

Co-Entrepreneurs in High-Tech Born Globals¹

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Abstract:

In the last few years we witnessed an enormous growth in the number of firms doing abroad since inception labelled as born globals or international ventures. Extant literature on SMEs internationalization as well as on born globals highlights their liabilities of newness and smallness. In order to overcome the lack of resources, these firms anchor their international operations on entrepreneurs' social networks, especially in embryonic stages of their life cycles. Recognizing the relevance of personal ties for firms internationalisation, in present study we are interested on a deeper analysis, particularly in the roots and roles played by those relationships. Based on four case studies of high-tech born globals, the study shows how firms use the relationships for different purposes: opportunity framing; technological resource developpeing; market facilitating; and credibility provision. Relationships are rooted in several environments, especially in the academia, friendships, business relationships, most part of them originated in entrepreneurs' personal ties. The study also provides evidence concerning the dynamism of such relationships, some of them evolving from loose ties to very tight networks.

Key Words: Relationships; Born globals; high-tech

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Introduction

International entrepreneurship (IE) became very fashionable in the last decade. There was an exponential growth of firms engaging since inception in international markets (Knight and Cavusgil, 2004; Rialp et al, 2005;). Such firms have been assigned different labels, the most common being international new ventures (Oviatt and McDougall, 1994) and born globals (Rennie, 1993). They go abroad not just to sell their products and/or services but also to have access and mobilize geographically dispersed resources and knowledge (Doz *et al*, 2001; Mathews and Zander, 2007).

Extant literature on born globals emphasises their knowledge intensity (Almor and Hashai, 2003; Luostarinen and Gabrielsson, 2002). These firms tend to be more common in industries where products and/or services have short life cycle products, demanding continuous innovation and calling for specialised and difficult-to-imitate resources (Peng, 2001; Rialp and Rialp, 2006). They usually market unique and specialised products and/or services (Oviatt and McDougall, 1995), often anchored in leading edge technologies. In this vein, they frequently follow international market niche strategies (Andersson and Wictor, 2003; Aspelund and Moen, 2001; Mathews and Zander, 2007; Oviatt and McDougall, 1995), involving product differentiation (Bloodgood *et al*, 1996; McAuley, 1999; Oviatt and McDougall, 1995) and a strong customer focus (Aspelund and Moen, 2001). These allows them to better understand customer needs as well as to use such understanding as a source for continuous innovation.

Other key feature concerns entrepreneurs' capabilities. Born globals are often founded by individuals with strong scientific competences, professional experience, technical expertise, and international exposure (Andersson and Wictor, 2003; Crick and Spence, 2005; Jones, 1999; Mathews and Zander, 2007; Oviatt and McDougall, 1995). Entrepreneurs usually have an international vision for the business (Harverston, 2000), often anchored in international scientific or business practice. In fact, such entrepreneurs were found to have post-graduate education, being examples of excellence in R&D (Beibst *et al*, 2003; Bloodgood *et al*, 1996; Burgell et al, 2001; Jones, 1999; Phiri *et al*, 2003; Sharma and Blomstermo, 2003) or to master specific knowledge about particular industries or activities (Andersson and Wictor, 2003; Evangelista; 2003; McAuley, 1999; Sopas, 2001). Such knowledge basis allows them to design innovative products and/or services and, in extreme cases, to create new global markets. Therefore, they enjoy international competitive advantages, which may enable them to overcome the liabilities of foreignness and newness. As Autio (2005:15) putted, "internationalisation may not always be an uphill struggle ... it may also constitute a crucial condition underpinning the firm's *raison d'être*".

Traditionally literature on SME internationalisation indicates, however, that carrying out business abroad is faced with significant problems (Stinchombe, 1965). Such problems may arise due to need of: (i) gaining specific knowledge about distant markets; (ii) mastering

processes to do business abroad; (iii) conquer the trust of customers or other actors to conduct operations abroad; and (iv) specific resources to overcome difficulties (Katz *et al*, 2003).

One of the key instruments for born globals to respond those problems is a strong recourse to social and business networks. Most research on born globals has recognised the relevance of personal relationships, and more specifically of business and academic international networks (Andersson and Wictor, 2003; Bell, 1995; Coviello and Munro, 1995; Oviatt and McDougall, 1995; Sharma and Blomstermo, 2003; Wakkee, 2004). Some authors have even argued that such firms anchor their strategies on a constellation of relationships (Arenius, 2002; Chetty and Campbell-Hunt, 2004; Coviello and Munro, 1995; Jones, 1999).

While recognising that relationships play a decisive role in company internationalisation, extant literature has not provided a deep analysis of their functions, origins and strategies, being focused on market issues, in particular how to serve foreign markets. The research undertaken by Doz and Williamson (2002) and Harris and Wheeler (2005) is an exception to these state of affairs. This bias is also present in born globals literature. To fill this gap, the aim of this exploratory paper is to analyse the role of co-entrepreneurs in born globals. Following Lindgren and Packendorff (2003), co-entrepreneurs are defined not as shareholders but as facilitators and propellers of business projects approval and implementation. More specifically, we are interested in the roots of relationships and in the functions fulfilled by co-entrepreneurs in born globals emergence and expansion, taking into account the various phases of the entrepreneurial process, from opportunity framing to opportunity exploitation in international markets.

Since this study has an exploratory nature, no hypotheses or proposition will be developed. The paper is organised in the following way: In the next section we review the literature on functions and origins of relationships, having in mind their relevance for born globals. Subsequently, we present the method, followed by a short description of four high-tech born global cases. Then, in order to answer the research questions, the cases are discussed considering the roles and roots of born globals relationships. The paper finishes with some conclusions.

Literature Review

A new breed of firms has caught academic attention in the nineties, following an internationalisation pattern in sharp contrast with the incremental process postulated by the Nordic School (Johnson and Vahlne, 1977; Luostarinen, 1979). Such firms, here labelled as born globals, are characterized by fast international reach, innovative moves, and multi-faceted cooperative arrangements. These firms are by-product of globalisation (Knight and Cavusgil, 2004), but they are simultaneously furthering it. In today's turbulent environment, firms must adapt quickly in order to survive and to achieve success, and need to forge opportunities, identifying global niches, often without relying on 'lead' markets. From the perspective of a 'traditional' internationalisation approach it becomes puzzling how these firms – often with no previous business experience, lack of knowledge about foreign markets, and scarcely endowed with financial resources – can compete and thrive internationally. In order to support international operations and to overcome their liabilities of newness and foreignness (Zaheer, 1995) as well as their lack of credibility, born globals develop a complex network of relationships along the value chain and across entrepreneurial process.

Entrepreneurs' social networks are crucial to understand how firm internationalise, as long as economic transactions are based on past dealings and ongoing interactions (Granovetter, 1985; Uzzi, 1997) and are not performed within a faceless market. The relationships can be categorised as weak or strong ties (Granovetter, 1973), that can be distinguished by mix of the amount of interaction time, emotional intensity, intimacy, and reciprocal services between the actors involved. Weak ties are based on more occasional social and business connection, with people from different contexts. These ties are considered as non-affective, when compared with strong ties, based in strong emotional relationships, very frequent and long lasting. While weak ties provide the access to novel knowledge and actors, strong ties often demand the adaptation of each partner on a similar basis, making difficult the contact with new pots of knowledge. In some cases, due to this embeddedness, they can blind the actors to new information and limit the effectiveness of the ties. Moreover, and for cost reasons, it is easier to maintain a large number of weak ties, when compared with strong ties, as long as they are less costly and time consuming (Granovetter, 1985). However, only strong ties can provide benefits such as: (i) acceleration of time to market of new products and services (Uzzi, 1997); and (ii) reduction of transaction costs resulting from mutual trust between partners.

For born globals, the development of a mix of weak and strong ties becomes crucial, in order to enhance international initiation and development (Johnson, 2004; Oviatt and McDougall, 1995; Sharma and Blomstermo, 2003). However, one needs to go beyond the number of ties activated by the firm, for two main reasons. Firstly, because it is not granted that a higher number of partnerships will increase the speed of internationalisation (Nummela *et al.*, 2004; Saarenketo, 2004). Secondly, because the ties do not perform the same functions and are not used for similar purposes. Lechner *et al.* (2005) show that, in a national context, while the number of network ties have a moderate effect on sales, the relational mix - social, reputation, co-petition, marketing information, and technological networks - has a strong explanatory power. Following these hints, one needs to go deeper into the relational mix activated by born globals.

Roots of Relationships in Internationalisation of Born Globals

While the importance of social networks is well acknowledged in born globals literature, the roots of these relationships have not been granted the same attention. Several studies on internationalization recognise the relevance of social relationships, outside business, as being critical to export initiation and development (Ellis, 2000; Ellis and Pecotich, 2001). Dibben *et al.* (2003) found the same differences when they proceeded to a comparison of national contexts. In the UK entrepreneurs base their partnerships in less coupled relationships, looking essentially for their usefulness and for what they can extract from them. In France, however, relationships are anchored in people with the same status, especially regarding University studies. Finally, in Holland, entrepreneurs mobilise personal and business contacts, but all were long-term relationships.

There is a clear need for better understanding the roots of the relationships activated by born globals. Entrepreneurs are able to mobilize several sources, such as family, friends, business connection, and intentionally searched contacts - trade fairs, approach to a distributor - (Harris and Wheeler, 2005). A useful categorisation was provided by Ellis (2000), who considers three types of relationship origins: (i) business social; (ii) non-business social; and (iii) planned network. These categories will guide our research.

Functions of Relationships in Born Globals Internationalisation

The relevance of networks for firms' internationalisation is well documented in the traditional internationalisation literature. According to Hakansson and Snehota (1995) networks allow parties to connect their activities, to share resources, and to develop bonds between actors, enabling the accumulation of knowledge, the creation of new resources, and the improvement of new activities. The role of these relational resources has been also acknowledged by Câmara and Simões (2006), Dunning (2002) and Harris and Wheller (2005). They are especially relevant in the case of SMEs, due to the shortage of managerial, financial, and reputation resources these firms face. They facilitate the internationalisation process of SMEs, being used in several ways (Nummela, 2003). In small firms, at least in embryonic phases, company relationships overlap with the entrepreneurs' social networks. In these cases, internationalisation follows the social networks of entrepreneurs (Câmara and Simões, 2006; Crick and Jones, 2000; Ellis, 2000).

The literature on entrepreneurial process shows that entrepreneurs' networks are very important for opportunity recognition (Hills *et al.*, 1997, Orwa, 2003). Drawing on Granovetter's (1973) work, De Konning (1999) suggested that entrepreneurs' networks encompass four levels: inner circle (long-term and stable relationships); action set (people recruited for opportunity development); partnerships (start-up team members); and weak ties (used to gather general information that could be used in testing an opportunity or in answering a general question). This is consistent with Singh's (2000) finding that entrepreneurs use different types of contacts in the process of framing opportunities: weak ties for technological information, and strong ties, mainly family contacts, for feedback. In the same vein, Birley (1985) found that entrepreneurs tend to seek advice and suggestions for their core ideas and business plans from their families. It was also found that the use of social networks increases the number of opportunities identified, and that these grow with the breadth of the social network (Singh *et al.*, 2000).

In spite of the well documented importance of relationships for opportunity framing, no attempts were identified in the literature – with the exception of the very recent contribution by Matthews and Zander (2007) – to study the relevance of networks for born globals opportunity framing processes. One may argue that entrepreneurs' relationships perform four main roles in such processes.

First, such relationships allow the entrepreneurs to gather more information for their judgments, particularly in the case of science based entrepreneurs. The involvement in academic networks enables not just getting new insights from inter-action and joint problem solving, but also the exposure of own ideas to scrutiny, the feed-back from experts, and the identification of suitable partners. Business networks may provide bridges to new markets (Câmara e Simões, 2006), as well as a better understanding of international markets, and the identification of 'holes' and neglected areas which may provide new business opportunities. Such relationships are also important for opportunity assessment, since they may be activated to validate ideas and to evaluate the possibility to mobilize additional resources and/or partners.

Second, personal relationships may be activated for other purposes, particularly in the access to financial, human, and technological capital for firm's operations (Doz and Williamson, 2002; Johannisson and Monsted, 1997). Personal cards and personal phone lists are used to borrow money for start-up, especially from family and close friends, as well as to hire people for the development of the new venture (Eisendhart and Schoonhoven, 1996). Personal relationships are also relevant to access venture capital, when referrals from relevant persons reduce the uncertainty and the risk associated with the value of new opportunities (Leonard and Swap, 2000). In extreme cases, they can provide a strategic reorientation and re-conceptualisation of firms operations (Harris and Wheeler, 2005).

A third role highlighted by the literature is the relevance of relationships to carry out marketing activities across borders and to initiate the internationalisation process. The results show that, at the initial phases, personal relationships are activated to start sales abroad, influencing market selection and entry modes used to serve international markets (Coviello and Munro, 1995, 1997; Ellis, 2000; Harris and Wheeler, 2005;). Besides facilitating access to external markets, personal relationships provide knowledge about external markets (Harris and Wheeler, 2005; Walters *et al.*, 2001) that are critical so that firms understand dissimilar business contexts and act according to their rules as well as to identify possible new opportunities. For born globals, networks have been considered relevant for international markets penetration, facilitating and accelerating venturing abroad (Andersson and Wictor, 2003; Bell, 1995; Chetty and Campbell-Hunt, 2004; Coviello and Munro, 1995, 1997; Jones, 1999; Phiri *et al.*, 2003; Sharma and Blomstermo, 2003).

The fourth role of social networks concerns referrals or credibility provided by those ties (Câmara e Simões; 2006; Harris and Wheller, 2005). In young, small high-tech firms, achieving legitimacy is crucial for firms that want to be innovative (DiMaggio, 1992; Elfring and Hulsink, 2003; Simões and Dominginhos, 2001). These firms face higher risks than older ones and are more prone to failure due to their lack of knowledge of markets, lack of capital, customer ties and track records. To overcome this liability of newness, firms must develop an institutional support capable to provide them the necessary legitimacy and credibility. For this purpose, firms should get the support and approval of some major players in the industry (Stuart *et al.*, 1999). Firms seek to obtain this reputation by getting the affiliation to a prestigious business partner, with high credibility in the market (Coviello and Munro, 1995; Elfring and Hulsink, 2003). This 'golden' business card could play a strategic role for several reasons. First, it represents a sign of credibility (Casson, 2003) as the market may assign an indirect reputation to the small firm due to its close relationship with a prestigious company. This is particularly relevant in born globals firms, where these firms act as 'godfathers' in international markets, allowing small firms to overcome the liability of newness (Simões and Dominginhos, 2001). Secondly, this strong tie could represent an important channel for increasing international sales. For born globals, the association with multinationals, as privileged channels for expansion abroad, becomes critical (Burgell *et al.*, 2001; Gabrielsson and Kirpalani, 2004). Furthermore, these relationships enhance international contacts, facilitating the access to new markets and new customers (Elfring and Hulsink, 2003; Harris and Wheeler, 2005; Holmlund and Kock, 1998) as well as the screening and evaluation of potential new partners for business development (Ellis, 2000; Ellis and Pecotich, 2001; Komulainen *et al.*, 2004)

METHOD

This is an exploratory study seeking to understand how the relationships are used in high-tech born global firms as well as to investigate their main roots. These subjects are under researched in internationalisation literature (Harris and Wheeler, 2005), particularly in what concerns fast internationalisers. In order to respond this objective, a qualitative in-depth approach becomes more suitable as Eisenhardt (1989) and Yin (1994) have indicated. In the same vein, Johnsen and Johnsen (1999) argued that case studies are particularly appropriate to address business relationships. One is essentially interested in what can be learned (Tellis, 1997) from case studies, and in analytical generalization (Yin, 1994). Since relationships are part of a social process, the option for case studies, based on records and experiences of entrepreneurs and on the evolution of their interactions in the context of social and business networks is justified (Gummerson, 2000). This approach is aligned with Coviello and Jones (2004) claim for developing further case studies to interpret and understand social phenomena in the field of IE.

Case studies were arranged having in mind the possibility to maximize our knowledge about the subject under investigation, and not to satisfy statistical procedures. Born globals from high-tech industries were selected (biotechnology, information and communications technologies, and software), recognising the critical role that relationships play, and their international orientation.

Following Andersson and Wictor (2003), the following definition of born global is used: any company that have reached a share of foreign sales of at least 25% within three years after their birth and, from inception, seeks to derive significant competitive advantage from the use of resources and the sales of outputs in multiple countries.

Data was gathered through semi-structured interviews with the CEO of each company. Such interviews were carried out between September 2004 and April 2005. Each interview lasted from 60 to 120 minutes. This data was complemented and triangulated with secondary data, available in public reports, in companies' web sites and in magazines. General questions were asked about firm antecedents, launching and development. A closer attention was devoted to the relationships mentioned by the entrepreneurs. Each tie mentioned or identified in secondary data was explored in detail to understand its main function and to find its roots. Additional information about international activities was also collected, particularly the geographic spread of activities, entry modes, and the time frame for entering international markets.

CASES

BIOTECH

In 1996, after earning a BSc. and a PhD. in Biotechnology from Kings College (University of London), the founder of BIOTECH returned to his home country and realised that that were almost no employment opportunities there. Biotechnology companies were few and small, and most pharmaceutical multinationals had no R&D departments in Portugal. The alternative, thus, was to return to England or to move elsewhere to profit from the knowledge acquired.

The decision, however, was to launch his own company. His PhD research, in the area of biotechnology had been undertaken in the context of an international project involving several companies and other Universities and research organizations, including partners from the United States and Denmark. During the scholarships there, the entrepreneur became more aware of the biotechnology markets boom. In his conversations with partners from pharmaceutical companies, he realised that a market for cheap copies of therapeutic proteins – called biogenerics – was about to emerge, because the validity period of some key patents was to expire soon. The perception of this opportunity led him to contact a former PhD colleague to convince him to join the entrepreneurial team. This colleague's knowledge in molecular biology was considered to be an asset for the new firm. At the end of the day, he joined the venture, to become Chief Scientific Officer (CSO) and responsible for intellectual property. The firm started its operations as a consultancy firm; however, as patents were granted, especially for a technological platform, consultancy lost weight. Turnover was around 2 millions € in 2004, more than 90% from external markets.

BIOTECH main mission was defined as to provide generic pharmaceutical companies with the biotechnological know-how needed to manufacture specific new products in the area of recombinant human proteins. The firm positions itself in technology development business, licensing its know-how and/or patents to manufacturing and marketing partners (Bommer *et al.*, 2002). The company is focused on the development of a competitive technology platform. This platform will allow the firm to use its technology in other fields, such as gene therapy. Additionally, BIOTECH can use its laboratories (plasmid production for gene therapy applications) and know-how to provide consultancy services (patent analysis and market research).

Initially, a consultancy contract with a German company was established, mainly in the fields of intellectual property and market research. This contract allowed the entrepreneurial team to confirm that their idea was feasible. Simultaneously, there was a bet on the development of own technology, through collaboration with two Portuguese Universities. These projects facilitated the access to academic expertise in the field. This was undertaken in close cooperation with leading international universities and laboratories, as well as two other SME (one from Holland and other from the USA) and hospitals, mainly through research projects aimed at developing new patents. The collaborative network is widely dispersed, including partners not only in Portugal, but also in Belgium, France, Germany, Finland, and the USA. Meanwhile, some pharmaceutical multinationals establish contracts with the company to produce molecules. A joint-venture between BIOTECH and a Dutch company, following other mutual agreements, was set up in 2002. This company was launched to operate in the certification and quality control field, a crucial area for firms who want to submit their processes and products to Food and Drugs Administration or to the European Medicinal Evaluation Agency.

The network behind the PhD project was used to mobilize people and/or organisations holding specific knowledge deemed to be relevant for the development of the company, as well as to forge contacts with potential partners. Personal relationships were also used to hire critical human capital - the Chief Operating Officer as a former colleague of CEO in a MSc. programme. Simultaneously, there was a policy of attending international conferences to present research results and to strengthen personal networks. International expansion was developed in close cooperation with pharmaceutical companies, getting access to new markets.

ICT

This firm develops geo-referentiation multimedia information systems, and interactive entertainment software. Created in 2000, with sales of 1 million € in the first year, the turnover grew to around 4 million €, in 2004, from customers in Portugal, Spain, Holland, United Kingdom, France, Germany, China, and Brazil. International turnover is now around 40%, compared with 10% in the first year of operation. Recently, the company increase its equity holdings, with an injection of 18 million € from venture capitalists.

The roots of ICT are based on a University research group, which, in the period 1993-1998, worked on geographical information systems. The knowledge in this field was also applied to virtual reality and environmental systems multimedia screening. Several of these projects were undertaken in cooperation with other European universities and led to papers published in scientific journals. In 1998, the present CEO of ICT had the opportunity to work in MIT as a visiting researcher and professor. During his stay, it was possible to benchmark the research undertaken by his group in Portugal with that carried out at MIT. This led him to a surprising conclusion: his group was carrying out pioneering projects at World level.

One of the leading areas was the exploration of urban spaces through mobile tools, while another was the interaction with videos. In this field, another founder of ICT, during a scholarship at MIT MediaLab, realised that he had worked in Portugal for a same project (a video for the National Geographic), and that the Portuguese group had progressed further in the interaction between the audience and the movie.

The MIT experience of these two members of the entrepreneurial team convinced them that their academic research might be translated into promising business opportunities. In 1999, when he came back from the United States, the present CEO of ICT decided to invite four colleagues to launch a new firm.

The first business contract was signed with Vodafone Portugal, through an international request for proposals. These relationships have been developed since then, especially in the field of mobile phones games. In 2003 the company develop a game for Vodafone Portugal, named Undercover. After this, the game was introduced in several countries around the World, namely Hong Kong, Spain, and Italy. Similarly, the company won a global contest, promoted by Nokia, to supply games worldwide for a new generation of mobile phones. These developments have benefited from other relevant relationships developed with two multinational companies, Siemens and Alcatel, with competence centres for mobile technology located in Portugal. In the case of Alcatel, ICT was considered a global partner, as a case study for mobile development services. This close collaboration allows the firm to test in advance novel technologies, benefiting from a first mover advantage. In this particular field, the company was considered by the French Newspaper *Liberation* one of the three best firms in the World, together with a French and a Swedish companies.

Other projects are being developed with three USA companies. Much of these contacts come from the reputation of the company, generated by scientific publications and international projects, and from referrals by other firms. A project developed in 2003/2004 for ESA, focused on the development of special garments for firemen, opened the door to collaborate with an USA company in order to extent project to other civil protection fields. In the case of virtual reality, the company is working with Hollywood producers and with some teams from basketball, hockey and American football.

Geo-refentiation systems are another important area for company. Besides Portugal, the company is present in Holland, with a strong partnership with a Dutch company. This relationship involves the development of joint projects and the selling of services and solutions as well as the exchange of employees between the companies. This connection is rooted on a relationship started when the Portuguese and the Dutch partners were playing for their respective National Tennis Teams. The relationship was reactivated as a consequence of an occasional meeting 15 years ago. Since then, contacts are made on a regular basis.

As the company benefits from referral, international exposure is strategically sought. The firm develops a web marketing strategy aiming at being present in the most prominent websites devoted to games. Additionally, international reputation is increasing, with news articles in leading newspapers in Spain and France, as well as in Business Week. The company hired a foreign marketeer, devoted to this task. International connections of this employee, particularly with people from his country around the world, are used to capitalise the international exposure of ICT.

Software 1

In 1999 the company was officially set up with the name of *Altitude*. However, it has earlier roots, dating back from 1987, when the entrepreneur launched another software company, *Easyphone*, with the support of a financial organization. CEO business experience came from working for various computer technology firms. In 1993, the Portuguese subsidiary of Alcatel invited the company to develop specific software for automating invoice collection. The entrepreneur, aware of the opportunities offered by this small but growing market segment, accepted the challenge and developed specific software for the management of call centers. Although the software was initially developed for the Portuguese subsidiary and for the Brazilian market, IBM has shown interest and latter became a customer. This was the first step in the internationalisation of the firm, which managed to attract customers in Japan and the USA. In this expansion, IBM played a decisive role, due to its presence and contacts across the world.

The election of *Easyphone*'s call center software package as "product of the year" in 1997 by the North American magazine *Computer Telephony* attracted US venture capital, and led to an investment of around 5 million Euros from Insight Capital Partner. This enabled the company founder (and the management team) to carry out a wider and more committed internationalisation strategy. *Easyphone* reputation increased considerably when Sidney Olympiads selected the company as the call center management software supplier. At the time of research, its customer portfolio included also firms like Coca-Cola and Shell.

In 1999, the company changed its name to *Altitude*, an international name which has a similar meaning in many languages. This change was accompanied by an innovation that was central to foster further international growth: the development of the concept of "Unified Customer Interaction" (UCI), which enables companies to manage all their contacts with clients using different types of support, including voice, e-mail, e-wap and the web. This package continues to be a unique product at a global level, giving the company a difficult-to-imitate advantage. *Altitude* innovation capacity has been strengthened by a high investments in R&D.

These developments led to a fast sales growth, from 1 to 36 million Euros, between in 1995 and 2001. Such growth was mostly based on foreign markets, which accounted for 82% of total turnover. By 2001, *Software 1* was operating in 44 countries, from the USA and Canada,

to Japan and Australia, mainly through the granting of software licenses. To support and enhance its international strategy, the company opened offices in several countries as a way of strengthening relationships with its clients. To coordinate the marketing strategy in the USA and Canada, a new American subsidiary was created in Milpitas, Silicon Valley. This new expansion strategy was strongly influenced by the American venture capitalists mentioned above. They believed in the US market, and the company made a strong bet there. This focused on marketing, where around 50 people were hired, and on the new segment of internet services. This strategy was put in jeopardy by the crash of Dot Com companies. Few American clients were conquered and the operational cost increased exponentially. Due to these facts, the company went into the brink of bankruptcy. An IPO in the Amsterdam Stock Exchange was prepared, but has never materialised. The company was then declared in bankruptcy. In 2002, a consortium, which included some of the former shareholders, acquired the company, with the exception of several subsidiaries abroad (USA, Germany and Asia). A new management team was hired and a focus on traditional business and more profitable markets was defined. The company returned to its core business, leaving internet services, and focusing on partners in crucial markets to sell software. After the troubled days of 2002 and 2003, the company increased its sales and entered in the Chinese market in 2004, through a former employee of the company, with strong technical competences as well as good knowledge about the Chinese market.

Software 2

The company was launched in 1998 as a spin-off from a technology transfer organization at the University of Coimbra (Instituto Pedro Nunes). It was founded by three entrepreneurs who carried out their doctoral projects at the Department of Engineering. The studies were included in European research projects. These allowed the entrepreneurs to develop international contacts within the academic community and to gain scientific legitimacy.

The company developed software (*Xception*) for the evaluation and testing of highly critical events and processes, allowing the detection of failures and the recover of data. It was the result of 10 years of research at the University of Coimbra, and filled a market niche that was still undiscovered. In the first year, sales were 50 thousand euros, but they quickly roused to 1,8 million Euros in 2001 and to 5 million in 2004. Foreign sales increased from for 25% and 70% of total turnover, between 2001 and 2004.

International recognition of entrepreneurs was spurred with the publication of an article in the prestigious American magazine *Byte*, based on the description of software to deal with critical situations. After the article, the researchers received several foreign inquires, that led to sign a contract with a Canadian company. It became clear that there was room to start up a company. Another important contact came from NASA. After a scientific conference, where founders described the potential of a specific software developed by the company through a case study applied to a Portuguese firm, they received an e-mail from NASA, showing interest in the product. After initial contacts and several tests, the company got the contract. Companies like Cisco, Siemens and Motorola also became included in the customer portfolio. The majority of the initial contacts were initiated in the context of scientific events, joining researchers and industry professionals together.

But the first customers were Portuguese companies for whom the founders had worked before. These first contracts provided the revenues required for keeping R&D investment high, and were also helpful in software testing.

The company recognizes the relevance of being present in the USA, and decided to set up a virtual office at the International Business Incubator (IBI) in San José, California, a base for technology firms with no headquarters in the USA. This office works as a link for supporting USA customers. This option was strongly influenced by a former USA colleague of the CEO at a Technology Commercialization Master.

After the relationship with NASA, *Software 2* approached the European Space Agency (ESA). Once again, weak ties were crucial to start the relationship. At the time, the company approached a well-known French company to apply into in a consortium to develop a project for ESA. For coincidence, a former PhD student at Toulouse University, who had met the founders in some scientific conferences, opened the door for the company due to his knowledge of the excellent work developed by the entrepreneurs.

One of *Software 2* priority areas of activity is the participation in R&D consortia. The company is active in various joint projects coordinated by Chalmers University, involving some of the leading information systems companies. Other partners are the Valencia, Coimbra and Friedrich-Alexander Universities. While at the beginning the company was searching for partners, now, due to its reputation, it is approached by international partners both from Universities and from industry to develop new knowledge and to solve specific problems. The relationship with ESA is a good case in point: it allowed the firm to enter in a new field, network IP software applied to the telecommunications industry. This new area of expertise was developed in collaboration with Portuguese and Foreign Universities, leading the development of a new product. A spin off was created to market the product around the World.

DISCUSSION

As mentioned above, this paper is addressed to understand how are used by high-tech born global firms, particularly which are their main functions and where they are rooted. In order to facilitate the discussion, two Tables were developed to provide a synthesis of the main findings from each case study. To enable a better identification, each tie is coded by indicating the initials of the company and the number assigned to the tie concerned. Table 1 presents the roots of relationships.

***** Table 1 Around here *****

The cases show that relationships are crucial for born globals set up and development. *Per se*, relationships cannot do anything, but all these high-tech firms were able to supply very innovative products and/or services. The number of relevant ties² is situated in a range between 5 to *Software 1* to 9 in *Biotech*. In line with the results presented by Ellis (2000) and by Harris and Wheeler (2005), non-social relationships play a decisive role, particularly in the early phases of firms' life cycles. For entrepreneurs with no previous business experience (*Biotech*, *ICT* and *Software 2*) academic networks and friendships were activated. Even in the case of *Software 1*, where the entrepreneur had prior business experience, the relationships initially used to develop the business corresponded to earlier contacts generated in former jobs; those contacts were later mobilized for internationalisation purposes. This suggests that

² There are more ties than those reported, but the analysis is limited to those mentioned by entrepreneurs as to have an international impact.

relationship sediments (Agndal and Axelsson, 2002) are activated to foster internationalisation.

In the three other cases, entrepreneurs used connections developed in the context of their specific and well known environment (former colleagues in Master and Ph.D studies) to support company creation and development. This shows how weak ties, often established long ago, may be instrumental for the emergence of born globals. The quotation below translates well entrepreneurs' views on this regard:

“... Relationships are our more valuable resource. We have no credibility in the market, so we have to make use of our networking to develop our knowledge basis and to get access to international markets and projects”.

Most of these relationships have played a crucial role in firms' birth. For instance, entrepreneur from *Biotech* noted that:

“... If I did not receive the support of B1, certainly *Biotech* would not be a reality. His support and sense of believing in the project was crucial for me.”

If a strategic use of networking was always in the mind of entrepreneurs, serendipity and chance also played an important role, confirming the suggestion of Harris and Wheeler (2005). The interviewee from *Software 2* stated that:

“... We approached a French company to join them in an international consortium for an ESA call for proposals. They did not know us, but luckily, S2b worked for them and said that we were very good in the area of critical software. Since then, several projects have been developed together and we started to work with ESA.”

As firms acquire market experience, business relationships increase, as well as planned networks, especially on what concerns agents and distributors abroad. Many of these relationships, especially business relationships, evolved from previous personal contacts, as is the case of B5, B6, ICT6, and S2a. In other cases, firms were able to create strong ties with global firms, as *ICT* reports:

“... Since the very beginning *ICT3* believed in the company and in its technologies and competencies. Since then, a very close relationship has been built up, helping us to enter the global market... In Cannes, where the most important worldwide event in mobile technology was taking place, we were introduced as *ICT5* global partners. This status was the result of a close cooperation with the Portuguese subsidiary”.

These examples show how relevant relationships developed with multinationals subsidiaries at home may be. *ICT* and *Software 1* are excellent examples of how a domestic relationship was leveraged worldwide. The entrepreneur from *Software 1* reported his experience this way:

“... Portuguese subsidiary of S1b saw our software and decided to test it in their central labs in the UK. After a successful test, they decided to sell it globally. Rapidly, we entered in more than 20 countries”.

The second objective of the paper is to investigate how relationships are used and for which purposes. The relevance of relationships in both opportunity framing and access to resources in the born global studied is presented on Table 2. A distinction is made among different types of resources, according to the functions they played (technological, financial, market and other).

***** Table 2 around here*****

Recognising that the number of ties is relevant, much more interesting is to analyse its mix and impact on firms' international operations. As suggested by Lechner *et al.* (2005), relationships are used with different intentions, to fulfil specific tasks and purposes. Additionally, different cooperative arrangements were used by all firms, from inter-company staff exchange (S26), to more formal agreements, such as agency contracts (S1e) and joint-ventures (B6).

Extant literature on international relationships pay particular attention to marketing issues (Coviello and Munro, 1995; Ellis, 2000; Ellis and Pecotich, 2001; Komulainen *et al.* 2004; Sharma and Blomstermo, 2003), especially on how they re used to initiate and promote international expansion. In this study, however, we are also interested in other phases of entrepreneurial process, namely opportunity framing.

Taking into account the above mentioned literature, it was not surprisingly to find relationships to play a relevant role in the opportunity framing by born globals. In all four firms, social networks were used to assess the feasibility and potential of the new business opportunities identified. In some instances, such networks were even instrumental in defining more specific business concept. Examples were found in the cases of *Software 1* (S1a), *Biotech* (B1, B2, and B3), *ICT* (ICT1; ICT2), and *Software 2* (S2a, S2b). The following quotations illustrate the perception of the entrepreneurs interviewed:

“... After publishing the article in Byte’s magazine, we receive some mails from international firms showing their interest in the acquisition of the software, innovative in a worldwide basis. We went to Canada, sold the software, became shareholders of the Canadian company and decided to set up a firm.” (*Software 2*).

“... When I have been in MIT, I realised that our research group, in Portugal, was conducting world-class research, Moreover, if in the USA academics became successful entrepreneurs, why should not we try? After returning to Portugal, I decided to set up a firm” (ICT).

Social relationships were very relevant in enabling the access to, and development of, specific technological knowledge. Through the involvement in international R&D projects, entrepreneurial teams were able to set up a constellation of international partners. These networks encompass partners with different capabilities and focus, ranging from Universities and research centres, to SME and multinationals, providing distinct strategic antennas that may be mobilised by born globals. The role of such networks was particularly relevant in the cases of *Biotech* (B5 and B6) and *ICT* (ICT3) in initial phases. It was also found in *Software 2*, where S2e opened new research avenues, facilitating the development of new software for Telecommunication’s industry.

The most common function of relationships is associated with the development of international sales, confirming the suggestions by Harris and Wheeler (2005). In the cases studied, the lack of experiential knowledge about foreign markets was overcome through the mobilisation of such relationships. This procedure was especially relevant in the case of *ICT* (ICT3, ICT4) and *Software 1* (S1a, and S1b). The S1b tie enabled the activation of worldwide

network of subsidiaries to speed out international sales of Software 1. The ICT3 tie, developed in the Portuguese context, was latter leveraged to international markets. It seems, as proposed by Harris and Wheeler (2005) that the access to knowledge about international markets was not a priority. Firms realise that relevant investment should be strongly addressed to the focal relationship, particularly in the case of multinationals. Through this commitment, international sales are achieved and new contacts abroad are collected. In several cases (B7, ICT8, S1b, and S1d) born globals, due to their lack of managerial and financial resources, are 'replaced' by their partners in international markets. The links thus forged may even drive the path of international expansion. It may be argued that born globals exhibit strong dedication to strategic partners and show a strong commitment to such relationships more than to foreign markets. This finding is convergent with the arguments developed by Johanson and Vahlne (2006)

A more intangible outcome may also emerge in some relationships – credibility or legitimisation. For entrepreneurs with no business experience, in high-tech industries, scientific credibility is one of the most valuable resource. The involvement (and leadership) of international research projects as well as publications in leading scientific journals act as referrals for market players. In the cases of *ICT*, *Biotech*, and *Software 1*, the international recognition of scientific excellence, open the door for new international projects. Besides scientific reputation, specific links with prestigious organisations and firms were critical to overcome the liability of newness. The CEO of *Software 2* put it this way:

“... When we show our portfolio of clients and our potential customers read NASA, initial resistance is broken and all the doubts regarding our technological competences disappear.”

For other born globals, partnerships with multinationals (as B7, ICT3, ICT4, ICT5, S1a; S1b) provide the necessary reputation to compete abroad, overcoming born globals' lack of credibility and experience in international markets. ICT has been very pro-active concerning this issue. The international network of one of its employees (ICT7) was carefully used to increase international exposure of the firm in strategic points, such as international websites devoted to games, business magazines and national leading newspapers in several countries.

The examples studied in present paper show how relationships may be used to start and speed up high-tech born globals expansion. More important than the sheer number of relationships, the analyses of their main functions enable us to enrich the knowledge on how they can be mobilised and used. Based on the analysis of functions carried out above, four main roles of social and business relationships are identified: ***opportunity framing; technological resource development; market facilitation; and credibility provision.***

Opportunity framing relationships support firms in two main ways. First, they may push the firms towards the development of new opportunities and provide novel knowledge to better define product and/or service concept. Second, they may be used to assess the feasibility and desirability of opportunities on a global basis. Firms receive valuable feedback that will guide them in pursuing a specific business path. High-tech born globals competing in innovative and volatile industries face strong resource constraints. To overcome this problem, they draw on relationships namely on R&D projects that enable *technological resource development* and provide bridges to the mobilization of complementary knowledge resources. Relationships may also be used for *market facilitation*, insofar they enhance international

sales and enable the access to³ knowledge about international customers about international markets in general. Finally, relationships are essential for *credibility provision*. In fact, they supply one of the most valuable, and at the same time difficult to reach, resource – reputation. This intangible asset facilitates the access to new markets as well to new relevant players (suppliers, complementers or customers), otherwise impossible to achieve due to their liability of newness.

The cases have shown how relationships promote internationalisation. However, one should be aware of their dark side. In fact, problems may arise from such networks, delaying international expansion or, in extreme cases, leading to desinternationalisation. In the case of *Biotech*, a first agreement with one financial partner, more interested in short term profitability (difficult to reach in biotechnology when firms are trying to apply for patents), delayed the research effort, with detrimental consequences in the firm's international expansion. The influence of venture capitalists in *Software 1* was also found to be negative, since it led to a concentration of marketing efforts in the USA and made the company more vulnerable to the consequences of the Dot Com crash.

CONCLUSIONS

Research on born globals and on small firms' internationalisation has acknowledged that relationships are important to overcome the resource constraints faced by these firms in the early phases of their international expansion. However, insufficient attention has been paid to the analysis of the specific roles played by such relationships. The present paper has been addressed to contribute to fill the knowledge gap in this regard, by exploring the roots of those relationships and the roles they play in furthering high-tech born globals internationalisation.

The four case studies of high tech born globals undertaken confirm that social relationships arise as a distinguished feature in all phases of the entrepreneurial process and are very relevant to enable born globals international expansion. More important than the number of ties used by the firms concerned is the specific relational mix achieved, allowing the mobilisation of such ties for different purposes in their entrepreneurial process. In fact, the relationships enable born global firms to overcome their shortage of managerial, technological, marketing and financial resources. Those ties facilitate the access to information and the sharing of knowledge relevant for the identification of opportunities as well for the assessment of their desirability and feasibility on an international basis, namely through valuable feedback from trustful ties. Moreover, relationships enable the development of new knowledge, the access to complementary resources and the strengthening of technological competences. The access to international markets and new contacts abroad constitute the third relevant role of relationships to enhance the international expansion of born globals. Last but not least, some partners may provide 'golden' business cards, facilitating the access to new partners and new markets. The analysis of the roles played by social and business relationships led to categorise them in four groups: opportunity framing; technological resource development; market facilitation; and credibility provision.

³ As mentioned above the firms studied use their relationships for accessing the relevant knowledge held by their partners, and not so much to internalise, as Hamel (1991) has suggested, such knowledge.

A significant diversity is also present on what regards the roots of relationships. Embryonic stages are strongly supported by non-business relationships, particularly personal ties developed in academic settings or through the involvement in international projects. As born globals international marketing experience increases, business social relationships become more important. The relationships established with multinational firms subsidiaries located in the born global 'home' country were found to lead, in some cases, to strong ties, facilitating international sales, new technological development as well as international credibility. The mix of business social, non-business social and planned relationships contributes to enhance firms' adaptability, insofar as ties with different roots and characteristics can be activated in different occasions. Furthermore, the research undertaken has also shown that the same partner can play various roles both simultaneously and in different time periods.

The study has two main limitations. First, only high-tech firms were studied. Further analysis should be undertaken in other industries. Second, the analysis was purposefully concentrated on born globals. It does not address the comparison of the roles played by social relationships in different types of firms. For instance, are there strong differences between born globals and slowly internationalising firms or domestic ventures? This issue deserves closer attention as Mathews and Zander (2007) have recently pointed out.

The exploratory study undertaken shows how some relationships can evolve, with different outcomes, more or less successfully. But there is a need to go further, to address other issues, such as the evolution of relationships strength and roles along born globals life cycles. Another area deserving additional research is the impact of networks on performance. As two of the cases studied have shown, relationships have also some shortcomings, delaying the process or pushing the firm into failed bets. How can firms develop relational management competences to deal with this problem and to overcome the difficulties in the process?

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Table 1 – High-Tech Born Globals’ Relationships

		Basis of the relationship	Roots of relationship
Biotech	B1	Former colleague of CEO in his PhD. Strong scientific knowledge and experience in international projects	Non-business social
	B2	Professionals of the industry in Portugal	Non-business social
	B3	Pharmaceutical companies in Portugal	Planned network
	B4	Universities in Portugal with scientific knowledge	Non-Business social
	B5	Universities and research laboratories in Europe and USA where the CEO has worked for during his PhD	Business social
	B6	SME in USA and Holland known while the CEO was developing his PhD.	Non-business social
	B7	Pharmaceutical multinationals – marketing channel for the market	Planned network
	B8	Former colleague of CEO at an M. Sc. Program with scientific knowledge	Non-Business social
	B9	Venture capital	Business social
ICT	ICT 1	Scientific relationships of founders	Non-business social
	ICT 2	MediaLab (MIT) – sharing of scientific knowledge	Non-business social
	ICT 3	Vodafone – mobile service provider	Planned network
	ICT 4	Nokia – mobile phone supplier	Planned network
	ICT 5	Alcatel and Siemens - mobile phone supplier	Planned network
	ICT 6	Dutch SME – former colleague of CEO in Tennis National Teams	Non-business social
	ICT 7	International journalists known by an employee of the company	Business social
	ICT8	American multinationals in entertainment area	Business social
Software 1	S1 a	Alcatel	Business social
	S1 b	IBM	Business social
	S1 c	American journalist	Business social
	S1 d	Venture capitalists	Business social
	S1 e	Agents recruited in international trade fairs	Planned network
Software 2	S2 a	Scientific relationships of founders	Non-business social
	S2 b	Canadian company	Business social
	S2 c	NASA	Business social
	S2 d	Employee from a French company who have met the founders in scientific meetings	Non-business social
	S2 e	ESA	Business social
	S2 f	Former colleague of CEO at an M. Sc. programme	Non-business social

Table 2 – Main Functions of relevant relationships in high-tech born globals

			Resources			
Opportunity			Technological/Production	Financial	Marketing	Other
Biotech	B1	Assessing feasibility and their framing	Scientific knowledge		---	---
	B2	Assessing feasibility	---		New market contacts	---
	B3	Assessing feasibility	---		First sales	---
	B4	---	Technological platform and scientific knowledge		---	---
	B5	---	Scientific knowledge, new technological resources		New market contacts; knowledge of other markets	Scientific credibility
	B6	---	Scientific knowledge, new technological resources		Market knowledge	Credibility
	B7	---	---		International sales; new market contacts	Credibility
	B8	---	Scientific knowledge; organization of the operation within the firm		---	---
	B9	---		Injection of Capital	---	---
ICT	ICT1	Assessing ideas; framing the opportunity	Technological competences		New market contacts	Credibility
	ICT2	Assessing feasibility of opportunity	---		New market contacts	Credibility
	ICT3	Assessing the feasibility of new opportunities	Technological resources		International sales; new contacts; knowledge of other markets	Credibility
	ICT4	---	---		International sales	---
	ICT5	---	Technological solutions		New market contacts	Credibility
	ICT6	---	New knowledge		International sales	Credibility
					New market contacts	---
					Knowledge of Dutch market; New contacts	---
	ICT7	---	---		International sales; new contacts	Credibility
Software 1			Technological knowledge			Credibility
	ICT9			Injection of Capital		
Software 1	S1 a	Pushing the development of opportunity; Assessing the feasibility of opportunity	---		International sales; new contacts	Credibility
		---			International sales; new contacts	---
	S1 b	---	---		---	Credibility

	S1 c		---		New contacts	Increase visibility of the company
	S1 d	---	---		International sales; new contacts; knowledge about the markets	---
	S1 e		---			---
Software 2	S2 a	Development of ideas; feasibility of opportunity	New technological knowledge	---		Credibility
	S2 b	Feasibility of opportunity	---		Sales	---
	S2 c	---	Development of new technological competences		Sales; knowledge of Aérospatiale industry; Access to new partners	Credibility
	S2 d	---	Development of new technologies and new knowledge		Access to new partners	---
	S2 e	---	---		Sales; knowledge of Aérospatiale industry	Credibility
					Access to new partners	
	S2 f	---			Access to new market	---