The Internationalisation of New Technology-Based Firms from Emerging Markets

_Fernanda Ribeiro Cahen_
*Corresponding author*
Assistant Professor of Management
Centro Universitário da FEI - School of Industrial Engineering
Rua Tamandare, 688 – 01525-000 - São Paulo - Brazil
E-Mail: fribeiro@fei.edu.br

_Moacir Miranda de Oliveira Jr._
Associate Professor of Management
University of São Paulo
Av. Prof. Luciano Gualberto, 908 Sala E-196, 05508010 - São Paulo, SP – Brazil
E-Mail: mirandaoliveira@usp.br

_Felipe Mendes Borini_
Associate Professor of International Management at ESPM
Av. Prof. Luciano Gualberto, 908 Sala H-145, 05508010, São Paulo, Brazil
E-Mail: fborini@espm.br

Abstract
This paper offers an analysis of the factors influencing the accelerated internationalisation of new technology-based firms (NTBFs) from emerging economies. This type of firm is typically called “born global”, and they have been reported primarily in high-tech sectors. Existing International Business (IB) theories have focused consistently on NTBFs from developed countries, however NTBFs from emerging markets remain under-studied. A survey was applied to small Brazilian NTBFs. The results indicate that NTBFs that have an entrepreneur, or a group of executives with international management skills, are more likely to have an accelerated internationalisation. In contrast to previous research in the field, the results demonstrate that NTBFs that take more than five years to enter the international market capitalise on their competence for innovation and abilities in international marketing, in the internationalisation process. Therefore, this research contributes new perspectives on studies on NTBFs from emerging markets.

Keywords: technology-based firms, born globals, emerging economies, small and medium firms.


Biographical notes:
**Fernanda Ribeiro Cahen** is Assistant professor of management at Centro Universitário da FEI - School of Industrial Engineering. She was a Post-doctoral fellow at Kelley School of Business at Indiana University in 2012-2013. She holds a PhD from University of Sao Paulo in Business Administration. Her research interests are in international entrepreneurship and innovation of high tech new ventures.

**Moacir Miranda de Oliveira Jr.** is Associate Professor and Coordinator of the Graduate Program in Business Administration - University of São Paulo. He was a Visiting Scholar at the Judge Business School - University of Cambridge (1997-1998). He is leading a research project on innovation environments (clusters, technological parks and business incubators) and its connections with global value chains and also a research project on strategy and innovation in Brazilian Multinationals. As a consultant in the field of strategic management and innovation, he has been working for major Brazilian companies...
and also for the Brazilian Government. He holds a PhD from University of Sao Paulo in Business Administration.

Felipe Mendes Borini is Associate Professor of International Management at ESPM and Assistant Professor of Management at University of Sao Paulo. He holds a PhD from University of Sao Paulo in Business Administration. His research interest is about global innovation, emerging markets and foreign subsidiaries management.

This paper is a revised and expanded version of a paper entitled “The 3rd Copenhagen Conference on Emerging Multinationals: Outward Investment from Emerging Economies” presented at Copenhagen Business School, Copenhagen, 25-26 October 2012.

1. Introduction

New technology-based firms (NTBFs) are new ventures, commonly small, which have been described as important sources of knowledge-intensive employment and promoters of technological change and innovation in different countries (Autio et. al., 2000). In the last decade, several studies have indicated that NTBFs “typically face growth challenges characterized by intense product and/or process innovations, frequently combined with business model innovations and early and fast internationalisation process.” (Onetti et. al., 2012, p. 338). The importance to discuss the topic is indicated by Knight and Cavusgil’s decade award-winning article in 2014 from the Journal of International Business Studies (JIBS), for the most influential article published in the JIBS ten years ago. And a series of discussions published by the same journal in January, 2015 (Zander et. al., 2015; Cavusgil and Knight, 2015; Coviello, 2015).

Reporting on the accelerated internationalisation of NTBFs, the most referenced studies have been conducted using samples from the U.S. (Knight and Kim, 2009; Oviatt and Mcdougall, 1994) and Western European countries (Zucchella et. al, 2007; Gabrielsson et. al., 2004). Therefore, the models that have emerged so far to explain the phenomenon are based on the reality of developed countries. There is no consensus and it is unknown how well studies from developed countries completely explain the dynamics of accelerated internationalisation in emerging markets (Kiss et. al., 2012). Empirical studies of accelerated internationalisation have focused consistently on the founders/entrepreneurs because these individuals embody most of the main resources (and capabilities) of these firms at start-up (Zander et. al., 2015). Articulation of unique internal resources or capabilities enables new and small firms to outperform their competitors and internationalise more rapidly (Knight and Kim, 2009; Cavusgil and Knight, 2015). However, most of these studies have originated from developed economies.

The specific discussion of NTBFs from emerging countries is taken for granted in International Business literature (Kiss et. al, 2012; Ciravegna et.al., 2014). Continental countries, such as India, China, and Brazil, have established themselves as exporters of agricultural, mining, and industrial commodities and do not have yet a significant position as exporters of high-tech sophisticated products and services (Hill, and Mudambi, 2010). Recently, studies from Latin America indicate software born global firms from Costa Rica (Lopez et. al., 2009; Ciravegna et. al., 2014) and Brazil (Dib, et. al., 2010). In Asia, studies include research on new Chinese international ventures (Zou and Ghauri, 2010) and Indian IT born globals (Varma, 2011). However, none of these studies have focused internal capabilities of NTBFs of a variety of sectors from an emerging market.
This paper examines accelerated internationalisation by (1) identifying influential internal variables (organisational and related to the entrepreneur) for accelerated internationalisation and (2) testing these variables in a sample of small Brazilian technology-based firms to determine whether the same internal factors reported in the literature can explain early internationalisation in an emerging market. The analysis is performed by comparing the behaviour of NTBFs that have internationalised in an accelerated manner with traditionally internationalised NTBFs. These findings allow us to discuss how the mainstream IB theory is consistent with the rise of international NTBFs from emerging economies. The paper contributes to the literature by indicating that the determining factor for rapid internationalisation remains the international management skills of the entrepreneur. Recurring factors in the literature in developed countries, such as, innovation capability and international marketing skills typically associated with rapid internationalisation in developed countries, appear to be associated with traditional internationalisation in the case of emerging markets.

This paper consists of five parts. We first examined the literature of accelerated internationalisation and identified studies that address the phenomenon in emerging markets. Next, we focused on internal variables that may impact a firm’s choice of an accelerated internationalisation path. We subsequently present hypotheses followed by our research design. Finally, we discuss our findings and contributions.

2. Theoretical Background
2.1 Born Global Firms: Organisational and Entrepreneur Factors

Despite different denominations of the same phenomenon, as international new ventures (Oviatt and McDougall, 1994) or born globals (Knight and Kim, 2009) or global start-ups (Oviatt et al., 1995) there is a reasonable understanding of what these companies are. They are presented as companies that start their business in the international market, sometimes with no experience in the domestic market or shortly after domestic operations are established. However, two decades after the pioneering study by Oviatt and McDougall (1994) there are no general explanations “of how and why these firms develop and implement their internationalization strategies, and what makes them successful remains incomplete” (Zander et al., 2015, p. 27).

The literature is controversial and different criteria have been chosen to define these firm’s internationalisation strategies, thereby making any attempt at comparison challenging. The most recurrent criteria (Rialp et al., 2005; Dib et al., 2010) are founding date (most authors believe that born global firms emerged after 1990), the beginning of international activities after the foundation (varies from 2 to 15 years), the percentage of revenues arising from foreign operations (ranging from 5% to 75% for firms with small domestic markets), and the range of markets (one or few international markets, in the same or in different regions around the world). Observation of these variables suggests that the adoption of a definition is contingent upon the company’s home country and the characteristics of its business environment (Dib et al., 2010).

There is no consensus regarding the factors explaining early and accelerated internationalisation, but some factors have been noted as the potentially main drivers of this process, such as organizational factors (Knight and Kim, 2009). The possession of unique assets, including brand awareness (Rindova, Petkova and Kotha, 2007), market and product knowledge (Rialp et al., 2005; Knight and Kim, 2009), and the orientation to meet international clients’ demands (Knight and Kim, 2009), was found to be positively related to being a born global.
Additionally, unique technologies combined with innovation capability have also been perceived as characterising born global firms (Knight and Cavusgil 2004; Cavusgil and Knight, 2015).

Factors related to entrepreneurs (Andersson, 2000) are also positively associated with early and accelerated internationalisation. McDougall et al. (1994) perceived the entrepreneur as an individual who is more aware of opportunities than others. Typically, an entrepreneur who runs a born global has a higher tolerance for risk (Zahra and George, 2002), has developed a global mindset (due to an international orientation and experience or education abroad) and often has social capital (the use of personal or professional relationships and networks).

Last are external factors (Zahra and George, 2002; Rialp et al., 2005). Country size (Bloodgood et al., 1996) seems to be one factor influencing accelerated internationalisation, with firms in small countries having easier geographical access to neighbouring markets. The size of the domestic market also appears influential because countries with small domestic markets (Gabrielsson, et. al, 2004) seem to favour accelerated internationalisation. Other factors, such as industry characteristics (Fernhaber et. al., 2007) and strategic alliances and networking (Coviello, 2006), may influence the likelihood of accelerated internationalisation for new ventures.

We have chosen to analyse the internal factors of a company and factors related to the entrepreneur because they are discussed more heavily in studies on born globals in general and born globals from emerging economies (Kiss et. al, 2012). External factors are important, but we are not discussing or testing them in this study. Fernhaber et. al. (2007) conducted a study in the United States and identified more than 20 industry structure variables and other external factors that may influence the likelihood of new venture internationalisation. The complexity and variety of external factors cannot possibly be tested here.

Several studies have indicated that the ability of born globals to succeed in international markets is largely a function of their specific skills and resources (Knight and Cavusgil, 2004; Knight and Kim, 2009). These companies tend not to have the same profile as multinational corporations undergoing traditional internationalisation, with their substantial financial and tangible resources. Born globals have much fewer tangible resources, such as facilities, goods, and equipment, as well as fewer human and financial resources, which generally favour the internationalisation of multinational corporations. Despite a lack of various tangible resources, both financial and human, and often a lack of experience in their home markets, born globals enter the international market and, in many cases, survive and succeed in their business. These companies generally have a high degree of product knowledge and expertise, which requires constant innovation (Knight and Cavusgil, 2004; Cavusgil and Knight, 2015).

The studies of accelerated internationalisation address the issue of a company’s internal factors and a relevant part of the discussion is based on the resource-based view (Rialp and Rialp, 2007; Kiss et. al, 2012). The resource-based view (RBV) has played an important role both in initiating the discussion of international entrepreneurship and the emergence of born global companies solving a key question: How do some young and small businesses with several limited resources quickly succeed abroad without going through the different phases suggested by the model of internationalisation in stages? (Rialp and Rialp, 2007).

In this context, intangible resources that are relatively unique confer competitive benefits and enable the company to produce higher added value in its offerings for international markets. In the traditional internationalisation approach (Johanson and Vahlne, 1977), entering the international market requires a long learning process. To establish operations in an international
market, the company must have sufficient resources and organisational capacity to negotiate in a foreign language, operate in a different legal environment, fulfil the consumer tastes of the target country, and relate with partners in this country, among other issues. This learning process and accumulation of knowledge is difficult and often becomes an obstacle to the internationalisation because the company learned to operate in its domestic market, establishing routines and accumulating knowledge about this market. For many companies, it is difficult to get international opportunities and overcome the logical operation in the domestic market (Rialp and Rialp, 2007).

Based on the resource-based view, Rialp and Rialp (2007) studied how specific intangible assets of a company support the emergence of born globals in Europe. The study was comprised 1102 Spanish companies and revealed that human capital and organisational resources have a greater influence on the speed of internationalisation than tangible resources.

In the logic of RBV, young and small companies with less resources can outperform their competitors and internationalise more easily because they manage to obtain “unique” factors to operate in the foreign market (Onetti et. al., 2012; Simões, 2012). In other words, unlike the disadvantages of the internationalisation of new companies suggested by the stage theory (Johanson and Vahlne, 1977), there may be “inherent advantages” to being small and new in regard to accelerated internationalisation. Large and established companies would need to first unlearn their domestic routines to then be able to operate successfully in international markets (Knight and Cavusgil, 2004). In young businesses, there is no administrative heritage and it may be easier to enter the international market (Rialp and Rialp, 2007).

### 2.2 Born Global Firms and Innovation in Emerging Economies

Emerging economies are defined as countries in the process of pro-market reforms (Dau, 2012) and rapid economic growth (measured by the gross national product per capita) but are still below developed economies (Kanna and Palepu, 2010; World Bank, 2012). Several scholars have conducted entrepreneurship research in emerging markets, but the most common focus is low tech sectors such as natural resources, mining and agribusiness. Felzensztein et. al. (2013), for example, analyzed low tech new ventures in Chile.

Some recent literature on early and accelerated internationalisation of NTBFs focuses on a group of emerging countries, namely, Brazil (Dib et. al., 2010), Costa Rica (Ciravegna et. al., 2014; Lopez et. al., 2009), Turkey (Uner et. al. 2013) and India (Varma, 2011; Lorenzen and Mudambi, 2013). Some of these studies have indicated trends that differ from the main research on born globals carried out in the context of developed economies (Kiss et. al., 2012; Lopez et. al., 2009; Dib et. al., 2010; Varma, 2011). In emerging economies the differences of the competitive and institutional context make these NTBFs exhibit singular behaviours.

Firstly, NTBFs are characterised by significant technological effort (Onetti et. al., 2012); however, in several cases, NTBFs born in the context of emerging economies have their technological and market strategies guided by technology imitation and often lack research and development (R&D) capabilities (Kiss at. al, 2012; Persinger et. al, 2011). These characteristics can result in difficulties developing entirely new products to meet the demands of foreign markets (Autio et. al., 2000). Technology imitation can also lead NTBFs to difficulties in setting up their markets because they face more structured and larger foreign competitors, which provide the same product or a similar product in foreign markets.
Secondly, innovation in NTBFs from emerging markets, typically, is held in formats other than the R&D aggregated to the company’s structure (Cimoli and Katz, 2003). However, the more innovative NTBFs are, the more opportunities they have to operate in international markets because their products tend to be more competitive than those of less innovative firms (Filipescu et. al., 2013; Knight and Cavusgil 2004). Studying Brazilian software companies, Dib et al. (2010) confirmed this premise: firms with higher R&D expenses (as a percentage of total expenses) tend to experience fast and non-sequential internationalisation (Dib et. al., 2010, p. 245).

Third, NTBFs from emerging countries are companies that operate in niche markets (Dib et. al., 2010). Niche markets have become a source of opportunities because new and small firms are normally more efficient than larger competitors at adapting or can customise their products to meet emerging demands. The opportunities for the operation of NTBFs take place mainly in niche markets, where demand is too small or specific to attract larger competitors’ operation.

In the next session, we build our research hypothesis and detail the influence of internal factors on accelerated internationalisation.

3. Research Hypotheses
3.1 Internal Factors

NTBFs typically have fewer tangible resources, such as facilities and financial and human resources, and very often have little or no experience in their home markets. Still, these companies enter the international market and often obtain positive returns (Oviatt and McDougall, 1994). This fact is attributed to the possession of products that imply a high degree of knowledge and expertise, thereby requiring constant innovation (Knight and Cavusgil, 2004). The articulation of unique products and the capability for constant innovation enable NTBFs to outperform their competitors and internationalise more rapidly (Cavusgil and Knight, 2015). Typically, NTBFs belong to industries where the life cycles of the products are short and require innovation and specialised resources. “In many cases their competitive domains are naturally global” (Onetti et. al., 2012, p. 338), and innovation capacity is inherent to the definition of NTBFs (Onetti et al, 2012).

There is a consolidated literature on the impacts of technological resources and innovation on NTBFs’ international behaviour (Onetti et. al., 2012). However, the research on NTBFs from emerging economies focusing on this relationship is limited (Kiss et. al, 2012) and still controversial (Dib et. al, 2010). The recent literature on companies from emerging countries (Ramamurti, 2012) focuses predominately on the effects of innovation on the international behaviour of large companies in low-intensity technology sectors, including the manufacturers of industrial commodities and producers of consumer goods (Ramamurti, 2012). In regard to NTBFs from emerging economies, some studies note that innovation capacity is not associated to the accelerated internationalisation of NTBFs (Hill and Mudambi, 2010). However, this association between innovation and accelerated internationalisation is admitted by other studies on NTBFs from emerging countries, such as Dib et. al. (2010) studying Brazilian NTBFs. Thus, we posit:

H1a: Innovation capability is positively associated with the accelerated internationalisation process followed by NTBFs from emerging markets.
Knight and Kim (2009) surveyed 354 nascent North American companies and found that orientation to the international market is an important factor for the rapid entry into foreign markets. Their results convey the “importance of having an aggressive, entrepreneurial approach to international markets” (Knight and Kim, 2009, p. 260). New ventures with limited tangible resources that rapidly succeed in foreign markets have a strong international orientation (Zander et al., 2015; Cavusgil and Knight, 2015) to pursue new opportunities in foreign markets, which typically means uncertainty and risk. An international orientation is likely to bring on certain activities guided to specifically meet the international clients’ demands, understand the performance of international competitors, and orient the international process and practices among the functional areas of the company (Knight and Kim, 2009), constantly targeting new markets internationally.

Until the early 1990s, most emerging markets companies were operating basically in their domestic markets and the business environments of these countries were characterised by large internal markets with closed economies (Kanna and Palepu, 2010). Instead of focusing on global opportunities, for decades, managerial vision and organisational practices were focused on investing in the well-known domestic markets, avoiding the challenges of competitive international markets (Marinov and Marinova, 2012). Research on NTBFs from emerging markets is not conclusive, but some studies such as Dib et al. (2010) Varma (2011) and Kiss et al., 2012) have suggested that international orientation may play an important role in the accelerated internationalisation of NTBFs from emerging markets and affect their achievements abroad. Thus, we propose:

**H1b: International orientation is positively associated with the accelerated internationalisation process followed by NTBFs from emerging markets.**

International marketing skills refer to the capacity of the company to create value for foreign clients through market segmentation and orientation (Knight and Kim, 2009). Value can also be created with the integration of the international marketing activities of planning, controlling and assessing to meet the preferences of international clients and differentiate their products from those of competitors. Issues such as means of distribution and sale, product price, adequacy to local customer, and company image can present important differences in relation to domestic markets (Calantone et al., 2006). When NTBFs enter international markets, they need to develop and apply international marketing skills (Knight and Kim, 2009; Knight and Cavusgil, 2004). Activities such as advertising, direct sales and promotional techniques are crucial to enable NTBFs to enter rapidly the international market. Luostarinen and Gabrielsson (2006) studied the strategies of prices, distribution and advertising of products for 89 born globals in high-tech sectors (NTBFs) from European countries. Their results were similar to those from studies based on the United States (Knight and Kim, 2009). International marketing skills have previously been identified as one of the factors positively influencing accelerated internationalisation (Knight and Cavusgil, 2004; Zucchella et al., 2007).

NTBFs from emerging countries typically have to meet the demands of a certain market niche and develop strategies of product customisation and orientation to specific clients’ needs (Kiss et al., 2012). Similar to the results of research on NTBFs from developed countries, Dib at.
al. (2010), studying NTBFs from Brazil, found that nascent software firms with more international marketing skills, customer orientation and customised products tend to become born globals. In addition, Tesfom and Lutz (2006) and Persinger et. al. (2007) have reported that NTBFs need to have an aggressive international marketing orientation because, in most situations, they face the poor reputation of their home country in the technological field they are operating. Thus, we propose:

**H1c:** *International marketing skills are positively associated with the accelerated internationalisation process followed by NTBFs from emerging markets.*

### 3.2 Entrepreneur Factors

The entrepreneur (the founder) who runs an NTBF has some characteristics that may lead the firm to accelerated internationalisation (McDougall et al., 1994; Zander et. al., 2015; Cavusgil and Knight, 2015), such as higher tolerance to risk (Zahra and George, 2002) and a global mindset (due to international orientation and international vision), and often has international social capital (the use of personal or professional relationships and networks). Based on the characteristics related to an entrepreneur’s profile (e.g., their technical and management background, their experiences accumulated over their professional and academic career, and language knowledge). Holtbrugge and Wessely (2009) have built the concept of the international management skills of a born global’s entrepreneur.

The international management skills (Holtbrugge and Wessely, 2009) concept is consistent with other studies on the role of entrepreneurs in NTBFs (Knight and Cavusgil 2004). Most research has been undertaken within companies in developed countries (Persinger et. al., 2007). Within this perspective, Johnson’s (2004) research found mainly influential factors related to the entrepreneurs influencing small US and UK high technology start-ups’ (NTBFs) accelerated internationalisation: the international vision of the founder(s), the identification of specific international opportunities as well as having international social contacts, and the desire of the entrepreneur and top management team to be international market leaders.

The study of the international entrepreneurship of more sophisticated technological sectors in emerging economies is a nascent area of research (Hill and Mudambi, 2010; Lorenzen and Mudambi, 2013). Thai and Chong (2008), studying the characteristics of the founder in Vietnamese born globals, did not find the association of international management skills with accelerated internationalisation. However, the results are still controversial, for example Lorenzen and Mudambi (2013), and Dib et. al. (2010) have found positive associations between the role of entrepreneurs and accelerated internationalisation for firms. Thus, we posit the following:

**H2a:** *The international management skills of entrepreneurs are positively associated with the accelerated internationalisation process followed by NTBFs from emerging markets.*

Prominent research on NTBFs from developed countries has indicated the positive association between the international experience of the entrepreneurs and a firm’s accelerated internationalisation (Harveston et. al., 2000; Andersson, 2000). International experience includes international work experience as an expatriate employee or some other type of professional interactions in a foreign market, extensive international travel and schooling outside of the home...
country. Even previous professional involvement in international or export departments in multinational companies based in the home country is reported as international experience (Harveston et. al., 2000). Entrepreneurs with these types of previous experiences are typically more familiar with international market opportunities and conditions and tend to be more involved in international business than entrepreneurs with no international experience. By accumulating international experience, an entrepreneur tends to build more international social and business networks, which brings more exposure to international market information and can allow the entrepreneur perceive more international business opportunities.

Studies on Indian IT born globals (Prashantham and Dhanaraj, 2010; Lorenzen and Mudambi, 2013) have indicated that accelerated internationalisation is related to an entrepreneur’s international experience. A recent stream of research explores the importance of cross-border social networks for technological entrepreneurship in emerging countries by examining ties between the expatriate community and local entrepreneurs in the home country (Nanda and Kanna, 2007; Dai and Liu, 2009, make the same association). One interesting finding of Brazilians NTBFs (Dib et. al, 2010) was the high percentage of entrepreneurs who worked for multinational firms in Brazil prior to founding their own businesses. Taken together, these arguments suggest that:

**H2b: The international experience of entrepreneurs is positively associated with the accelerated internationalisation process followed by NTBFs from emerging markets.**

We synthesise our theoretical framework in Figure 1.

---

4. METHODOLOGY

4.1 Population and Sample

We tested the hypotheses using survey data from new technology-based firms (NTBFs) in Brazil. We focused on high technology sectors because they have been emphasised by the most prominent studies on accelerated internationalisation (Knight and Kim, 2009). It is challenging to consolidate a statistically representative sample of NTBFs due to a lack of official census or complete records of this type of firms in Brazil. Therefore, we drew the sample from the most reliable sources as possible, one being (1) the National Association of Entities Promoting Advanced Technology Ventures (ANPROTEC), which is known for supporting NTBFs from high technology sectors. ANPROTEC has 90 associated technological parks and 384 incubators. It was not possible to contact all the technology parks and incubators associated with ANPROTEC because some are so new that there is no company operating yet. The other source is (2) the lists of government programs of the Brazilian Trade and Investment Promotion Agency (APEX) with incentive to internationalisation of high technology sectors. Due to the uncertainty of the number of NTBFs, the nature of the sample in this study did not aim to meet the criteria for statistical representativeness of the population, making that sample a non-probabilistic and intentional sample (Hair et. al., 2005).
We had four sampling criteria: the firms had to be (1) not more than 10 years old (the 10-year upper limit is consistent with previous research on entrepreneurial firms (Autio et. al, 2000)); (2) small Brazilian companies according to IBGE (Brazilian Geography and Statistics Institute), so companies with more than 50 employees were excluded; (3) involved in developing, commercialising, or manufacturing (high) technology, according to the classification from the Organisation for Economic Cooperation and Development (OECD, 2003): Aeronautics and aerospace, pharmaceuticals, computer, electronics and telecommunications, and optical and precision; (4) companies with any type of operation in at least one foreign market, including exports to greenfield ventures. Because NTBFs depend on exports as their main entry mode into international markets, most of the samples from international research on the phenomenon of accelerated internationalisation use databases of exporting companies (Knight and Kim, 2009).

The questionnaire was developed with a five-point Likert scales (See the Appendix). The questionnaire was analysed for validation by a group of international business scholars. Following this validation, pre-tests were conducted with 3 executives of NTBFs that closely reviewed the survey. Next, after making adjustments, the questionnaire was sent to the founder (entrepreneur) or an executive who works directly with the international operations of each NTBF to answer the questions. The questionnaire was available on the internet in June and July 2011.

We received responses from 214 of approximately 800 firms. A precise number of NTBFs invited to this research could not be defined. In certain cases, we were not granted a full list of companies residing in the incubators and technology parks, and the invitations to answer our questionnaire were sent by the head of those places. ANPROTEC helped advertise the research on their web site with a direct link to the questionnaire. We could not control how many companies had access to that. The first database generated had 214 answers. Of these 214, 114 questionnaires were from companies with operations exclusively in Brazil and were therefore excluded because they did not meet all sampling criteria; 85 (39.7%) were from companies that had some type of foreign business. However, 31 of these 85 questionnaires had a large number of missing values and they were eliminated from the analysis (Hair et. al., 2006). In the end, 54 valid questionnaires were considered. However, we found 05 questionnaires with answers with no variance, and this indicates not reliable data in those 05 questionnaires, since it is expected to minimum a small variance. Thus the statistical analysis was reduced to the number of 49 questionnaires.

4.2 Construction of variables

We set in our goals that the analysis would be performed by comparing NTBFs that had accelerated internationalisation with traditionally internationalised NTBFs. To meet this goal, our binary dependent variable was type of internationalisation (accelerated or traditional). This is the dependent variable where 0 is traditional internationalisation and 1 is accelerated internationalisation. Accelerated internationalisation is when, within a time horizon of up to five years from NTBF foundation, a company has already conducted business in at least one international market (Dib et. al. 2010). Traditional means that the NTBF took more than five years after its foundation to initiate international operations. Several authors worked with the same type of dependent variable; however, the period from the company’s foundation and the first foreign operation varies from 02 to 15 years (Two years (Luostarinen and Gabrielsson, 2006), three years (Knight and Kim, 2009), five years (Zucchella et. al., 2007), eight years
(McDougall et. al., 1994), and fifteen years, in this case counting 50% of the sales in another continent (Gabrielsson et. al, 2004). According to Dib et. al. (2010), we made no restriction regarding both the percentage of revenues from international operation and the country coverage, which could be one or several countries.

The independent variable company’s internal factors was built in accordance with the models of Knight and Kim, (2009), Gabrielsson et al. (2004), and Knight and Cavusgil (2004) and consisted of the following factors: Innovation Capacity (INNOV), International Orientation (MINT), and International Marketing Skills (MKT) (See the Appendix).

The independent variable of entrepreneur factors is based on Harveston et. al. (2000); Andersson (2000) and Oviatt and McDougall (1994), and it was built on the following factors: Entrepreneur’s international management skills (MGT) and International experience (EXP) (See the Appendix).

4.3 Statistical techniques

In this study, the model of logistic regression was estimated to assess whether and at which level each of the independent variables contributes to rapid entry of an NTBF in the international market. The significance of the independent variable coefficients of external factors was tested by using the Wald test, and it was considered a valid coefficient for the model when the level of statistical significance was p < 0.05 (Hair et. al., 2006). The significance of the final model can be observed in the Hosmer and Lemeshow measure of general adjustment, whose focus is not to reject Ho: there is no significant difference between the classifications observed and predicted.

Moreover, sectors of activities of companies and their size were used as control variables, dealing with dummy variables that distinguish IT companies (most common sample of born global).

Regarding the small sample size, it is important to remind the reader that this article follows the recommendations of Vittinghoff, Sen and McCulloch (2009), in which the objective of the research is not to make predictions but only to test the influence of the variables in relation to the dependent variable.

5. Results

In total, 49 NTBFs were considered, of which 31 NTBFs, or 63%, had experienced accelerated internationalisation and 18 NTBFs, 37%, had not (i.e., internationalise their business after five years of experience in the domestic market).

Table 1 presents the means, standard deviations and the results of the correlation made with the independent variables of the model.

The correlations presented in Table 1 are considered low, although in some cases are significant at 5% and 1%. However, the VIF test (Variance Inflation Factor) of less than 5, shown in Table 2, indicates that the level of multicollinearity is acceptable in order to consider real effect each construct in the logistic regression. The variables entrepreneur’s international
management skill (MGT) and international experience of the entrepreneur (EXP) have significant average correlations with the variables for international market orientation and international marketing.

----------------------
Insert table 1 here
----------------------

Table 2 presents the logistic regression model. The results of the regression model had high explanatory power at 60%, which indicates that the factors tested here have reasonable predictive power for explaining the strategic behaviour of NTBFs.

----------------------
Insert table 2 here
----------------------

According to table 2, three of the five independent variables of the internal factors presented significance \((p < 0.05)\) for the internationalisation process of NTBFs: innovation capability (INNOV), international marketing skills (MKT) and entrepreneur’s international management skill (MGT). By contrast, the innovation capability and international marketing skills present a negative coefficient \(B\), which contradicts the theoretical model. In the sample, the analysis of the coefficient sign of these variables reveals that when NTBFs delays internationalising and stay more than 5 years operating only in the domestic market, the innovation capability and international marketing skills are more relevant to their internationalisation strategies.

According to Table 2, entrepreneurs’ international management skills are significant in terms of the accelerated internationalisation \((p = 0.032, p < 0.05)\) of NTBFs. The sign of the coefficient of the variable entrepreneur’s international management skill (positive) also reveals that, as predicted in the theoretical model, the more international management skills the entrepreneur has, the greater the likelihood the NTBF follows a process of accelerated internationalisation.

The results demonstrate empirical support for the construct international management skills, allowing us to conclude that NTBFs that have entrepreneurs with international management skills tend to follow accelerated internationalisation.

----------------------
Insert Table 3 here
----------------------

The result of the logistic regression analysis related to entrepreneurs’ international management skills supports the literature on born globals in the sense that it is a factor that accelerates the entry of a company abroad (Harveston et. al.; 2000; Andersson, 2000; Oviatt and McDougall, 1994; Holtbrugge and Wessely, 2009; Madsen and Servais, 1997; Andersson, 2000).

Another result of this study was that two of the five tested hypotheses for internal factors, namely, innovation capability and international marketing skills, were proven to be the opposite.
Therefore, in the sample we have found that the NTBFs develop their strategies based on its innovation capability and international marketing skills, when the company delays internationalisation, but are not significant factors for these NTBFs becoming born globals.

The literature on accelerated internationalisation (Oviatt and MacDougall, 1994; Knight and Kim, 2009, Knight and Cavusgil, 2004) is still undeveloped and controversial. Despite the growing prominence of emerging countries and the important role that NTBFs play in powering innovation in their home countries, the understanding of NTBFs’ accelerated internationalisation in emerging economies is quite limited (Kiss et. al, 2012). Our results seem to demonstrate a difference from what the main studies from developed countries have indicated. In the literature, a NTBF with greater innovation capability and international marketing skills than their competitors is more likely to follow accelerated internationalisation.

The hypothesis of international experience (EXP) has no empirical support. The literature on accelerated internationalisation is also controversial concerning this factor. The majority of studies state that the international experience of the entrepreneur is a necessary condition for accelerated internationalisation and creates the motivation and ambition to make the company become a born global because it changes the perception of distance from other countries (Oviatt and McDougall, 1994; Madsen and Servais, 1997; Andersson, 2000). Consequently, a more systematic research approach is needed to improve the understanding of accelerated internationalisation in a wider range of cultural and institutional contexts.

6. Conclusions

We analysed the factors influencing the accelerated internationalisation of new technology-based firms (NTBFs) from emerging economies. We advanced hypotheses regarding the relationships between two types of drivers to accelerated internationalisation (organizational and related to the entrepreneur) with a survey applied to small Brazilian NTBFs. Our findings indicate that NTBFs, which have an entrepreneur or group of executives with international management skills have more opportunity to have an accelerated internationalisation. In contrast to previous research in the field, the results demonstrate that NTBFs that take more than five years to enter the international market capitalise on their competence for innovation and abilities in international marketing in the internationalisation process.

6.1 Theoretical Implications

There is a plethora of research on the accelerated internationalisation of NTBFs in North America and Europe, but research in “developing countries virtually is absent” (Kiss at. al., 2012, p. 267). Here, we analysed the accelerated internationalisation of new technology-based firms (NTBFs) in a key but under-studied emerging market, Brazil (Dau, 2012).

The results suggests that, considering Brazilian NTBFs, those that have an entrepreneur or a group of executives with international management skills are the most likely to experience accelerated internationalisation. This result is consistent with the main literature on born globals (Oviatt and MacDougall, 1994; Knight and Kim, 2009, Knight and Cavusgil, 2004). It also supports the results of other studies from emerging markets, such as Varma (2011), Hill and Mudambi (2010); Lorenzen and Mudambi (2013) and Dib et. al. (2010). Thai and Chong (2008) did not find the association of international management skills with accelerated
internationalisation in Vietnamese born globals and it can be explained by specific characteristics of the Vietnam’s context.

The insipient research on NTBFs from emerging markets (Kiss et. al. 2012) suggests that NTBFs may lack certain key resources and may base their innovation strategy on imitation (Cimoli and Katz, 2003; Tesfom and Lutz, 2006). Our results indicate that the advantages of NTBFs from emerging markets experiencing accelerated internationalisation rely on the international management skills of the entrepreneur. Thus, in-depth studies on the impact of entrepreneurs in NTBFs from emerging countries on accelerated internationalisation are needed.

In NTBFs from developed countries the accelerated internationalisation is mainly driven by organisational capabilities such as international orientation, international marketing skills and existing technological competences of the respective firm (Knight and Kim, 2009; Cavusgil and Knight, 2015). Different from the main born global studies, our results suggest that to establish operations in an international market, NTBFs from emerging markets seem to require more time to build organizational capacities such as international marketing skills and innovation capability. This explain our result that NTBFs with a little more experience in the domestic market, rely more on their innovation capability and international marketing skills during the traditional internationalisation processes, i.e., five years after the company’s foundation. The different trend of NTBFs from emerging markets, may be partly explained by the business environment variance between developed and emerging countries (Hill and Mudambi, 2010; Kiss et. al., 2012).

Most of the internal factors for entering international markets in an accelerated manner identified in developed countries (Oviatt and Mcdougall, 1994; Knight and Kim, 2009) have also been reported in studies for developing countries (Ciravegna et.al., 2014; Lorenzen and Mudambi, 2013; Dib et. al., 2010), especially factors related to the entrepreneur’s international management skills. Other factors, such as innovation capability, international orientation, international marketing skills and the international experience of the entrepreneur, are still controversial, and the research on NTBFs from emerging economies focusing on this relationships is still limited (Kiss et. al, 2012). The literature on companies from emerging countries focuses predominately on the internationalisation process of large companies in low-intensity technology sectors (Ramamurti, 2012). Internationalisation in high technology sectors, which are much more expressive for technology development in developing countries (Cimoli and Katz, 2003), have been discussed in a fragmented way in different emerging countries, such as India (Lorenzen and Mudambi, 2013; Varma, 2011), Costa Rica (Ciravegna et.al., 2014) Brazil (Dib et. al., 2010), Turkey (Uner et. al., 2013), and China (Zou and Ghauri, 2010).

6.2 Managerial and Policy Implications

Our results indicate that it is essential that the entrepreneurs or executives of NTBFs with accelerated internationalisation have international management skills. This result has important managerial implications. For example, if the entrepreneur wants to enter the NTBF business in the international market rapidly, hiring executives is critical. In this case, candidates who have the skills necessary to operate in international markets must be identified. These candidates typically can handle cultural differences, speak a second language and know the international competitiveness of the company's products.
6.3 Limitations and Future Research

This research used a survey with Brazilian technology-based companies to collect data. The method is valuable for drawing a broad picture of the internationalisation process of these companies (whether accelerated or not). In Brazil, the only study that used a survey to understand born globals was that of Dib et. al. (2010), and even in the international literature, such methodology has not been used extensively (Kiss et. al, 2012). Therefore, the limitations of the study must be recognised:

Firstly, we used a non-probabilistic sample, which prevents the researcher from calculating a statistically liable sample. There is no official census on the number of Brazilian NTBFs. The objective of this study was to create a sample covering (1) sectors in which the activities of high-technology NTBFs are normally developed and (2) the main regions in Brazil where there have been previous indications of the existence of this type of company.

Secondly, most data collected in this study were based on the perceptions of respondents. Studies using other sources of information for some of the key measures are needed.

Thirdly, because our results indicate that the international management skills is what makes NTBFs from emerging markets experience accelerated internationalisation, this issue deserves further investigation. Theoretical research developing a conceptual framework of entrepreneurs and their essential roles in accelerated internationalisation in multiple emerging countries such as Brazil, India, and China as analytical setting would enhance our understanding of NTBFs pursuing accelerated internationalisation. Additionally, in this research it was not possible to collect data on performance of NTBFs. It would be interesting to see how successful these companies are after internationalisation.

References


### TABLES AND FIGURES

**Figure 1: Hypothesis Model**

```
+---------------------------------+-------------------+-------------------+-------------------+-------------------+-------------------+-------------------+-------------------+-------------------+
| Innovation capability (INNOV)  | International orientation (MINT) | International marketing skills (MKT) | Entrepreneur’s international management skills (MGT) | International experience (EXP) |
+---------------------------------+-------------------+-------------------+-------------------+-------------------+-------------------+-------------------+-------------------+-------------------+
| H1a                             | H1b               | H1c               | H2a               | H2b               | Accelerated/Traditional Internationalization |
+---------------------------------+-------------------+-------------------+-------------------+-------------------+-------------------+-------------------+-------------------+-------------------+
```
Table 1: Correlations of the independent variables of the model.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std Dev</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>INOV</td>
<td>3.87</td>
<td>0.735</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>MINT</td>
<td>3.13</td>
<td>0.819</td>
<td>358</td>
<td>.404**</td>
<td>.409**</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>MKT</td>
<td>3.00</td>
<td>0.725</td>
<td>0.18</td>
<td>0.279</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>MGT</td>
<td>4.10</td>
<td>0.630</td>
<td>346</td>
<td>.429**</td>
<td>.425**</td>
<td>0.252</td>
</tr>
<tr>
<td>5</td>
<td>EXP</td>
<td>2.53</td>
<td>0.750</td>
<td>0.147</td>
<td>.429**</td>
<td>.425**</td>
<td>0.252</td>
</tr>
</tbody>
</table>

*p<0.05

n = 49  **p<0.01

Source: The authors

Table 2: Logistic regression - the internal environment factors

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>INOV</td>
<td>-3.803</td>
<td>1.542</td>
<td>6.079</td>
<td>1</td>
<td>.014</td>
<td>.022</td>
<td>1.258</td>
</tr>
<tr>
<td>MINT</td>
<td>-.075</td>
<td>.728</td>
<td>.011</td>
<td>1</td>
<td>.918</td>
<td>.928</td>
<td>1.552</td>
</tr>
<tr>
<td>MKT</td>
<td>-2.672</td>
<td>1.209</td>
<td>4.885</td>
<td>1</td>
<td>.027</td>
<td>.069</td>
<td>1.738</td>
</tr>
<tr>
<td>MGT</td>
<td>7.680</td>
<td>2.717</td>
<td>7.990</td>
<td>1</td>
<td>.005</td>
<td>2165.335</td>
<td>1.842</td>
</tr>
<tr>
<td>EXP</td>
<td>-.751</td>
<td>.735</td>
<td>1.044</td>
<td>1</td>
<td>.307</td>
<td>.472</td>
<td>1.450</td>
</tr>
</tbody>
</table>

Less than 10 employees

<table>
<thead>
<tr>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.194</td>
<td>1.747</td>
<td>1.578</td>
<td>1</td>
<td>.209</td>
<td>8.974</td>
<td>2.731</td>
</tr>
<tr>
<td>-.661</td>
<td>1.331</td>
<td>.246</td>
<td>1</td>
<td>.620</td>
<td>.517</td>
<td>2.746</td>
</tr>
<tr>
<td>-.298</td>
<td>1.281</td>
<td>.054</td>
<td>1</td>
<td>.816</td>
<td>.743</td>
<td>1.415</td>
</tr>
<tr>
<td>-5.588</td>
<td>4.157</td>
<td>1.807</td>
<td>1</td>
<td>.179</td>
<td>.004</td>
<td></td>
</tr>
</tbody>
</table>

Nagelkerke R Square 0.684
Cox & Snell R Square 0.501
Hosmer e Lemeshow 4.999
p= (0.758)

Source: The authors.

Table 3. Summary of the testing of hypotheses related to external factors
Internal factors

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H1a:</strong> The innovation capability is positively associated with the accelerated internationalisation process followed by NTBFs from emerging markets.</td>
<td>Supported, but Inverted</td>
</tr>
<tr>
<td><strong>H1b:</strong> The international orientation is positively associated with the accelerated internationalisation process followed by NTBFs from emerging markets.</td>
<td>Not supported</td>
</tr>
<tr>
<td><strong>H1c:</strong> The international marketing skills are positively associated with the accelerated internationalisation process followed by NTBFs from emerging markets.</td>
<td>Supported, but Inverted</td>
</tr>
</tbody>
</table>

Factors of the Entrepreneur

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H2a:</strong> The international management skill of the entrepreneur is positively associated with the accelerated internationalisation process followed by NTBFs from emerging markets.</td>
<td>Supported</td>
</tr>
<tr>
<td><strong>H2b:</strong> The international experience of the entrepreneur is positively associated with the accelerated internationalisation process followed by NTBFs from emerging markets.</td>
<td>Not supported</td>
</tr>
</tbody>
</table>

Source: The authors.

Appendix – Questionnaire items

The response format was 1, “strongly disagree”, to 5, “strongly agree”, unless otherwise described.

**Innovation capacity** (Alpha of Cronbach 0.856). Adapted from Knight and Cavusgil (2004) and Knight and Kim (2009).
- Our company is at the technological forefront of our industry in the international markets;
  We developed a large part of the technology of our product;
- We hired some of the most qualified experts in the industry to create the design and manufacture our product;
- We are known in the international market for products with superior technology;
  Compared to local competitors, very often, we are the first to introduce product innovation or new operation approaches in international markets;
- We formally invest in the R&D of new products.

**International Orientation** (Alpha of Cronbach 0.803). Adapted from Knight and Kim (2009).
- The strengths and weaknesses of our main international competitor;
- If a competitor launches an intensive campaign oriented towards our international clients, we will implement an immediate answer;
- Integrated business operations (commercialisation/sales, finances, production etc.) to meet the needs of the international market;
- If the strategy of the company is based on the international clients’ needs;
- If the satisfaction of international clients with the products or services is systematically measured.

**International marketing orientation** (Alpha of Cronbach 0.903) Adapted from Knight and Kim (2009).
How do you compare the International marketing skills of your company to its major competitors (1= Much worse than competitors; 5= Much better than competitors).
- The process of international marketing planning;
- Ability to segment and identify foreign market niches;
• Ability to use marketing tools to make the product stand out (design, price, publicity);
  Develop and fit the product in the international market;
• The image of the company;
• Worldwide recognition of the product/service.

The independent variable of entrepreneur factors is based on the models of Simões (2012) and Oviatt and McDougall (1994) and was built on the following factors:

**Entrepreneur’s international management skills** (Alpha of Cronbach 0.813). Adapted from Holtbrugge and Wessely (2009).

- The manager’s view about the international market;
- The entrepreneur’s orientation when deciding to enter in foreign markets;
- The entrepreneur’s management training when entering in the foreign market;
- The manager’s language skills;
- The selection process for hiring candidates with skills to perform in international markets;
- The ability of company staff to work with people from other countries, with different cultures;
- Staff adaptation to other countries and cultures;
- The manager’s ability to identify business opportunities in foreign markets.

**International professional experience** (Alpha de Cronbach 0.625). Adapted from Harveston et. al. (2000); Andersson (2000).

How the prior international experience of the entrepreneur influences the internationalisation of the company (1 = no influence; 5 = High influence)

- The entrepreneur’s previous work in multinational companies in Brazil (in international or export departments);
- The entrepreneur’s previous experience abroad as an expatriate employee of MNEs; Educational experience abroad (MBA, Master’s degree, professional courses);
- The entrepreneur’s personal relations abroad;
- The entrepreneur’s family background.