the sixth case firm.

5.7. THE INTERNATIONALIZATION PROCESS OF THE CASE FIRM 6

The analysis of the internationalization process and the decision criteria to determine the internationalization pattern is in accordance with empirical criteria used for defining early and rapidly internationalizing enterprises. This framework is central for the analysis of the internationalization pattern and the comprehension of the enterprise's internationalization process. The reference Table 15 enables the criteria conceptualization of early and rapidly

internationalizing enterprises. Table 40 presents the internationalization pattern of the sixth case firm, from the Production of Whole Sugar sector:

Decision Criteria	Data
Time Lag (Commencement)	1987 (together with the firm's inception)
Foreign Sales Ratio in 1987 (International Sales Intensity)	99%
Geographic Regions	Europe – 100%
Foreign Sales Ratio in 2014 (International Sales Intensity)	99%
Geographic Regions	Asia – 30%; Europe – 58%; North America – 10%; Oceania – 1%.

Table 40: Characteristics of the Born Global Firm from the Production of Whole Sugar Sector

Source: Research Data Analysis (2015).

The sixth case firm presents a rapidly and early commercial expansion to foreign markets; in this case, the commencement of the international market expansion focused in Europe. This characteristic denotes an international market expansion to further markets, which is a distinctive characteristic of born global firms. Yet, considering data from 2014, the firm presented an international market expansion of its product, which is an indicative of the product's competitiveness in international markets and the strategic placement of the foreign commercial activities. The proxy for the foreign sales ratio of born-global firms is from 20% to 80% from total annual turnover (Acedo & Jones, 2007; Knight & Cavusgil, 2004; Kuivalainen, Saarenketo, & Puumalainen, 2012; Kuivalainen, Sundqvist, & Servais, 2007), which, in this case, converges with the literature.

The first differential from the internationalization pattern of the sixth case firm is in the foreign sales ratio in the commencement year of the international outward activities and the internationalization process along with the firm's inception. The literature of born global firms analyzes firms from high-technology sectors, mainly due to the uniqueness of the innovative products and the need to achieve large market shares in order to obtain the return on investments of the innovation development. The inherent characteristics of high-technology firms lead to a rapid international market expansion (Li, Qian, & Qian, 2012; Sedoglavich, 2012). The sixth case firm is from a low-technology sector, which tends to present a traditional internationalization process, exploring first the domestic market and then to expand to international markets. This progression is due to the firm's product characteristics, which does not present a radical innovation development that has to be diffused largely. Yet, the firm experiences the learning process required to explore international markets (Bell et al., 2003; Chetty & Stangl, 2010; Grandinetti & Mason, 2012; Johanson & Vahlne, 1977).

This differential from the sixth case firm, a born global firm from a low-technology sector focused on international markets brings further contributions to the Born Global Firms theory (Acedo & Jones, 2007; Knight & Cavusgil, 2004; Kuivalainen, Saarenketo, & Puumalainen, 2012; Kuivalainen, Sundqvist, & Servais, 2007). The contributions center on the international sales ratio and the fact that the firm is from a low-technology sector. The international sales ratio of this firm exceeds the international sales ratio of born global firms, which is from 20% to 80% from total annual turnover. This factor converges with the internationalization strategy of the firm, which is to supply international market niches that largely recognize the importance of organic products and have the purchase power to acquire this product class. The quality of the product and the nine certifications that the organic whole sugar of the sixth case firm possesses enable the international market expansion.

According to the respondent, the product of the firm, organic whole sugar, was a worldwide pioneering product in 1987, due to its nutritional properties, as it is an organic product and its production process is based entirely on the plantation and the manufacturing prerogatives for the production of organic products. This product possesses nine certifications, which are related with the organic procedures, as well as the KOSHER certification (including the KOSHER certification for the Jewish Passover). Nowadays, this product innovation remains as the main product of the firm. The main international market of the product in 1987 was Switzerland, due to the business networks the respondent has with the Swiss cooperative of organic farmers. The internationalization process was, in this sense, based on the opportunities' recognition from the Swiss market, as the firm was founded to supply the organic market niche of this country, to after explore further markets. Therefore, the international market expansion of the sixth case firm unites the business networks (Johanson & Vahlne, 2009; Ruzzier et al., 2006) and the goals and the global mindset of the respondent (Andersson & Tell, 2009; Blackburn et al, 2013; Bloodgood, 2006; Miocevic & Crnjak-Karanovic, 2012).

The sixth case firm is an exporter and has four people in charge of the International Trading and Export Department. The respondent explained that the certifications the firm has for the organic whole sugar also works as a Marketing tool for the firm in international markets. Aligned with this factor, there is a few number of organic whole sugar producers worldwide, which contributes to the market niche maintenance of the firm. The presence in the North American market is to supply mainly the KOSHER stores in New York, where there is a large concentration of Jewish people. The presence in Germany is due to the market expansion in 1988. The presence in Japan is due to the certifications and the product requirements the firm

has to serve this market. The presence in New Zealand is due to the intermediary business networks the respondent has with Argentinean partners that indicated this market niche.

International Sales Performance

The database from MDIC (2016a) provides time series that enhance the analysis of the internationalization process of the sixth case firm. The available period is from 2001 to 2015, which, in this case, does not contemplate the entire period of the internationalization process; notwithstanding, this period provides ground for its analysis. Table 41 presents the international sales performance of the sixth case firm:

Period	Export Performance Range
From 2001 to 2005	Up to U$S 1 million
In 2006	U$S 1 million to U$S 5 million
From 2007 to 2008	Up to U$S 1 million
From 2009 to 2015	U$S 1 million to U$S 5 million

Table 41: International Sales Performance of the Sixth Case Firm

Source: MDIC (2016a).

Table 41 reinforces the internationalization pattern of the sixth case firm. The firm had, during the period of 2001 to 2005, the same export performance. In 2006, the firm had an increase in the international sales performance and during the period of 2007 to 2008, the firm had a decrease in the international sales performance, which can be explained by internal and external organizational environmental variables. In addition, the respondent mentioned that, in the past, due to the shortage of organic whole sugar, a substitute product, the organic crystal sugar obtained the market share of organic whole sugar for a short period, which, thereafter, was recovered by the organic whole sugar. Since 2009, the firm maintains the same international sales performance, which reinforces its internationalization strategy and signals that there is a worldwide growing recognition of the importance of organic products, according to the respondent.

Referring to the International Sales Intensity of Innovative Products, the sixth case firm seeks to maintain the improvement in quality of organic whole sugar among its core guidelines, which means the focus is on the development of incremental innovations in product and process. The evaluation of the innovation development process is yearly, as the production process of organic whole sugar has to obey a series of guidelines that are part of certifications' requirements. Therefore, improvements involve organic agriculture and the production process of organic whole sugar, aiming to meet the certifications' requirements. However, this process does not affect the international sales intensity of the firm's product, as this is a precondition to the commercialization of the firm's organic whole sugar.

The subsequent sections are The Product Innovation Development Process and The Dynamic Capabilities for Innovation. The main objective is to present the technological innovation development process of the sixth case firm, thus highlighting its differentials and characteristics. The last section presents the dynamic capabilities for innovation, which emphasizes the technological and organizational capabilities inherent to the firm that support the product innovation development, thus corroborating with market competitiveness.

5.7.1. THE PRODUCT INNOVATION DEVELOPMENT PROCESS

The main product of the sixth case firm is the organic whole sugar. This product has nine organic certifications that ensure the quality and the nutritional properties of the product and its entirely production process obeys the procedures to produce organic products. The firm has its own advanced technologies that are part of the manufacturing process. The entire farm has an organic treatment and covers an area of 440 hectares. There are in this property the main farm, where the firm is established and there are other three smaller farms. The certifications the firm has are the European Union Certification (EU), the National Organic Program, from the United States Department of Agriculture (USDA NOP), the Canada Organic Regime (COR), the Japan Agricultural Standards (JAS), the Brasil Orgânico, the BIOSUISSE, the KOSHER (including the KOSHER certification for the Jewish Passover), the Hand in Hand Certification and the Hazard Analysis and Critical Control Points (HACCP). The EU, USDA NOP, COR, JAS, Brasil Orgânico and BIOSUISSE certifications are in accordance with national or community rules that allow the commercialization of the product in these regions. ECOCERT (2016) is responsible to certify the firm. The KOSHER certification obeys the Jewish dietary rules. The Hand in Hand Certification is from the Rapunzel Naturkost GmbH (2016), which assures the social responsibility of the business and the HACCP certification (2016) aims to verify the control of biological, chemical and physical hazards to the product.

The sequence of the production process of the whole sugar has an order. The harvest process is manual and the workers are trained to this process, in order to prepare the sugarcane to the milling process. The production unit is in the mill. The first phase is the milling process of the sugarcane, to continue in the processing phase. The subsequent phase is the boiler process, evaporating the resulting sugarcane juice in a vacuum evaporation unit. The drying process ensures the free flowing characteristic of this organic whole sugar. The last phase is the

packaging process, with packages of five hundred grams and fifteen kilos, this latter destined to the international market. The firing process of the residual sugarcane fibers after pressing provides the steam used in the process. The firm has a yearly production of 1.500 tons of organic whole sugar. The respondent stated that this production volume is significantly low when compared to conventional sugar industries.

5.7.2. THE DYNAMIC CAPABILITIES FOR INNOVATION

The analysis of the dynamic capabilities for innovation of the sixth case firm focuses on the Development of Green Innovations. According to Helfat (1997), the dynamic capabilities enable organizations to create new products and processes in order to be able to respond to market conditions. This definition consolidates the dynamic capabilities for the innovation development of this case firm, which focuses on environmental sustainable actions.

Development of Green Innovations

The growing importance of organic products calls for attention to this market trend. Denmark is one of the leading countries that aims to expand the organic agriculture (Ministry of Food, Agriculture and Fisheries of Denmark, 2016). The production chain of the organic product is environmental sustainable (Chen, Chang, & Wu, 2012; Mannheim Innovation Panel, 2009), which means that this process has as main focus the development of innovations that assures the quality and the characteristics of the organic product. This involves the soil and the water treatment, the use of fertilizers for the organic plantation and the conscious of social responsibility. According to the respondent, the organic agriculture is based on three pillars, which are the environmental protection, the social aspect and the organic treatment of the nature, also reiterated in the Danish Organic Action Plan (2016). The production of organic products involves expertise from the agriculture, agronomy and food engineering fields of work. The respondent reiterates the importance of this group of professionals, as they are responsible for the continuous monitoring of the soil and for the techniques of planting and harvesting. The continuous improvement of the production process of the whole sugar is progressive, as there are new techniques and applied research that aim to comprehend the properties of this product. The interview extract that certifies this affirmation is:

> And we are still learning, every year, how to deal with it (the whole sugar). It depends on the rain, it depends on the sugarcane, it depends on the harvest time, it depends on the sunlight, it depends on the staff. It depends on various factors.

The continuous improvement of the production process is a yearly goal of the firm. The allocation of specialists in this process ensures improvements in the manufacturing process of the firm. There are field specialists, like the agronomist engineering that deals with the sugarcane treatment. The main process innovation is related to the cleaning process of the manufacturing equipment, as there are sugar residues during the production process. The interview extract that confirms the importance of the cleaning process for the improvement on the production process, which also leads to improvements on the product quality, is:

> So, we have to develop specific cleaning methods for every section of the process. We are in charge to do this. That is because it is organic.

The firm has its own laboratory for the product analysis. There are professional technicians and an engineer in charge of this laboratory. The main duty of the professional staff is to coordinate the agricultural process, from the plantation to the production. There is a strict control of the fertilizers' utilization, which are under the authorization of the certifications. Due to the highly controlled manufacturing process, a distinctive characteristic of this case firm, the firm receives researchers and students from the agronomy field of study that are interested in learning about the control of the manufacturing process and to visit the farm. However, there is not a formal partnership for the innovation development with universities, even though the respondent has established networks with researchers from universities. The quality control is mandatory for the firm, as this is in accordance with the prerogatives of the certifications.

The respondent mentioned that the market trends and the clients' preferences are important drivers for the innovation development. The preferences are not only related to the organic whole sugar characteristics, but also to the type of package. The strategic management of innovation maintains the market share and its continuous improvement of the characteristics of the organic whole sugar.

The Dynamic Capabilities for Innovation and the Internationalization Pattern of the Sixth Case Firm

The analysis of the sixth case firm presents the development of green innovations as the main dynamic capability for the innovation development of this case firm, which drives the international performance of the firm. This dynamic capability is the main pillar of the firm, as its main product is the organic whole sugar. The crescent market demand for organic products

places the firm in a competitive position, as the firm not only is among the few worldwide producers of organic whole sugar but also has nine certifications that ensure its international market expansion. This pioneering characteristic leads to a committed international market expansion, as the firm presents the born global internationalization pattern. This pattern states that the firm begun its internationalization process near to its inception, which means the focus is on international markets. Indeed, this focus is reiterated by the respondent, as the firm directs its production to international markets.

The firm's certifications, the business networks and the global mindset of the respondent confer the firm its committed international market expansion. Yet, the product's characteristics are also determinants for the international market acceptance. The focus on international markets, the manager's networks and global mindset, the product's certification and characteristics and the manufacture process of organic whole sugar are the key factors to comprehend the internationalization pattern of the sixth case firm. Yet, the respondent emphasized the role of the specialists responsible for the agricultural process. In this sense, the alignment of the dynamic capabilities for the green innovation development and the internationalization pattern define the sixth case firm.

This section presents the data analysis of the Internationalization Process, the Product Innovation Development Process and the Dynamic Capabilities for Innovation of the sixth case firm. The subsequent section shows the data analysis of the seventh case firm.

5.8. THE INTERNATIONALIZATION PROCESS OF THE CASE FIRM 7

The analysis of the internationalization process and the decision criteria to determine the internationalization pattern is in accordance with empirical criteria used for defining INVs. This framework is central for the analysis of the internationalization pattern and the comprehension of the enterprise's internationalization process. The reference Table 29 enables the criteria conceptualization of INVs. Table 42 presents the internationalization pattern of the seventh case firm, from the Manufacture of Electric Material for Installations in Consumption's Circuits sector:

Decision Criteria	Data
Time Lag (Commencement)	2005 (3 years after the firm's inception)
Foreign Sales Ratio in 2005 (International Sales Intensity)	3,18%
Geographic Regions	Latin America – 100% (until 2010)
Foreign Sales Ratio in 2014 (International Sales Intensity)	14,44%
Geographic Regions	Latin America – 95%; Middle East – 3%; Africa – 2%.

Table 42: Characteristics of the International New Venture from the Manufacture of Electric Material for Installations in Consumption's Circuits sector

Source: Research Data Analysis (2015).

The seventh case firm presents a rapidly and early commercial expansion to foreign markets; in this case, the commencement of the international market expansion focused in Latin America until 2010. This characteristic denotes an international market expansion to closer markets, which is a distinctive characteristic of INVs. Yet, considering data from 2014, the firm presented an international market expansion of its products, which is an indicative of the products' competitiveness in international markets and the strategic placement of the foreign commercial activities. The proxy for the foreign sales ratio of international new ventures is from 20% to 80% from total annual turnover (Acedo & Jones, 2007; Knight & Cavusgil, 2004; Kuivalainen, Saarenketo, & Puumalainen, 2012; Kuivalainen, Sundqvist, & Servais, 2007), which, in this case, is the solely criterion that differs from the literature.

The firm has four people in charge of the International Trading and Export Department. In addition, the firm extensively relies on international trade fairs to promote the products and for the search of fruitful business opportunities. The firm also has international sales representatives, which are technical experts that know the technical characteristics of the product. This characteristic converges with the internationalization strategies of the first, the second, the third and the fourth case firms. The beginning of the internationalization process of the firm relied on international strategic alliances to the international expansion. The importance of the business networks for the internationalization process, in this sense, is similar to the first, the third, the fifth and the sixth case firms.

For the period of 2005 to 2010, the Latin America countries were the international targets market of the firm. According to the second respondent, the choice for this international market obeyed the following criteria: the geographic proximity, the ease of access, the MERCOSUL, as a commercial vector and the similarity with Brazil, in terms of the requirements of the products. The Latin American countries are, therefore, important for the internationalization process of the second, the fourth, the fifth and the seventh case firms and

reiterate the preference for neighboring countries for the beginning of the internationalization expansion (Johanson & Vahlne, 1977).

The international trade fairs are part of the internationalization strategy of the firm and integrate the schedule of the firm's activities. According to both respondents, the main goal in participating in such events is to promote the product, to present the product technically, to explore further business opportunities with different business partners. The international trade fairs also contribute to enhance the sales representatives' competences. This staff is responsible not only for concretizing the sales, but also to explain the differentials of the product, the characteristics and the application of the product. As trade fairs are hubs, where there is a large amount of information exchange (Blythe, 2009; Evers & Knight, 2008), this forefront staff has to have a deep knowledge about the product's specifications, as the final clients are electricity distributors that search for quality products, with certifications and with technical applications. Yet, this staff is also able to provide training to explain how to apply the product correctly in the electric energy system. The second respondent, the Commercial manager, explained how this dynamic works:

> There is the local sales representative, but this person does not have the technique to do this training, because the connector comes with a connection system. So, there is this training for the electrician, to know how to operate in the electric energy system, in the (electric energy system) of the pole and to apply this (product) correctly. (The sales engineers) Who train this are our sales engineers.

It is also important to mention that there are different return rates from the international trade fairs, which is dependent on the market, the risks inherent to political conditions in the country and the forms of establishing negotiations that differ across the markets. The first respondent, the Commercial Director, emphasized that the firm had long-term investments in the Middle East, in terms of participation in trade fairs, and are now having this return. As explained by this respondent, the continuous commitment with the clients is crucial to establish and to strengthen the ties. As an example, the following interview extract corroborates with this affirmation:

> You go to the (trade) fair, you have to bring the result. No. There are countries that we visited, we spent during three years. And then, after three years, you are with a consolidated image and you had the return. In the Middle East people say like this: "The problem with the ones that come from overseas is that they think they come one time and then they disappear. The Arab (buyer) has to have the close contact. . . . (The Arab buyer) has to catch the material, do samples, know that you are active there. . . .

International Sales Performance

The database from MDIC (2016a) provides time series that enhance the analysis of the internationalization process of the seventh case firm. The available period is from 2001 to 2015, which, in this case, contemplates the entire period of the internationalization process. Table 43 presents the international sales performance of the seventh case firm:

Period	Export Performance Range
In 2005	No Data Available
In 2006	Up to U$S 1 million
From 2007 to 2008	U$S 1 million to U$S 5 million
From 2009 to 2010	Up to U$S 1 million
From 2011 to 2015	U$S 1 million to U$S 5 million

Table 43: International Sales Performance of the Seventh Case Firm

Source: MDIC (2016a).

Table 43 reinforces the internationalization pattern of the seventh case firm. The absence of data for 2005 does not compromise the analysis of the internationalization process of the firm. From 2007 to 2008, the firm maintained the same export range. However, from 2009 to 2010, the international sales performance of the firm had a decrease. From 2011 to 2015, the firm recovered its international sales performance.

International Sales Intensity of Innovative Products

In order to verify the international sales intensity of innovative products, the first part of the presentation aims to show the volume of sales of the products to total annual turnover in 2014. Subsequently, the second part of the presentation aims to present the international sales intensity of different types of products in 2014. Table 44 presents the first part of the data:

Types of Products	Product's Total Sales/Total Sales in 2014 (%)
New or significantly improved products, developed during the period of 2010 to 2012	20,67%
Unchanged or not significantly improved products	79,33%
The resale of products	0

Table 44: Products' Sales Intensity in 2014

Source: Research Data Analysis (2015).

The second part of the presentation focuses on the analysis of the international sales intensity of different types of products in 2014. Table 45 presents the second part of the data:

Types of Products	International Sales/Total Sales in 2014 (%)
New or significantly improved products, developed during the period of 2010 to 2012	30%
Unchanged or not significantly improved products	70%
The resale of products	0

Table 45: International Sales Intensity of Different Types of Products

Source: Research Data Analysis (2015).

The prevalence of unchanged or not significantly improved products, developed during the period of 2010 to 2012, in the international market sales can be explained because innovation is a path dependent process that takes some time to manifest its effects on the firm's activities. In this sense, the time lag from the product innovation development to the international sales intensity is two years, as the data concerned to this latter variable is from 2014 (D'Angelo, 2012; Pla-Barber & Alegre, 2007; Rodríguez & Rodríguez, 2005). The main goal of the firm is to launch two products every year, which affirms the mission and the compromise of the enterprise with the innovation development. Yet, as the firm has to work directly with the client, mainly the electric energy distributors, there is the need to adequate the product to the client's requirements and the characteristics of the electric energy system. This condition is applied to both national and international markets.

The subsequent sections are The Product Innovation Development Process and The Dynamic Capabilities for Innovation. The main objective is to present the technological innovation development process of the seventh case firm, thus highlighting its differentials and characteristics. The last section presents the dynamic capabilities for innovation, which emphasizes the technological and organizational capabilities inherent to the firm that support the product innovation development, thus corroborating with market competitiveness.

5.8.1. THE PRODUCT INNOVATION DEVELOPMENT PROCESS

According to the first respondent, the firm has as main goal the development of two products every year. This yearly goal permeates the organization and the Product Engineering Department, which is the main area of the firm, the "core competence", as emphasized by the first respondent. The technological capacity of the firm and the core competences from this department are the structuring factors that ensure the market competitiveness and propel the innovation development. The Product Engineering Department of the firm has a 3D printing machine and extensively uses software to the product conception, development and projection. Yet, the firm has a laboratory to test and verify the properties of the product in electric circuits, which reinforces the characteristics and the applicability of the product.

Considering the organizational structure of the firm, which has four main areas, the commercial, the administrative, the financial and the engineering, the Product Engineering

Department is the core area of the firm and has four engineers. The manufacturing process is internalized in the firm, which means the firm does not outsource the production process. The first respondent explains this process in this interview extract:

> Today, erstwhile, people were very focused on the product approval. So, develop a product, and how are we going to produce this product. So, today we have focus, we are internalizing all this production, that is what we are first worried about today. Because you need a product that is this, it is necessary in the market. So, how are we going to produce this? So there is the involvement of the Product Engineering Department. In the conception, speed of assembling and for the last what is referred always to the product, the quantity, price expectation, things like this.

The products of the firm's portfolios have patents registered at the INPI in Brazil and there are patents registered in Argentina. INPI is part of MDIC and is responsible for "the improvement, dissemination and management of the Brazilian system of authorization and guarantee intellectual property rights for the industry" (INPI, 2016a). In Argentina, the organization responsible for the intellectual property rights is the National Institute of Industrial Property (Instituto Nacional de la Propiedad Industrial [INPI]). The main mission of the INPI in Argentina is to protect the rights of the industrial property through titling or making the records set by the national legislation for this purpose (INPI, 2016b). The patents are, therefore, important mechanisms for the firm, in order to secure the technological protection of the firm's products and to ensure the products' competitiveness.

5.8.2. THE DYNAMIC CAPABILITIES FOR INNOVATION

The analysis of the dynamic capabilities for innovation of the seventh case firm focuses on the Technological Capacity of the firm, centering on the product innovation development and the key role of the engineering staff. According to Makadok (2001), the capabilities of an enterprise to generate resources are due to the combination of the enterprise's organizational processes that aims to achieve a result. This definition converges with the firm's characteristics, as the core competence of the firm, the Product Engineering Department, is focused on the innovation development, which is also part of the firm's annual goal, the development of two product innovations.

The firm has two distinctive characteristics that enable the market competitiveness and the innovation development, which is the technological capacity, in terms of machinery, the

most important is the 3D printing machine and software, which are for the product development. Yet, the firm has the ISO 9001 certification, which confers the market international expansion, as the ISO certification is recognized worldwide, also being a commercialization requisite in determined markets.

According to the first respondent, the main activity of the firm is to produce products for the electric energy distribution, which means the firm has to have constant market information for the product development and upgrade. In this sense, the input for the innovation development comes from the market need. In order to identify this trend, the sales engineers are responsible for data collection in the market to provide thereafter information for the product innovation development. The strategic positioning of the organization for this process consists in centering the investments in solutions, searching for internal or external partnerships that contribute to consolidate the product innovation development. This focused direction conducts the firm's innovative efforts. The interview extracts that support this sentence are:

> I usually say to the staff that we do not have limits to spend. (The person) brought a new product and there is the need to do a test. Who does this? Only NASA does. So, how much is it going to cost? Do we have financial health to pay for this? Do we? So we are going to chase for this.
>
> I want to have a 100% of autonomy. . . . If I decided to do something that only NASA does, with my (financial) resource I go there and I do.

The strengths of the firm are the capacity to articulate the expertise of the Product Engineering Department sustained by its technological assets, such as machinery and software, which is determinant for the continuous monitoring of the market needs and trends. This process constitutes the informational inputs for the innovation development and for the improvement of the applicability of the products. Due to this advantage, the firm's products have a great acceptability in both domestic and international markets.

The Dynamic Capabilities for Innovation and the Internationalization Pattern of the Seventh Case Firm

The analysis of the seventh case firm presents its technological capacity and the engineering department as the main dynamic capabilities for innovation of the firm. These key differentials dictate the firm's competitiveness in both domestic and international markets. The firm presents an early and rapidly internationalization pattern, focused on exploring, in the beginning of the international commercial activities, the Latin American market, as the neighboring countries present cultural and business proximities with Brazil. The explanation of the firm's market expansion to further markets is due to the firm's participation in trade fairs,

to enlarge the business networks and to explore market opportunities. This expansion occurred in a gradual manner, as stated by the first respondent, which means that the results from international trade fairs are not immediate. Au contraire, the results are obtained after years of investments and business network maintenance.

The dynamic capabilities for innovation of the seventh case firm drive the international market expansion. The technological capacity to develop products for electric circuits denotes that the firm has an integrated business model, in other words, the Product Engineering Department of the firm is responsible for the product innovation development and this department has the technological support, the 3D printing machine and specialized modeling software. The Directorship members participate in the innovation decision process; as an example, the first respondent of the firm, the Commercial Director, is part of this decision-making process. In this sense, not only the firm has the technological capacity and specialized staff, but also the interconnectivity is present within the firm.

This section presents the data analysis of the seven Brazilian case firms from technology-based sectors. The subsequent chapter presents the comparative analysis of the case firms. This section contemplates the contributions to the Business Internationalization and the Innovation Process literatures, as well as sheds light on the managerial contributions, for managers and practitioners.

6 THE COMPARATIVE ANALYSIS

The analysis of each case firm reinforces the importance of the dynamic capabilities for innovation, encompassing the resources, competences, technology and managerial and strategic expertise that support the innovation development of the firms (Guan & Ma, 2003; Teece, Pisano, & Shuen, 1997). The innovation development process is an intrinsic characteristic of technology-based firms (Côrtes et al., 2005; Oliva et al., 2011; Toledo et al., 2008) and this process sustain both the national and international market competitiveness of the firms.

The comparative analysis aims to present the common characteristics of the research variables. The research variables are the Business Internationalization, focusing on the Internationalization Patterns of SMEs and the Innovation Process, focusing on the Product Innovation Development Process and the Dynamic Capabilities for Innovation. This analysis also contemplates the emerging variables. Therefore, the research variables and the emerging variables are presented in this order. This section has as main goal to present, through the comparative analysis, the academic and managerial contributions of this Dissertation.

The Internationalization Pattern of the Brazilian Born Global Firms

The internationalization pattern of Brazilian born global firms presents singular characteristics in determined parameters of the decision criteria that differ from the Born Global Firms' literature (Acedo & Jones, 2007; Knight & Cavusgil, 2004; Kuivalainen, Saarenketo, & Puumalainen, 2012; Kuivalainen, Sundqvist, & Servais, 2007). The distinctive characteristics of the Brazilian born global firms, which are the foreign sales ratio and the country scope, require further explanation.

The first case firm is born global firm due to its rapidly and early international commercial expansion and due to its foreign market scope in the beginning of the internationalization process. The foreign sales ratio of the first case firm differs from the literature, as it does not reach the minimum percentage required, which is twenty percent of the total sales. The country scope, considering the commencement of the international commercial activities, also deserves further attention. The firm focused on North America, which is an indicative of international expansion to further markets; nevertheless, it is not an indicative of global expansion. In the subsequent years, the firm presented a global expansion, also diversifying the international operation modes, with the establishment of a subsidiary. This singularity, along with the rapidly and early international expansion, reinforce that the

internationalization pattern of the first case firm is a born global firm. According to the respondent of the first case firm, there are factors that contribute to explain and shed light on the foreign sales ratio of the first case firm. The domestic market is important and contributes to the majority of the revenues of the firm, which, therefore, implies that the focus of the firm is on the achievement of higher proportion of sales from this market. The focus on the domestic market, as presented in the Data Analysis Chapter, is also emphasized in the Marketing structure of the firm. The explanation for the international competitiveness of this firm resides in the advanced technologies embodied in its products of both sectors, the business networks the firm maintains and the participation in international trade fairs. This triad sustains the competitiveness of the first case firm in international markets.

In terms of domestic market extension, Brazil has a potential consumer market, due to its large size and the crescent population. This remarkable exogenous factor supports the firm's market strategy to focus on the internal market, which contributes to explain the small foreign sales ratio, in comparison with the decision criteria from the literature. Yet, the respondent of the first case firm reiterated the role of the internal market for the Defense sector.

The sixth case firm is a born global firm due to its rapidly and early international commercial expansion and due to its foreign market scope in the beginning of the internationalization process. Considering the history of the firm, the firm was founded to supply a single European country in the commencement of its international commercial activities, which was interested in buying the organic whole sugar of this firm due to the unseen characteristics of this product. This focus is not an indicative of global expansion; however, in the subsequent years, the firm presented a committed global expansion. Along with the characteristics of this product, the firm also possesses its own advanced technologies, in terms of manufacturing and laboratory structure and competences related to the Agronomy field of study that places the firm competitively in international markets, the focus of the firm. This confers the firm the required organic certifications to commercialize the organic whole sugar worldwide. The elevated foreign sales ratio, the uniqueness of the product, which is the result of the continuous product innovation development of the firm, the advanced technologies, the business networks and the CEO's global mindset confirm the firm's international competitiveness. Interesting to note that the firm's focus on international markets also influences the innovation development process.

The innovation development process of this firm is based on the continuous improvement of organic whole sugar's characteristics. Therefore, the analysis of the international market competitiveness of the sixth case firm is not restricted to the dynamic

capabilities for innovation, but also in the role of the international markets that push the product innovation development process.

The data analysis from the two Brazilian born global firms brings further contribution to the literature, concerning the parameters of the decision criteria for determining born global firms. Thus, Table 46 provides a comparative analysis amid the proposed parameters and the parameters from the literature to determine Brazilian born global firms (Acedo & Jones, 2007; Knight & Cavusgil, 2004; Kuivalainen, Saarenketo, & Puumalainen, 2012; Kuivalainen, Sundqvist, & Servais, 2007).

Decision Criteria and Parameters from the Literature to Determine Born Global Firms		**Proposed Parameters for Determining Brazilian Born Global Firms**	
Typical description	Young firms; Knowledge-intensive industries, global market niches; Simultaneous entry into foreign markets; Global from inception; Proactive; Radical and committed internationalization.	**Typical description**	Young and mature firms; Knowledge-intensive industries, global market niches; Entry into foreign markets depends on the firm's strategy, the participation relevant in international trade fairs, the international business networks and the type of product offered by the firm; Global from inception; Proactive; Internationalization as means for market expansion.
Countries (Geographic Scope)	Concurrent domestic and international expansion; Worldwide operations focusing on lead markets; Several markets at the same time.	**Countries (Geographic Scope)**	International expansion derives from the firm's strategy, the international business networks, the participation in relevant international trade fairs, the capacity of the firm to adequate the product to serve the international target markets and as means for market expansion; The market selection and the internationalization progression is a condition from the abovementioned factors.
Foreign Sales Ratio (Intensity Scale)	Large share of foreign sales; Different definitions, usually more than 20% to 80%.	**Foreign Sales Ratio (Intensity Scale)**	Foreign sales ratio depends from the firm's strategy, the international business networks, the type of product offered by the firm, the capacity of the firm to adequate the product to serve international target markets and due to organizational environment factors; The range of foreign sales is from 2% to 100%.
Foreign Operation Modes (Structure Scale)	Flexible choice of entry modes; No defined sequence; Varies from exports to collaborative modes and FDI.	**Foreign Operation Modes (Structure Scale)**	Flexible choice of entry modes; Generally beginning with exports; Varies from exports to collaborative modes and FDI.
Time Lag (Commencement)	Early; From 3 years to 10 years after the firm's inception.	**Time Lag (Commencement)**	Early; Within 3 years after inception.

Table 46: Proposed Parameters for Determining Brazilian Born Global Firms

Source: Based on Olejnik and Swoboda (2012, p. 487), from Bell et al. (2003), Acedo and Jones (2007), Crick (2009), Kuivalainen et al. (2012), Kuivalainen et al. (2007).

This proposed framework enables the comprehension of the Brazilian born global firms, as it presents the decision criteria and the parameters to define this internationalization pattern,

as well as contributes to the methodological classification of born global firms. The framework is based on the analysis of two case firms that presents distinct characteristics in terms of dynamic capabilities for innovation, product innovation development process and industrial sector. This approach presents that the reality of the Brazilian born global firms is complex. There are, therefore, apart of the early and rapidly international market expansion characteristic, further parameters from the decision criteria and the internationalization processes of this group of firms that contribute to explain this internationalization pattern.

The Internationalization Pattern of Brazilian INVs

The internationalization pattern of Brazilian INVs presents singular characteristics in determined parameters of the decision criteria that differ from the INVs' literature (Bell et al., 2003; Crick, 2009; Olejnik & Swoboda, 2012). The distinctive characteristics of the Brazilian INVs, which are the foreign sales ratio and the country scope, require further explanation.

The fourth case firm is an INV due to its rapidly and early international commercial expansion and due to its foreign regional market scope in the beginning of the outward internationalization process. This case firm begun the internationalization process through inward commercial operations, to, after, start the outward commercial operations. The main characteristic of this firm is the important role of the inward commercial operations, which is a distinctive characteristic of this INV. The focus on the Latin American markets is also a notable factor for the fourth case firm, which extensively relies on these markets for international commercial operations. This characteristic of the internationalization process of the fourth case enables the classification of this firm as an INV.

Another important characteristic concerned to INVs is the foreign sales ratio. In order to define the foreign sales ratio of INVs, the proxy to the foreign sales ratio of the born global firms is due to the rapidly and early international commercial expansion of born global firms and INVs. The fourth case firm does not reach the minimum percentage required, which is twenty percent of the total sales. The explanation for this factor resides in the importance of the domestic market for this case firm as well. Thus, the firm presents a committed and strategically planned international market expansion to new markets.

The seventh case firm is also an INV, due to its rapidly and early international commercial expansion and due to its foreign regional market scope in the beginning of the internationalization process. This case firm, in consonance with the second case firm, focuses on the Latin American markets as the main international markets. Yet, another remarkable characteristic of this case firm is that the Technological Capacity, the firm's dynamic capability

for innovation, sustains the product innovation development process, which leads to the international market competitiveness. The requirements from the foreign markets also boosts this process, as the firm's products have to be adapted to the electrical circuits of the buyers' nations. Thus, Table 47 provides a comparative analysis amid the proposed parameters and the parameters from the literature to determine Brazilian INVs (Bell et al., 2003; Olejnik & Swoboda, 2012).

Decision Criteria and Parameters from the Literature for Determining INVs		**Proposed Parameters for Determining Brazilian INVs**	
Typical description	Young firms; Knowledge-intensive industries, global market niches; Simultaneous entry into foreign markets; Global from inception; Proactive; Focused and committed internationalization.	**Typical description**	Young and mature firms; Industries from technology-based sectors; Entry into foreign markets depends on the firm's strategy, the participation relevant in international trade fairs, the international business networks and the type of product offered by the firm; Proactive; Internationalization as means for market expansion.
Countries (Geographic Scope)	Concurrent domestic and international expansion; Foreign operations focusing on foreign regional markets; Several foreign regional markets at the same time.	**Countries (Geographic Scope)**	International expansion derives from the firm's strategy, the international business networks, the participation in relevant international trade fairs, the capacity of the firm to adequate the product to serve the international target markets and as means for market expansion; The market selection and the internationalization progression is a condition from the abovementioned factors.
Foreign Sales Ratio (Intensity Scale)	Large share of foreign sales; Different definitions, usually more than 20% to 80%.	**Foreign Sales Ratio (Intensity Scale)**	Foreign sales ratio depends from the firm's strategy, the international business networks, the type of product offered by the firm, the capacity of the firm to adequate the product to serve the international target markets; The range of foreign sales is from 2% to 40%.
Foreign Operation Modes (Structure Scale)	Flexible choice of entry modes; No defined sequence; Varies from exports to collaborative modes and FDI.	**Foreign Operation Modes (Structure Scale)**	Flexible choice of entry modes; Generally beginning with exports; Varies from exports to collaborative modes and FDI.
Time Lag (Commencement)	Early; From 3 years to 10 years after the firm's inception.	**Time Lag (Commencement)**	Early; Within 6 years after inception.

Table 47: Proposed Parameters for Determining Brazilian INVs

Source: Based on Bell et al. (2003), Crick (2009) and Olejnik and Swoboda (2012).

This proposed framework enables the comprehension of the Brazilian INVs, as it presents the decision criteria and the parameters to define this internationalization pattern, as well as contributes to the methodological classification of INVs. The framework is based on the analysis of two case firms that presents distinct characteristics in terms of dynamic capabilities for innovation, product innovation development process and industrial sector. This approach presents that the reality of the Brazilian INVs is complex. There are, therefore, apart

of the early and rapidly international market expansion characteristic, further parameters from the decision criteria and the internationalization processes of this group of firms that contribute to explain this internationalization pattern.

The Role of International Business Networks

The international business networks for the foreign commercial expansion are important mechanisms that support this process in multiple forms, especially concerning the presence of mediating agents in foreign markets that enable this process. Mediating agents are enterprises, domestic and international government institutions, international trading firms and potential foreign buyers (Confederação Nacional da Indústria, 2016; Sandberg, 2013). The mediation is through the knowledge sharing amid the enterprise and the mediating agent about the target markets, concerning the market trends and preferences, the legal and tax systems and the inward and outward commercial operations, which contributes to minimize risks concerning this activity (Johanson & Vahlne, 2009; Ruzzier et al., 2006). Yet, this learning process enables the firm to evolve to other forms than exporting, which supports the improvement of the international activity (Grandinetti & Mason, 2012).

In this sense, risks are related to possible financial losses, in terms of profit and assets, due to political, economic, legal, environmental and social uncertainties. In order to remain competitive in international markets, firms have to align their strategic goals to the domestic and international organizational environments, thus supporting the management and the prediction of the risk exposure of the firm (Buckley & Casson, 2009b). The first, the fourth, the fifth and the seventh case firms state the importance of the international business networks, which corroborates with the literature concerning this subject (Johanson & Vahlne, 2009; Ruzzier et al., 2006). Yet, from the research data analysis, this mechanism supports the product innovation development of the firms, in terms of product adjustment and customization, which, therefore, constitutes a relevant tool for the domestic and foreign market expansion.

The Role of International Trade Fairs

International trade fairs are important means to know the market trends and to diffuse the firm's product (Blythe, 2009; Evers & Knight, 2008; Sarmento et al., 2015; Tafesse & Skallerud, 2015). The first, the second, the third, the fourth and the seventh case firms affirm the role of the international trade fairs as a relevant strategy to leverage the international market share. It is important to note that this emerging variable presents multiple finalities, as shown in the research data analysis. In this sense, Table 48 presents the synthesis of the findings:

Case Firm	Finalities of the International Trade Fairs
First case firm	Diffuse the product for a specialized public; Search for market trends; Search for information concerned the product innovation development; Reach the domestic market.
Second case firm	Diffuse the product for a specialized public; Raise the number of sales contracts; Foster the product customization, developing projects of products on time; Enhance the proximity with the clients.
Third case firm	Diffuse the product for a specialized public; Strengthen the COI of the product; Strengthen the Brazilianness of the product; Promote the brand internationally.
Fourth case firm	Diffuse the product for a specialized public; Reach business partners.
Seventh case firm	Diffuse the product for a specialized public; Enhance the product's differentials; Consolidate long-term strategic commercial alliances.

Table 48: Synthesis of the Findings Concerning the International Trade Fairs

Source: Research Data Analysis (2015).

International trade fairs are important events to enhance the firm's international competitiveness. Even though the returns from trade fairs are not immediate, as emphasized by the respondents of the first and the seventh case firms, the insertion in these hubs of potential networks brings further benefits to the firms. The main contributions to the Marketing literature, concerning the International Trade Fairs theme (Blythe, 2009; Evers & Knight, 2008; Sarmento et al., 2015; Tafesse & Skallerud, 2015), reside in reaching not only international buyers, but also compatriot buyers in a foreign country. This finding is particularly important for high-technology firms, as the participation in international trade firms, in this case, confers legitimacy to the firm. This legitimacy is the result of two factors, such as the promotion of specialized events in trade fairs that have a large concentration of well-knows firms that develop cutting-edge technological and innovative products and the image of the host country, which counts as a positive factor as well. The learning potential about the technological and innovation development is an asset of the international trade fairs, which also supports the establishment of scientific partnerships for the co-innovation development.

The strengthening of the COI of the product is also a benefit from trade fairs. Considering the third case firm, the participation in international trade fairs of the beverage market is necessary to follow the market tendencies, to diffuse and to promote the Brazilianness of the product. According to the research data, trade fairs unite a great number of worldwide producers of typical beverages of their country of origin, which converges to the consolidation

of the COI of the product not only for this Brazilian firm, but also to other foreign firms. This distinctive factor places international trade fairs also as cultural hubs.

The firm's participation in international trade fairs also supports the continuity of the innovation development cycle. This factor is particularly important for the second case firm, which has the ability to provide rapid answer to the market and the clients in terms of product customization. This distinctive dynamic capability is reiterated during the data analysis and promotes the market competitiveness of the firm. In trade fairs, this case firm employs a front specialized staff to develop on time projects, which can turn into potential sales contracts. Trade fairs are, therefore, means to develop consolidated commercial alliances.

The Dynamic Capabilities for the Innovation Development

The data analysis presents the dynamic capabilities for innovation of the case firms. The totality of the case firms presents distinctive dynamic capabilities that support the innovation development, which is a determinant characteristic of technology-based firms, thus converging with the literature (Côrtes et al., 2005; Oliva et al., 2011; Toledo et al., 2008). The dynamic capabilities are idiosyncratic to the case firms, sustain the technological and non-technological innovation development, which leads to market competitiveness. Besides the dynamic capabilities, the case firms also define the strategic management for the innovation development, thus enhancing the importance of this process to the market competitiveness.

The role of the product customization as part of the innovation activities also deserves further attention. The innovation activities aim to perform incremental innovations that serve specific demands of the buyers. This characteristic is in the second and the fourth case firms, which places this dynamic capability for innovation among their core competences. This characteristic leads to market competitiveness and may lead to the buyers' loyalty, as the firm has the capacity to attend the buyers' specification in the proposed schedule.

The dynamic capabilities are drivers for the innovation development. The innovative performance of the seven case firms corroborate with this affirmation, as the innovation development is at the core competence of the firms. This finding reinforces the role of the innovation development for the firm, thus converging with the Dynamic Capabilities Approach literature (Barreto, 2010; Cardoso & Kato, 2015; Makadok, 2001; Teece & Pisano, 1994; Teece et al., 2007; Zahra et al., 2006; Zollo & Winter, 2002). In addition, the strategic management of the dynamic capabilities promotes the knowledge generation and information systematization within the firm (Nonaka & Takeuchi, 1997; Nonaka & Toyama, 2003), which contributes to foster the innovation cycle.

The role of the incremental innovation development is the key finding concerning the international market competitiveness of the firms. The innovation development of the firms are based on continuous improvements on the products' first version, which, in the case of the first, the sixth and the seventh case firms, presented unseen characteristics in their respective sectors. The incremental innovation development as the main process for the products' improvement that leads to market competitiveness brings further contributions to the Innovation Process literature (Baregheh, Rowley, & Sambrook, 2009; Cantisani, 2006; Chesbrough, 2003; Goswami & Mathew, 2004; OECD, 2005). Yet, considering firms from high-technological sectors and in science-based industries, investments in R&D and the innovation development supports the rapidly and early international expansion of the firm (D'Angelo, 2012; Pla-Barber & Alegre, 2007; Rodríguez & Rodríguez, 2005). In reference to the technological intensity of industrial sectors, it is interesting to note that the sixth case firm that is classified as a born global firm that is from a low-technological sector, which is, therefore, a contribution to the the Born Global Firms theory (Acedo & Jones, 2007; Knight & Cavusgil, 2004; Kuivalainen, Saarenketo, & Puumalainen, 2012; Kuivalainen, Sundqvist, & Servais, 2007).

The Importance of the Non-Technological Innovation Development

The role of the non-technological innovation development, such as the Marketing innovation, in this research brings further contribution to the Innovation Process literature. The focus on the technological innovation development to enhance the market competitiveness is well established in the Innovation Process theme (Baregheh, Rowley, & Sambrook, 2009; Cantisani, 2006; Chesbrough, 2003; Goswami & Mathew, 2004; OECD, 2005). Nevertheless, the role of non-technological innovations to sustain market competitiveness deserves further investigation. Among the main research findings, apart from the differentials brought from Marketing innovations, which mainly focus on product differentiation, organizational repositioning in market niches and brand upgrading (Mannheim Innovation Panel, 2010; OECD, 2005), there is the role of the COI concept.

Considering the data analysis of case firm 3, the simultaneous analysis of this concept and this type of innovation led to a differential of market positioning. This differential resides in exploring Marketing innovations, in terms of package differentiation and brand upgrading, to expand to different market niches, taking at the same time advantages from the COI of the product in international contexts, such as in trade fairs.

The Brazilian Business Environment

The Brazilian business environment is an important emerging variable that deserves further investigation. The organizational environment variable, in this research, is an intervening variable in the relationship between the innovation orientation and the internationalization patterns of the Brazilian technology-based firms. The variable "Brazilian business environment" encompasses the legal and the tax systems and is an intervening variable that emerged from the data analysis of the first, the second, the third, the fifth and the seventh case firms. This variable, therefore, intervenes in the innovation process development and in the internationalization processes of the abovementioned case firms.

Data analysis from the first case firm reiterates the importance of the national legal framework to enhance the national enterprises' competitiveness through the innovation development and the business internationalization (OECD, 2005). Concerning the Brazilian position in global markets, the enterprises' innovation development is of great importance, as relevant players, such as China and India, are developing strategic technological sectors of their economies through the process of rapid internationalization (Chang, 2011; Zhou, Wu & Luo, 2007) and the innovation development (Li, Qian, & Qian, 2012). The measurement of the strengths, the weakness, the opportunities and the threats present in the domestic and the international environments contributes to comprehend the Brazilian business environment. In this sense, the emerging variable Brazilian business environment appears both in opportunities and in threats, according to the research data analysis.

This chapter presents the Data Analysis of the research. The seventh chapter "Final Considerations" aims to present the research conclusions, the delimitations and the future research perspectives concerning the research themes of this Dissertation.

7 FINAL CONSIDERATIONS

The seventh chapter presents the final considerations of the Dissertation. This final chapter recalls the contributions of the research and the achievements directed to accomplish the research objectives. In addition, this chapter presents the future research avenues on the Business Internationalization and the Innovation Process, focusing on the Internationalization of Small and Medium Sized Enterprises and the Dynamic Capabilities for Innovation.

The globalization phenomenon drives the international competition among organizations of different sizes and from different industrial sectors (Ruzzier et al., 2006; Thomas et al., 2012). The crescent participation of internationalized, mainly exporting, SMEs is an important indicator of economic development in emerging nations (Amal & Freitg Filho, 2012; Chang, 2011; Mtigwe, 2005; Neupert, Baughn, & Dao, 2006; Thai & Chong, 2013). In order to remain competitive in international markets, firms place the innovation development as the main differential, as, according to Chesbrough (2003, p. 35), "Companies are increasingly rethinking the fundamental ways in which they generate ideas and bring them to the market – harnessing external ideas while leveraging their in-house R&D outside their current positions". This affirmation presents the importance of the open innovation and the role of the strategic innovation management. In this regard, the innovation development is a core activity for firms and supports the competitiveness in this current context (Pla-Barber & Alegre, 2007; Rodríguez & Rodríguez, 2005). In this sense, firms in the globalized scenario invest part of their revenues in innovation-related activities that aim to develop technological and non-technological innovations for increasing market shares (Cantisani, 2006; Mothe & Thi, 2010; OECD, 2005).

This dynamic context supported the development of this research. Aiming to contribute to the Business Internationalization and the Innovation Process literatures, the general objective of this research is to explore the relationship between the innovation orientation and the internationalization patterns of small and medium enterprises (SMEs). The contribution lies in the analysis of the dynamic capabilities of technology-based SMEs that ensure the innovation development. The development of innovative product and services enhances the competitiveness of Brazilian technology-based SMEs in both domestic and international markets, which contributes to the sales intensity improvement. Thus, the dynamic capabilities for innovation are inherent to this group of firms, are drivers for the innovation development

and contribute to explain the SMEs' internationalization patterns. In order to accomplish the general objective of this research, the research problem of this Dissertation is:

How the dynamic capabilities for innovation, inherent to internationalized SMEs, drive their innovation development process and market competitiveness?

The accomplishment of the general objective of this Dissertation leads to the comprehension of the dynamic capabilities for innovation, as well as of the internationalization pattern and the internationalization process of technology-based SMEs. The main contribution of this Dissertation lies in filling the gap of the literature by empirically investigating what the dynamic capabilities for innovation of technology-based SMEs are and how they drive the technological and non-technological innovation development, thus focusing on the product development. In this sense, the case firm analysis, as well as the case firm comparison, contribute to satisfy both the general and the specific objectives of this research.

As demonstrated in the data analysis and the comparative analysis, the seven case firms analyzed in this study have distinct dynamic capabilities for the innovation development, which reinforce the product innovation development, the innovation strategic management and foster the innovation cycle. The dynamic capabilities for innovation is central variable to comprehend the domestic and international competitiveness of the firms. This group of dynamic capabilities permeates the organizational structure of technology-based firms, which is in accordance with the literature of technology-based firms (Côrtes et al., 2005; Toledo et al., 2008), and with the Innovation Process literature (Baregheh, Rowley, & Sambrook, 2009; Cantisani, 2006; Chesbrough, 2003; Goswami & Mathew, 2004; OECD, 2005). Even though the focus is on the product innovation development, there is also the role of the non-technological innovation development that sustains market competitiveness (Cantisani, 2006; Mothe & Thi, 2010).

The analysis of the dynamic capabilities for innovation of the case firms permits the comprehension of the innovative efforts in order to promote the innovation development process. There are other explanatory variables that contribute to explain this process, which are the innovation strategic management and the interconnectivity within the firm and the organizational environment. In addition, the dynamic capabilities of the case firms are related to the industrial sector, the type of product, the technological capacity, the specialized staff and the management of the organization, which converge to the innovation development. Therefore, these organizational differentials sustain the innovation development.

The innovation development aims, among its main goals, the market competitiveness. As the focus of this research is on foreign markets, along with the innovation development, there is also the internationalization strategy, the international business networks and the structure of the International Trading department of the firms that support the market competitiveness. According to the literature, the SMEs' internationalization patterns are the Born Global Firms, the INVs, the Born-Again Global Firms and the Traditional Pattern Firms (Acedo & Jones, 2007; Bell et al., 2003; Crick, 2009; Knight & Cavusgil, 2004; Kuivalainen, Saarenketo, & Puumalainen, 2012; Kuivalainen, Sundqvist, & Servais, 2007; Nessel, 2003; Olejnik & Swoboda, 2012). The data analysis of the Brazilian SMEs presents that this group of firms brings further contributions to this Internationalization Pattern literature, as there are specificities concerning the internationalization pattern of the case firms. This finding is important to understand the internationalization process and to comprehend the internationalization patterns of the case firms of this research, thus leading to the accomplishment of the objectives of the research. Yet, it also permits to propose parameters to determine the internationalization patterns of the Brazilian technology-based SMEs.

In terms of managerial contributions, this Dissertation provides to managers and practitioners the analysis of the dynamic capabilities for the innovation development considering the strategic organizational spheres, presenting the key dynamic capabilities of each case firm that sustain their innovation development. The focus on the technological innovation development supports the comprehension of the international market competitiveness. In this sense, the findings from this Dissertation corroborate to advance the managerial practices and contribute to enhance organizations' competitiveness in both domestic and international markets. In addition, the analysis of the emerging variables, specially mentioning the Brazilian business environment, intervenes in both the innovation and in the business internationalization processes. The analysis of the emerging variables contributes to enrich the theoretical and managerial contributions of this research.

The last part of the Final Considerations chapter presents the limitations of the research and the future research avenues. In the case of this Dissertation, there are methodological limitations as well as limitations referred to the research scope.

The methodological limitations center on the conduction of the data collection and the execution of the data analysis. Due to the intrinsic characteristics of the Dissertation, which is

an individual work, the researcher executed the research phases. In addition to this inner characteristic, there is the prerogative of the data confidentiality, which infers that the researcher has the exclusively access to the collected data. However, in case studies, it is advisable that the conduction of the data collection and the execution of the data analysis, which are part of the research phases, involve more than one researcher, in order to avoid research biases. Nevertheless, this methodological procedure does not invalidate the research. Au contraire, this procedure demonstrates this is in accordance with what it is expected of the elaboration of a Dissertation.

The limitations of the research scope refer to the sample size and the focus on the state of São Paulo. The sample size, for case studies, is in accordance with Eisenhardt (1989), thus validating the sample. Howsoever, the addition of extra case firms may enhance the comparative analysis. The explanation for the focus on the state of São Paulo is due to the technological development and the presence of a great number of Brazilian technology-based enterprises. In order to surpass this limitation, the possibility of the research replication converges to validate this study.

In conclusion, the future research avenues direct to the advancement of the Innovation Process and the Business Internationalization research themes. In this sense, the future research perspectives are:

- The replication of this research to other Brazilian states. This future research avenue is important due to two main streams. The possibility to validate the research through replication is important to verify how technology-based SMEs from other Brazilian states behave. This research perspective is not only important to confirm methodological procedures, but also to explore the relationship between the innovation orientation and the internationalization patterns of small and medium enterprises (SMEs). This replication enriches the comprehension of the Brazilian technology-based SMEs and provides ground to a macro perspective comparative analysis. Policymakers are going to be able to identify the differences amid the states, thus providing public policies tailored to the specificities of Brazilian technology-based SMEs from each state;
- The empirical validation of the model based on a quantitative approach. The future research perspective is the analysis of the dynamic capabilities for innovation that direct the technological innovation development and are inherent to the internationalized SMEs. The main research objective is to identify the dynamic capabilities for innovation inherent to each SMEs' internationalization pattern, thus aiming to comprehend what

are the dynamic capabilities of the traditional pattern firms, the born global firms, the INVs and the born-again global firms from technology-based sectors. Yet, as the dynamic capabilities approach (Teece et al., 1997) considers the organizational environment of the firm, it is important to place in the analysis the emerging variables, which enhance the comprehension of this relationship;

- The analysis focusing on a single industrial sector. This analysis contributes to shed light on sectors of similar technological intensity, thus presenting the convergences and divergences between their innovation patterns;
- The analysis of each internationalization pattern found in this group of Brazilian technology-based SMEs, considering the proposed decision criteria for born global firms and INVs. This focus on the born global firms and INVs is due to the presence of divergent parameters compared to the Internationalization Pattern theory (Bell et al., 2003; Olejnik & Swoboda, 2012) referred to the foreign sales ratio. This distinctive characteristic of Brazilian born global firms and INVs is an important indicative that deserve further research in order to examine the born global and the INV internationalization pattern. The target market, the foreign market scope, the role of the domestic market, the internationalization strategies and the organizational environment of the firm are key variables that sustain the comprehension of the Brazilian born global firms and INVs.

This chapter presents the Final Conclusions of the Dissertation. The research limitations and the future research avenues constitute its focus.

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ANNEXES

ANNEXE A

Portuguese Version of the Interview Guide

Informações Gerais

C1 – Nome da empresa:

C2 – Nome do respondente (pode haver mais de um respondente):

C3 – E-mail:

C4 – Nível de escolaridade:

C5 – Posição ou ocupação dos respondentes:

C6 – Ano de fundação da empresa:

C7 – Setor da empresa, de acordo com a Tabela CNAE:

1. Descrição da Empresa

1.1. A sua organização faz parte de um grupo de empresas?

Não ☐

Sim, a empresa faz parte de um grupo de empresas ☐

A matriz está localizada em:

1.2. A sua empresa, ou parte dela, é controlada por uma família?

Sim ☐ Não ☐

1.3. Indique qual das alternativas corresponde ao volume total de negócios da empresa para o ano de 2014:

Volume Total de Negócios	2014
Maior que R$ 2,4 milhões e menor ou igual a R$ 16 milhões	
Maior que R$ 16 milhões e menor ou igual a R$ 90 milhões	
Maior que R$ 90 milhões e menor ou igual a R$ 300 milhões	

1.4. Informe ao número médio de colaboradores da sua empresa em 2014:

Ano	Número Médio de Colaboradores
2014	

1.5. Indique qual é a posição da sua empresa na cadeia produtiva, considerando a sua principal atividade:

Fabricante do Produto Final ou Principal Fornecedor
Principal Subcontratada ou Fornecedora de Sistemas
Subcontratada ou Fornecedora de Produtos, Equipamentos, Sistemas e Componentes
Outra posição (descreva):

2. Inovações Tecnológicas

2.1. Durante o período de 2010 a 2012, a sua empresa desenvolveu inovações em produtos e/ou serviços? Explique quantas e quais foram estas inovações, se houve a necessidade de mudanças tecnológicas na empresa e quais foram os investimentos realizados para o seu desenvolvimento.

Para as questões 2.2., 2.3., 2.4. e 2.5., considere a principal inovação em produto desenvolvida no período de 2010 a 2012 (a empresa poderá decidir quantas inovações são consideradas como sendo as mais importantes).

2.2. Explique as fases e a gestão do processo de desenvolvimento deste produto, desde a prospecção e o levantamento de ideias, a seleção do projeto, o desenvolvimento do protótipo, o planejamento da produção até a sua comercialização e a contínua avaliação e monitoramento de seu desempenho nos mercados-alvo da empresa.

2.3. Houve o estabelecimento de parcerias para o desenvolvimento desta inovação? Comente sobre a importância destas parceiras.

2.4. Comente sobre o seu grau de novidade desta inovação: se ela foi inédita somente para a sua empresa, para a empresa e para o mercado ou a nível mundial.

2.5. Com relação ao posicionamento de mercado desta inovação, ela foi desenvolvida para atender principalmente o mercado interno, externo ou ambos? Apresente quais foram as principais tendências de mercado e as demandas dos consumidores e/ou clientes finais atendidas por esta inovação.

2.6. Comente sobre o grau de desenvolvimento tecnológico desta inovação e se o produto apresentou mudanças significativas ou incrementais em suas características e funcionalidades iniciais.

2.7. Em relação ao ano de 2014, indique o percentual do volume total de negócios referentes aos seguintes tipos de produtos:

Tipos de Produtos	Percentual do Volume Total de Negócios em 2014
Produtos novos ou significativamente aprimorados desenvolvidos anteriormente, no período de 2010 a 2012	
Produtos não-modificados ou muito pouco aprimorados	
A revenda de produtos	
Total	100%

2.8. Ainda durante este período, a sua empresa desenvolveu inovações em processos? Explique quais foram estas inovações e se houveram mudanças e incrementos nos meios e nas técnicas de produção da empresa.

2.9. Considerando a principal inovação em processo desenvolvida neste período, esta foi desenvolvida exclusivamente pela empresa ou houve o estabelecimento de parcerias? Comente sobre a importância destas parcerias.

2.1.1. Esta inovação em processo trouxe mudanças para o desenvolvimento das inovações em produtos? Se sim, comente sobre estas mudanças e seus resultados.

3. Capacidades Dinâmicas para a Inovação

As capacidades dinâmicas para a inovação são elementos tecnológicos e organizacionais da empresa, ou seja, o conjunto de suas habilidades, comportamentos e capacidades organizacionais, assim como seus processos e rotinas, que levam a empresa a inovar e se diferenciar competitivamente perante seus concorrentes. As capacidades dinâmicas direcionam, portanto, o esforço inovador da empresa.

3.1. Explique quais são os diferencias competitivos da organização com relação ao processo de aprendizado para o desenvolvimento da inovação, referindo-se à assimilação e ao uso de tecnologias e à gestão do conhecimento organizacional.

3.2. Agora, apresente os diferencias relacionados ao processo de pesquisa e desenvolvimento, no que tange ao desenvolvimento das inovações tecnológicas (produto, serviço e processo) e não-tecnológicas (Marketing e organizacional) e o papel das equipes de trabalho para o desenvolvimento da inovação. A empresa registra patentes, segredos industriais, marcas e design de produtos?

3.3. Sobre os diferencias competitivos relacionados à gestão dos recursos humanos para o desenvolvimento da inovação, como a organização se estrutura para gerenciar e alocar especialistas durante as diferentes fases do projeto? Qual é a porcentagem estimada de pessoal com nível Superior e de Pós-Graduação? Quais são as principais competências pessoais e técnicas requeridas dos profissionais? Existe interconectividade entre as áreas da empresa envolvidas nos processos inovadores?

3.4. Ainda sobre os diferenciais citados acima, a empresa realiza parcerias para o desenvolvimento de novas tecnologias e inovações?

3.5. Apresente os diferencias competitivos relacionados aos processos de manufatura, os seus principais processos produtivos e como ocorre o alinhamento do desenvolvimento da inovação para o processo de manufatura. Quais são as principais tecnologias utilizadas no processo produtivo (máquinas, equipamentos, sistemas de apoio à gestão, sistemas e tecnologias da informação)?

3.6. Comente sobre os diferencias de Marketing da empresa e de posicionamento de mercado do produto. Como a empresa coleta e quais são as suas principais fontes de informações sobre o mercado, seus concorrentes e sobre o ambiente externo da empresa, assim como sobre as tendências e preferências de seus consumidores finais? Por favor, avalie o grau de aceitação do seu produto no mercado internacional.

3.7. Seguindo este raciocínio, como a empresa dissemina este conhecimento obtido para a continuidade do processo de geração de inovações? Qual é o grau de apropriação das oportunidades presentes no mercado?

3.8. Comente sobre os diferencias competitivos relacionados ao alinhamento da gestão estratégica e a gestão da inovação. Como são tomadas as decisões referentes ao processo de desenvolvimento da inovação e como é feita a seleção das ideias a serem desenvolvidas?

3.9. Comente sobre as principais forças e fraquezas da empresa no que tange o desenvolvimento da inovação e as principais oportunidades e ameaças presentes no ambiente externo que influenciam a gestão estratégica do negócio (mercado, concorrentes, ambiente de negócios, âmbito legal, tributário e das regulações).

4. Internacionalização

4.1. Em que ano a sua empresa iniciou as suas atividades comerciais internacionais?

4.2. Como ocorreu o processo de expansão internacional da sua empresa e quais foram as principais razões para esta projeção? No ano em que a empresa iniciou as suas atividades comerciais internacionais, quais eram os principais mercados atendidos? Por que houve a escolha destes mercados? Por favor, informe os percentuais aproximados de vendas para estes países no ano de início das atividades comerciais internacionais da sua empresa.

4.3. Durante o processo de internacionalização da empresa, houve eventos que levaram à retração ou à expansão das atividades comerciais da empresa? Comente sobre esses eventos.

4.4. Atualmente, como a empresa avalia o seu desempenho internacional?

4.5. Atualmente, quantas pessoas trabalham na área/departamento/setor de comércio exterior da sua empresa? Como a empresa estrutura as suas atividades comerciais internacionais? A sua empresa possui representações internacionais, como filiais, escritórios ou subsidiárias?

4.6. Indique o percentual das vendas internacionais provenientes de cada um dos países onde a empresa realizou operações comerciais em 2014: (adicione linhas caso seja necessário)

Nome do País	Percentual das Vendas Internacionais em Relação ao Total em 2014

4.7. Comente sobre o desempenho das vendas dos produtos inovadores, desenvolvidos durante o período de 2010 a 2012, no mercado doméstico e internacional e relacione este desempenho com o posicionamento estratégico de mercado da empresa. Qual é o grau de concentração dos mercados para os produtos inovadores e para os não-inovadores?

Tipos de Produtos	Percentual das Vendas Internacionais em Relação ao Total das Vendas em 2014
Produtos novos ou significativamente aprimorados desenvolvidos anteriormente, no período de 2010 a 2012	
Produtos não-modificados ou muito pouco aprimorados	
A revenda de produtos	

MUITO OBRIGADA PELA SUA VALIOSA COOPERAÇÃO E PARTICIPAÇÃO!

English Version of the Interview Guide

General Information

C1 – Name of the enterprise:

C2 – Name of the respondent (more than one respondent allowed):

C3 – E-mail:

C4 – Educational level:

C5 – Position and/or occupation of the respondents:

C6 – Enterprise's foundation year:

C7 – Enterprise's sector, according to CNAE Table:

1. Enterprise Description

1.1. Is your enterprise part of a national group of enterprises?

No ☐

Yes, it is part of a national group of enterprises ☐

The head office is located in:

1.2. Is your enterprise, or part of it, controlled by a family?

Yes ☐ No ☐

1.3. Please indicate which of the alternatives correspond to the total annual turnover of your enterprise in 2014:

Total Annual Turnover	**2014**
More than R$ 2,4 milllion and less or equal than R$ 16 million	
More than R$ 16 milllion and less or equal than R$ 90 million	
More than R$ 90 milllion and less or equal than R$ 300 million	

1.4. Please indicate your enterprise's average number of employees in 2014:

Year	**Average Number of Employees**
2014	

1.5. Please indicate your enterprise's position in the value chain, considering its main activity:

Manufacturer of the Final Product or Main Supplier
Main Subcontractor, Systems Supplier
Subcontractor, Equipment, Systems and Components Supplier
Other position (describe):

2. Technological Innovations

2.1. During the period of 2010 a 2012, did your enterprise develop product and/or service innovations? Please explain how many and what were these innovations, if there was the need of technological changes in the firm and what were the investments made for this development?

For questions 2.2., 2.3., 2.4. and 2.5., consider the main product innovation developed during the period of 2010 a 2012. (the enterprise may decide how many innovations are considered the most important)

2.2. Please explain the phases and the management of the product development process, from the survey and the prospection of ideas, the project selection, the prototype development, the production planning until the commercialization and the continuous evaluation and monitoring of its performance in the target markets of the firm.

2.3. Was there the establishment of partnerships for the development of this innovation? Please comment about the importance of these partnerships.

2.4. Please comment on the degree of novelty of this innovation: if it was only unprecedented for your firm, for the firm and for the market or worldwide.

2.5. Considering the market positioning of this innovation, was it developed to serve mainly the domestic market, the external market or both? Please present what the main market trends were and consumer and/or end-customers demands served by this innovation.

2.6. Please comment about the level of technological development of this innovation and if the product showed significant or incremental changes in its characteristics and initial features.

2.7. For the year 2014, please indicate the percentage of total turnover relating to the following types of products:

Types of Products	Percentage of the Annual Turnover in 2014
Newly introduced or significantly improved products developed from 2010 to 2012	
Unchanged, insubstantially changed products	
The resale of products	
Total	100%

2.8. Considering this same period, did your firm develop process innovations? Please explain what these innovations were and if there have been changes and increases in the means and the production techniques of the firm.

2.9. Considering the main process innovation developed in this period, has it been developed exclusively by the firm or was there the establishment of partnerships? Please comment on the importance of these partnerships.

2.1.1. Did this process innovation bring changes to the development of product innovations? If so, please comment on these changes and their results.

3. Dynamic Capabilities for Innovation

The dynamic capabilities for innovation are the technological and organizational elements of the firm, in other words, the set of skills, behaviors and organizational capabilities as well as its processes and routines, which lead the firms to innovate and differentiate themselves competitively to its competitors. In this sense, the dynamic capabilities direct the innovative effort of the company.

3.1. Please explain the competitive differences of the organization with respect to the learning process for the innovation development, referring to the assimilation and use of technologies and the management of organizational knowledge.

3.2. Please present the differences related to the research and development process, with respect to the development of technological innovations (product, service and process) and non-technological innovations (Marketing and organizational) and the role of work teams for the innovation development. Does the firm register patents, trade secrets, trademarks and product design?

3.3. Concerning the competitive differences related to the management of human resources for

the innovation development, how the organization is structured to manage and allocate experts during the different phases of the project? What is the estimated percentage of staff with Graduate and Post-Graduate levels? What are the main personal and technical skills required of professionals? Is there interconnectivity between the areas of the firm involved in innovative processes?

3.4. Concerning the differentials cited above, does the firm establish partnerships for the development of new technologies and innovations?

3.5. Please present the competitive differences related to the manufacturing process, its main production processes and how does the alignment of the innovative development occur for the manufacturing process. What are the main technologies used in the production process (machinery, equipment, support systems management, systems and information technology)?

3.6. Please comment about the firm's Marketing differentials and the product market positioning. How does the firm collect and what are your main sources of information about the market, your competitors and the firm's external environment, as well as on the trends and preferences of your end-consumers? Please rate the degree of acceptance of your product in the international market.

3.7. Following this logic, how does the firm disseminate this knowledge obtained for the continued generation of the innovation process? What is the ownership degree of the opportunities present in the market?

3.8. Please comment about the competitive differentials related to the alignment of the strategic management and the innovation management. How decisions are made regarding the process of innovation development and how is the selection of ideas that are going to be developed?

3.9. Please comment about the main strengths and weaknesses of the firm regarding the development of innovation and the main opportunities and threats present in the external environment that influence the strategic management of the business (market, competitors, business environment, legal, tax and regulations systems).

4. Business Internationalization

4.1. When, in years, have your enterprise started the international commercial activities?

4.2. How was the international expansion of your business and what were the main reasons for this projection? In the year that the company started its international commercial activities, which were the main markets served? Why was the choice of these markets? Please inform the approximate sales percentages for these countries in the beginning year of the international commercial activities of your firm.

4.3. During the internationalization process of the firm, were there events that led to the shrinkage or the expansion of the firm's business activities? Please comment about those events.

4.4. Currently, how does the firm evaluate its international performance?

4.5. Nowadays, how many people are working in the international commerce area/department/sector of your enterprise? How does the firm structure its international commercial activities? Does your firm have international representations, such as branches, offices and subsidiaries?

4.6. Please indicate the percentage of international sales to total international sales in 2014 derived from each country where your enterprise had commercial operations: (you may add lines if necessary)

Country's Name	Percentage of International Sales to Total International Sales
Total	100%

4.7. Please comment about the sales performance of the innovative products developed during the period 2010 to 2012, in the domestic and international markets and relate this performance with the strategic market positioning of the firm. What is the markets concentration degree for innovative and non-innovative products?

Types of Products	Percentage of International Sales in 2014
Newly introduced or significantly improved products developed from 2010 to 2012	
Unchanged, insubstantially changed products	
The resale of products	

THANK YOU VERY MUCH FOR YOUR VALUABLE COOPERATION AND PARTICIPATION!