
Innovation management of internationalised IT companies in Brazil and Portugal

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Abstract: Internationalised companies in innovative industry need to create means to innovate no matter the country they are from, because globe is the competitive arena for all. Thus, internationalised IT companies from both developing and developed economies must carry out similar innovation management. However, studies comparing countries in different stages of development are scarce. Through an exploratory approach, this study compares the process of innovation management of four international IT companies from an emergent economy (Brazil) and a small-developed economy (Portugal). The results suggest some differences: Brazilian firms present a more undeveloped way to manage both intellectual property and their internal structures of R&D, while Portuguese companies implies higher investment in R&D and a faster and earlier process of internationalisation. Thus, this study contributes to a reflection on the traditional innovation model through the perspective of country of origin and of the impact of companies' internationalisation on their innovation process.

Keywords: innovation; internationalisation; IT industry; case study; Brazil; Portugal; R&D structure; international companies; innovative firms; R&D management; intellectual property; international partnership.

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1 Introduction

Innovation is considered an important tool for organisations (Tidd et al., 2005). Consequently, scholars and practitioners have studied how innovation may be managed. Hansen and Birkinshaw (2007) define innovation management as the process of transforming ideas into commercial outputs as an integrated flow by active and conscious organisation. Even well-researched topics, comparative studies in developing and developed countries are so far under explored. Thus, this paper focused on the perspective of two economies in different stages of development. For this, we have considered two premises

- 1 companies from both types of economies are becoming more internationalised (UNCTAD, 2010)
- 2 innovation and differentiation is related to a competitive entrance of companies in foreign markets (Cassiman and Golovko, 2011; Kafourous et al., 2008).

Thus, we suppose that internationalised companies in innovative industry (such as ICT) need to create means to innovate no matter what environment they are from. However, the context of internationalisation and the home country lead multinational companies to follow particular paths of international expansion (Ramamurti, 2012), so it is worth to compare companies from countries in different stages of development (Cuervo-Cazurra, 2012). Usually, companies from developing countries have poorer environment at home to innovate, thus they try to obtain knowledge and innovation from abroad (Doz et al., 2001; Niosi and Queenton, 2010), in spite of huge challenges in knowledge sharing (Lepik and Krigul, 2014).

The entrepreneur profile and the international network are determinant for this strategy and also for the growing process of companies. Improving entrepreneurial mindset in human capital is becoming one of the most important challenges to raising innovation (Secundo et al., 2015). This discussion contributes to a recently studied issue: the importance of international network of entrepreneurs and intra-entrepreneurs (ex: Whelan, 2011). Part of companies that internationalise early is identified as born global (Oviatt and McDougall, 1994; Knight and Cavusgil, 1996) and as so, they capture value from external environment, affecting their capacity of operation, innovation and performance (Efrat and Shoham, 2011). Thus, we deduce that internationalised and innovative IT companies from both developing and developed economies carry out similar innovation management. Consequently, this paper aims to explore the following questions:

- 1 How Brazilian and Portuguese internationalised IT companies manage innovation process?
- 2 What are similarities and differences in innovation process between studied companies?

At the end, the paper proposes some propositions and research clues to further studies in this field. So, this research allows the comparison of innovation management IT in two countries in different stages of development and provides some clues about companies' internationalisation and their innovation process.

2 Innovation management

The process of innovation management depends on the perspectives of innovation. The definition of innovation varies across sub-fields of innovation research, but its importance prevails (Cooper, 2005). Considering innovation as a process, Tidd et al. (2005) proposed, firstly, a conceptual model of innovation process used here (Figure 1) and then improved by Tidd and Bessant (2009). Depending of the companies' innovation strategy the effort inside each phase is different:

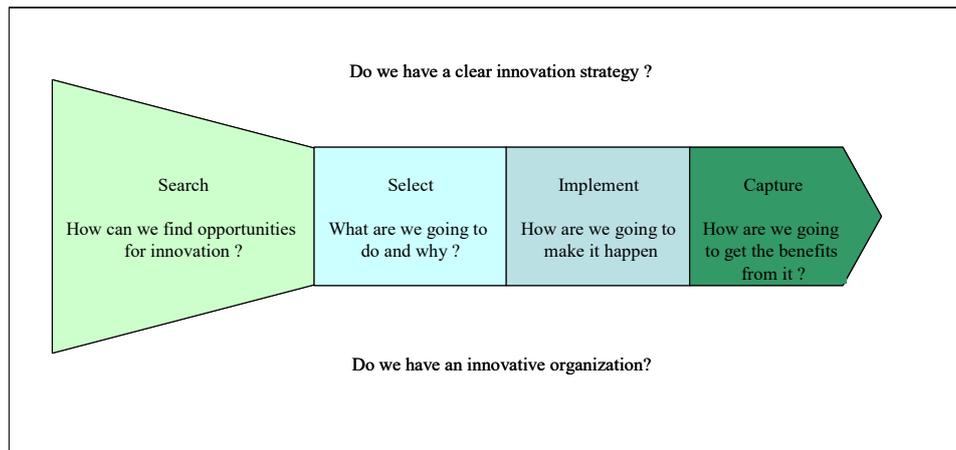
- Search: Scanning the environment for processing relevant signals about, threats and opportunities for change. These can take different forms, sometimes integrated (new technologies, new market requirements, changes in legislation, etc.). Once these factors are diverse and not always obvious, it is crucial to implement mechanisms to identify, select and process information (often just 'signs') on these drivers of innovation. The main limitation of this is that the search information tends to be

more effective but also more limited as the time and experience increased, and may represent a barrier to more radical forms of innovation.

- **Select:** Refers to an effective selection of the various opportunities that may arise, taking into account their potential and strategic alignment with the company and its capabilities and skills (which does not mean it can not mobilise external expertise in a specific innovation project). The objective of this phase is to resolve these conflicts and determine which projects should move to the next stages of the process.
- **Implement:** Converting the potential idea into something new for internal or external market (enabling innovation). The purpose of the implementation phase is to concretise the opportunities previously identified. The implementation phase is a process that tends to be iterative and gradual. In the early stages, the uncertainty is large at all levels. As the process develops, initial problems will be solved and uncertainties are being increasingly smaller. The end of this process will allow the innovation (internally in the case of a new type of business, or externally, on the market, in the case of a new product or service).
- **Capture value from innovation:** This phase refers to the learning process that allows doing better next time. The innovation process always involves an important component of learning, whether the innovation is successful or its implementation will eventually fail. Moreover, the process that leads to innovation allows creating a competitive advantage to develop incremental innovations later. It opens a path that can last for years and generate new products, processes or services based on an early version.

Based on these phases, this research proposes an interview guide (Appendix) to capture information indispensable to answer the research questions. For that, we considered four dimensions of innovation (Oslo Manual, OECD, 2005): product, process, marketing and organisational.

Figure 1 Model of innovation process (see online version for colours)



Source: Based on Tidd and Bessant (2009)

3 Innovation and internationalisation

In general, mainly in developed countries, the most productive firms are internationally active (Bernard et al., 2010), and in fact studies suggest that internationally active firms are large and productive and, when small, they are innovative before going international (Boermans and Roelfsema, 2015). Nevertheless, several authors confirm the relationship between internationalisation and innovation. There are evidences that innovation occurs in anticipation of internationalisation (Aw et al., 2008; Kafouros et al., 2008; Melitz and Costantini, 2008), that internationalisation affects innovation (Filippetti et al., 2012; Bratti and Felice, 2012), and that exists reciprocal causal relationship between internationalisation and innovation (Filipescu et al., 2013; Golovko and Valentini, 2011).

In emerging countries, although still scarce (Shehata, 2010), it has growing up literature about these topics and studies argued that internationalisation not only increases firm performance but also spurs innovation itself (De Loecker, 2007; Wagner, 2007; Hagemeyer and Kolasa, 2011). The diversity of organisational contexts is a source of creativity and considered a critical success factor for innovation projects (Chatenier et al., 2010; Lee and Nathan, 2010). Thus, companies operating internationally have greater capabilities to increase competitiveness as they can prospect, obtain and operate technologies and knowledge from abroad. These are premises of metanational model (Doz et al., 2001).

According to this model, the metanational company is defined by three core capabilities:

- 1 to identify and capture new knowledge emerging anywhere in the world
- 2 to mobilise globally dispersed knowledge to innovate more than competitors
- 3 to transform this innovation into added value through production, marketing and efficient distribution on a global scale.

It is particularly important for companies that need for knowledge because it can hardly be found in their home countries (Santos et al., 2004). These are mainly emerging economies' characteristics.

In a micro level, international innovation depend, in part, on the process of innovation management by the firms. Usually, companies operationalise international innovation through their own R&D foreign subsidiaries or through R&D partnerships. What companies learn from their different partners can be shared and combined to increase innovation (Cui and O'Connor, 2012). Companies internationalise their structure of R&D for mainly both (Florida, 1997): adapting products to meet market demands (market factors) or in searching of knowledge abroad (technology factors).

According to Ester et al. (2010), the pioneers of R&D internationalisation were high-tech companies operating in small markets with few R&D resources in their home country. The internal structure for R&D (input indicator) and the appropriation of intellectual property (IP) (output indicator) could be connected with the absorptive capacity, and the country environment could influence this concept (Garner and Ternouth, 2011). Cohen and Levinthal (1989, 1990) introduced the concept of absorptive capacity to label firm's capabilities to innovate, and thus to be dynamic. They assumed three components of absorptive capacity and defined it as the ability to identify, assimilate, and apply knowledge from external sources (Cohen and Levinthal, 1990) for

commercial purposes. Internationalisation increases competition, allowing local businesses to absorb technological novelties and effective processes from foreign firms, thus raises their productivity (Rugman and Verbeke, 2003). Although innovation is used and internalised at the firm level, firms exist as part of 'systems' (Narula and Kodiyat, 2014). Firms are surrounded of historical, social and economic ties with other actors in their home country (Narula, 2003). The external environment engages broader factors that outline the behaviour of firms: the social and cultural context; the institutional and organisational framework; physical infrastructure; and innovation systems which create and distribute scientific knowledge (Verbeke, 2009).

However, capacity to absorb essentially depends on technological abilities (Hamida and Gugler, 2009) but varies with the industry, in which receptor firms operate. Patents is a determinant of absorptive capacity (Coombs and Bierly, 2006) particularly technology licenses (Atuahene-Gima, 1992).

In a country-level analysis, R&D expenditures favour the absorption of technological knowledge from foreign direct investment (FDI) (Bodman and Le, 2013). The environment, social and political context of the country could influence the absorptive capacity. Blonigen and Wang (2005) suggest that schooling is a significant absorptive capacity factor in the case of developing countries. Nevertheless, schooling is found to be insignificant as an absorptive capacity factor in the case of developed countries. Hanushek and Kimko (2000) suggest using international test scores as proxies for cognitive ability, revealing education quality. They apply their constructed variable to examine its influence on economic growth, and attain that the "labor-force quality has a consistent, stable and strong relationship with economic growth". Later on, Hanushek and Woessmann (2008) confirm this conclusion through a more extensive study.

Institutional quality has been also examined as an absorptive capacity factor in studies that were examining the impact of financial openness in general (Bekaert et al., 2010), and established that institutional quality as a mediating factor.

Several studies focus other potential absorptive capacity factors associated with internationalisation and FDI influenced by the environment of the country. Hermes and Lensink (2003) and Omran and Bolbol (2003) explore the impact of financial development on the relationship between FDI and economic growth, whereas Kinoshita and Lu (2006) investigate the role of infrastructure in capacity. These researches allowed to relate country's environment with absorptive appropriation, and established a bridge between internationalisation and innovation literature.

Emerging economies have a propensity to have a comparative advantage in industries that rely on low cost inputs (including labour) and economies of scale. According to Narula and Kodiyat (2014), firms from emerging economy developed R&D in different patterns of firms from other nationalities. Habitually, they identify locations proxy with university or public institutions, or benefit from spillovers effects of other firms in the same industry.

Concerning IT companies, internationalisation and innovation are closely related. In fact, IT industry is very innovative and one of the biggest investors in R&D. In terms of R&D expenditures, patents, and venture capital investment, it exceeds other industries (OECD, 2009; EC, 2014). Besides, products, companies, and even services are widely globalised on this industry. Expenditure on software R&D has risen most rapidly of all parts of the information and communication technologies (ICT) sector (OECD, 2009). The reason for that is probably that software development is the most important piece to make ICT innovative products. According to Frascati Manual (OECD, 2002), identifying

R&D component in the process of software development is difficult once “software development is an integral part of many projects which in themselves have no element of R&D. The software development component of such projects, however, may be classified as R&D if it leads to an advance in the area of computer software” [OECD, (2002), p.46].

4 Methodology

This exploratory study adopted an iterative process of data collection in conducting four case studies built on the results of a semi-structured interviews (Appendix) applied to key-informers in Portuguese and Brazilian IT companies – Altitude, Ydreams, Navita and Stefanini. The selected cases attended to some key factors: consistent internationalisation; dimension of domestic market and localisation in urban regions. The four interviews were applied to key-informers (founders and/or main executives of international or innovation sectors) face-to-face or using Skype or similar applications in 2012. The study aims to suggest hypotheses/propositions for more systematic investigation [Platt, (1992), p.28]. This methodology is applied to study internationalisation process (Johanson and Wiedersheim-Paul, 1975) and prior research suggests that a multi-level framework can expand our understanding of firm internationalisation and innovation (Andersson, 2000; Terjesen and Elam, 2009). Besides semi-structured interviews, analyses count with documental data in companies’ websites, journals and other documents (updated in 2015).

5 Results: comparative studies in Brazil and Portugal

5.1 Brazilian companies

5.1.1 Navita

Navita is specialised in solutions for mobility and telecommunication; however, the most important product (and service) of the company is a solution for enterprise mobility management, which includes a range of activities for mobile device control. They comprise applications such as: management of contents available on each device according to level of managers; control of use (ex: data access ability or disability in roaming, etc.); contents management when lost or stolen device; managing the relationship between Navita’s clients and telephony operators; maintenance of mobile devices. Navita also provides mobile enterprise applications for mobilising of regular information systems for its clients.

Navita is a company with just over 100 employees, based in Brazil (three sites in different Brazilian states) that supports clients all over Latin America. The company, founded in 2003, has worked with different products, services and business models since its beginning. One of the Navita’s founders stated: “the company only survived due to the persistence of both founders, who felt restless until find a competitive opportunity to perform”.

In 2009, Navita finally began to operate in its current business, and it has started to internationalise in 2010, motivated by meeting demand of Brazilian multinational companies (clients), which needed support for management of mobile devices in its

foreign subsidiaries. Somehow, this new business (and so the company) may be considered a ‘born global’, once it took less than a year to be internationalised. However, less than 2% of revenue comes from overseas. Related to innovation, the company has no formal R&D division. Clients’ necessities are the most important motivators for product innovation. The ‘ideas’ of new products, prospected on the clients, goes to the board of company that evaluates their strategic fit and market potential (possibility of extending to other customers). Once approved, an innovation project counts on multidisciplinary team in order to find technical and financial feasibility.

Navita is a service company whose distinction is a network of partners with globally mutual dependence. For example, Navita’s mobility management system leads mobile operators to create a market differential in terms of aggregated services for their business customers, on the other hand Navita has wider market by accessing operators’ clients. Navita’s network includes business telephony operators (ex. Telefónica, TIM, Nextel), device manufacturers (ex. Apple, Nokia, Samsung), local technical assistance (ex: Insomnia Sensebyte Argentina, Rhiscom Chile, Actin México). Table 1 shows company’s innovation process according to Tidd and Bessant (2009) model.

Table 1 Navita’s innovation process

<i>Phases</i>		<i>Results</i>
Search	Internal sources	Company does not have formal R&D department.
	External sources	Clients are the most important source of new ideas used to solve existing problems identified by them. The company has strong international networks and captures ideas from their partners and clients.
Select	Evaluate ideas	Evaluation of ideas considers company’s strategy and market trends A multi skill team, whose employees contribute to different ongoing projects, transforms ideas into projects (and later into services or products)
Implement	Four dimensions innovations	Company mainly has organisational and marketing innovation by developing new ways to attend client (new business model). It used its experience in Brazil to act abroad; all the accumulated learning that company has performing in a huge and diverse country like Brazil (with 27 states with different law and taxation) is used to meet client’s necessities in other countries.
Capture	Strategies for internationalisation and the importance of innovation	Company internationalised by following clients’ demands abroad. Characteristics of the main company’s product/service (enterprise mobility management) are essentially global.

5.1.2 *Stefanini IT solutions*

Stefanini was established in 1987 and has become a major international technology company (about 16 thousand employees) that offers products and services such as: consulting services (divided in vertical sectors or industries), software development and integration, Business Process Outsourcing – BPO. Company is not focused on development of innovative products, instead its differential, when compared to its competitors, is rapidity on software development and service provision for clients. This is

a vantage mainly developed due its capacity of process innovation and a proprietary tool for controlling routine’s library. This tool was developed by Stefanini in order to control use of algorithms already developed by its programmers and software analysts around the world.

Stefanini is one of the most internationalised Brazilian companies with subsidiaries located in the USA, Europe and Asia. Its first FDI was in 1996, in Argentina. This was the first step of a gradual intensification of internationalisation, very similar to Uppsala Model (Johanson and Vahlne, 1977). The following stages included subsidiaries in other countries in America (including the USA) until 2001, Europe by 2003, and finally Asia in 2006. In 2015, it has operational units in 35 countries and software factory in eight countries besides Brazil: USA, Mexico, Colombia, Peru, Argentina, Romania and India. Stefanini’s innovation process is in Table 2.

Table 2 Stefanini’s innovation process

<i>Phases</i>		<i>Results</i>
Search	Internal sources	Only recently (since 2013) company launched an R&D department through the acquisition of a technology company. For more than 25 years, it held no formal R&D activities, but a software development department (called software factory), which is responsible not only for traditional software development but also for product’s incremental innovativeness. New ideas come mainly from specific consulting areas (directly evolved to client’s needs). There is an internal system to stimulate (and help) employees to transform new ideas into improved product.
	External sources	It has grown acquisition of companies (mainly startups) with technological solution for product innovation. Contact with clients is a very important source of innovation.
Select	Evaluate ideas	Ideas are evaluated considering if they are aligned with company’s strategy and if the product/service may be replicated in other clients. Market necessity is also an important filter.
Implement	Four dimensions of innovation	Technological innovation is for process, once companies’ products are traditional and incremental innovation depends on few innovative developments. Copyright is used as intellectual property, but this is not essential for company.
Capture	Strategies for internationalisation and importance of innovation	Internationalisation was motivated by market expansion of traditional products in the 1990s; global competitiveness (specially with Indian companies) led Stefanini to search differential in process

5.2 Portuguese companies

5.2.1 Altitude software

Altitude is an IT Portuguese company founded in 1993 as Easyphone that provides a Unified Customer Interaction (UCI) suite over IP manages, measures, and improves relationships with customers from small to large organisations worldwide. Altitude Software is also recognised for its leadership in the contact centre outsourcing market. Nowadays Altitude Software has 300 employees, offices in 16 countries and 1,100 live

installations worldwide in about 80 countries. In the terms of sales and distribution, Altitude serves its customers either directly or through a wide network of partners. Altitude Software Partner Network (ASPN) has more than 160 members promoting Contact Centre solutions using Altitude's products and services. Altitude has partnered with companies like Siemens, NextiraOne and other local and global Systems Integrators like British Telecom Global Services, Atos Origin, Mantis Informatics, Mellon Technologies, Fujitsu Services and many other companies spread all over the world committed to offer superior Customer Interaction Solutions. The company also has about 1100 live installations worldwide in about 80 countries. Additionally, as a truly global and multicultural organisation, altitude combines various languages from 25 nationalities. See altitude's innovation process in Table 3.

Table 3 Altitude's innovation process

<i>Phases</i>		<i>Results</i>
Search	Internal sources	Company has R&D department, with a significant relative budget. Also have complementary methodologies to generate new ideas and stimulate creativity.
	External sources	Altitude has international networks and captures ideas from their partners, clients, suppliers, universities and research institutes and other international networks. Also, the competitors can be an important source of new ideas. However, clients are the most important stakeholder and company frequently follows clients in their internationalisation process. It mostly generates new ideas to solve existing problems identified by clients.
Select	Evaluate ideas	Company evaluates the ideas considering market trends and competitors. They also evaluate the possibility of products replication and consequently the standardisation for different markets with small adjustments.
Implement	Four dimensions of innovation	Altitude mainly develops product innovation. The innovation is protected though copyrights because investment in patents are hard and bureaucratic. Company points a gap between the patent process, which is too long, and the product life-cycle that is too short.
Capture	Strategies for internationalisation and the importance of innovation	It is possible to identify several internationalisation strategies depending on company's lifecycle. Sometimes it prefers, in a first stage, expand to large markets with fast financial returns. Others it identifies markets according to technological partnerships, and others it follows clients. Some Asian countries are important markets.

5.2.2 *YDreams*

YDreams is a global company, founded in 2000 with a strong linkage with university (the founder is professor and researcher) that is redefining its interactivity concept with a particular focus on the field of natural user interfaces and augmented reality.

Combining technology, art and design, the company conceives full-scale interactive environments and experiences, and innovative products that are transforming the way we interact with information and contents. The year 2004 marks the internationalisation phase of the company with the opening of an office in Barcelona, and in 2007 opening another office in Austin, Texas.

The company has 120 employee and offices in Lisbon, Barcelona, Austin, Rio de Janeiro and São Paulo, and developed over 500 projects for clients around the world, such as Adidas, Vodafone, Nokia, TMN, Barclays, Coca-Cola, Santander, BBC, JCDecaux, IDEO, among others, and partnerships with Microsoft, Siemens, Geodan, Grupo Portucel Soporcel, Sonae Indústria and Corticeira Amorim. Table 4 presents YDreams innovation process.

Table 4 YDream’s innovation process

<i>Phases</i>		<i>Results</i>
Search	Internal sources	Company has R&D department and develops its own proprietary interaction technologies with a focus on natural user interfaces, in the field of augmented reality, computer graphics, mobile computing and robotics, in-house.
	External sources	YDreams has international networks and develops some products in partnership. The company’s proprietary technologies and ongoing R&D are also the launch pad for three unique spin out companies – Ynvisible, YVision and YDRobotics, and Audience Entertainment, a joint venture with a North-American partner.
Select	Evaluate ideas	Company evaluates the ideas considering market trends and competitors.
Implement	Four dimensions of innovation	YDreams mainly develops product innovation. The innovation is protected through legal mechanisms (copyright, patents) but also with secrecy agreements implied by labour contracts.
Capture	Strategies for internationalisation and the importance of innovation	YDreams identifies markets according to technological

5.3 *Brazilian and Portuguese IT companies – comparative analysis*

We studied two different Brazilian companies successfully internationalised. Stefanini is a huge multinational with traditional products (software) and innovative process for software factoring, which ensured its global competitiveness. Navita is a small company with an innovative idea transformed into its main product and service that depends much more of organisational innovation (with real network) than of technological innovation. Both companies have in common an inability for R&D management (Navita does not have formal R&D department and Stefanini started to carry out internal R&D only

recently) and do not consider technological innovation important to compete globally. From 2013 on, Stefanini started to organise its internal expertise for activities of R&D firstly in Brazil and in 2015 inaugurated a foreign centre in Singapore).

Although technological innovation is not a motivational force for internationalisation, both companies have improved its products by global agreements. Navita is very dependent not only on commercial network but also on technological partners to change and adapt its products and services abroad. Stefanini realised recently the acquisition of some innovative companies (in Brazil and abroad, mainly the USA and Singapore) that was important to find solutions that will fit properly their products improvements. This seems to be the company's initial steps toward internal innovation.

The analysis of the results reveals some similarities for both Portuguese companies. In fact, it was possible to understand that the opportunities and threats faced by Altitude Software and Ydreams are comparable and the strategic options undertaken during each stage of innovation process (search, select, implement and capture) are similar. Both of Portuguese firms invest in R&D, establish international partnerships with others firms or clients and decide to internationalise early. It corroborates with Fernández-Jardón et al. (2014), which affirm that product innovation management and strategy affect innovation performance in Portuguese firms.

The comparison between Brazilian and Portuguese IT companies allows us to identify some similarities and some differences considering the theoretical support of this study (Tidd and Bessant, 2009).

Concerning the stage of development of the Portuguese companies, both faced a period of expansion stage, however due to international crisis of 2009, particularly Ydreams faced some difficulties related to its fast growing process. On the other hand, despite a latest internal (economical and political) crisis in Brazil (started in 2015), the Brazilian studied companies are in an expansion stage of development. The market opportunities that Brazilian companies faced in a recent wealthy period (since 2009), both nationally and internationally, led them to take higher risks not only in terms of international expansion but also of innovation investments.

Table 5 presents similarities and differences in order to answer the second question of this paper (what are similarities and differences in innovation process between IT companies?). It also shows some propositions derived from cases' research and in order to consolidate the results, it presents some references that identify comparable results.

The results show more similarities between companies in the 'Search' phase of innovation model (Tidd and Bessant, 2009). Both Brazilian and Portuguese studied companies internationalise in search of a marketing expansion, but they do not have interest in looking for technological innovation (proposition P1). When it happens, this is not a planned action and this is in accordance with what observed in other Brazilian multinational companies (Galina and Moura, 2013). This illustrates that product development carried out abroad by studied companies are market-oriented, according to Florida (1997). In all studied companies, agreements with clients appear as the most important form of product differentiations (P2), corroborating Whelan (2011), which highlights the importance of networks for internationalisation of companies. Most of these partnerships appear as a way of product improvement, not as a technology innovation investment. Thus, market trends influence innovation strategy. Once again, it is highlighted the relevance of market (and not technology) to establish innovation through internationalisation. This shows that companies do not plan to increase their technology base by sensing and mobilising knowledge from abroad, as should one expect

(cf., Doz et al., 2001), considering that studied firms are not located in countries with developed competencies for IT innovation.

These both propositions refer to external sources in the 'search' stage, however, when we observe the internal sources, we see an important difference (P4). Although emerging economies are catching up to rich economies, Portugal presents better indicators of innovation when compared to Brazil (Dutta et al., 2015). Even with lower rates than other members of European Union, Portugal has been ranked in higher positions than Brazil in terms of innovation. Thus, the impact of this innovative culture is evident. We shed light on a question that, even competing in high technology fields, internationalised companies from emerging countries, with no tradition and lower investment in R&D present a more limited internal structure for R&D (P4). However, Brazilian studied firms are not taking advantage of their overseas base to look for knowledge from external sources, what would be expected, once this could improve their innovativeness performance (Mellor, 2015).

Another similarity observed between countries is that studied companies are market-pull, once they evaluate ('select' phase) ideas that will continue at innovation process considering market trends and competitors (P3). Therefore, it is worth to mention that technology-push can be characterised as creative, while market-pull presents a replacement characteristics (Walsh et al., 2002).

On the other hand, at the 'Implement' stage, there is a relevant difference between Brazilian and Portuguese firms. Stefanini and Navita value less formal mechanisms of intellectual properties (like patents and copyrights) than the Altitude and YDreams. This is not only because Brazilian companies innovate less in product and technology than on management and market, but also because of limitations of local system for IP. Brazil has a law and a patent office for IP that follow properly the requirements of international agreements (WTO/World Trade Organization and World Intellectual Property Organization/WIPO). However, there are some difficulties when compared to European system for IP. For instance, a process for patent application is longer in Brazil, and interviewed executives mentioned that this discourages companies to patent an invention. Besides, Brazilian legal system is also sluggish. Thus, culture of IP in Brazil is not deep, so it is worth to shed light on this result (P5). This is an important found of this research because when companies are competing in a global (and innovative) market, intellectual properties are important mechanisms for inclusion of them once importance of patent increases as the firms become more international (Saarenketo et al., 2004).

Related to 'Capture' phase, only YDreams clearly get benefits of innovation for internationalisation (and vice-versa). This Portuguese company does not only use its innovative products for foreign competition, but it also considers global operations for knowledge and technology access. However, through case studies, it seems more a matter of capacity of the companies than of country of origin's impact (P6). This is an interesting route of future research, as studies on the relationship between the development of firm's capabilities (including absorptive capacity) and the context in which they are have been neglected; most of studies on dynamic capabilities (Teece et al., 1997) are intra or inter-firms and not cross-countries (Volberda et al., 2010; Barreto, 2010). Anyway, these results lead us to believe that it will be necessary deeper analysis to understand exactly what are the factors that influence the relationship between innovation and internationalisation in IT companies from countries in different stages of development.

Table 5 Similarities and differences between Brazilian and Portuguese IT companies

	<i>Comparative study</i>	<i>Propositions</i>	<i>References</i>
Similarities	Innovation as driver for internationalisation (SEARCH)	P1: Technological innovation is not a motivational force for internationalisation	Galina and Moura (2013), Florida (1997) and Doz et al. (2001)
	International partnership (SEARCH)	P2: Companies improve its products by global agreements and partnership with clients	Whelan (2011)
	Innovation filter (SELECT)	P3: Market trends influence selection of ideas toward innovation (market pull)	Walsh et al. (2002)
Differences	Internal structure for R&D (SEARCH)	P4: Internationalised companies from emerging countries present limitations for formal structure of internal R&D	Narula (2003) and Narula and Kodiyat (2014)
	Intellectual property (IMPLEMENT)	P5: Companies from countries with weaker institutions supporting intellectual properties value less patents and copyrights as mechanisms of competition	Narula and Kodiyat (2014)
	Innovation and internationalisation (CAPTURE)	P6: Benefit from innovation to internationalise (and vice-versa) is related to company's capacity and not to country of origin	Cohen and Levinthal (1990) and Teece et al. (1997)

6 Concluding remarks

The study suggests some evidences about IT companies in Portugal and Brazil. Some of the studied companies have rapidly internationalised and all of them use their international commercial partnerships for growing abroad. Some of these companies are born global and as so, they should capture value (phase 'Capture' of innovation process, Tables 3, 4, 5 and 6) from foreign environment. However, although companies use their global network to internationalise, most of them do not take advantage of international operations to innovativeness in technology.

The results also suggest that some internationalisation strategies are mainly dependent from their clients internationalisation process, these pattern is more evident in companies that provides essentially services (Bell, 1995). The same dependence is observed in innovation, with a market-oriented strategy, studied companies improve its products by global agreements and partnership with clients.

This research also reveals differences mainly based on the management of R&D. On the one hand, in Brazil, companies present a more undeveloped way to manage both intellectual property and their internal structures of R&D. On the other hand, a small market in a developed country (Portugal) implies higher investment in R&D and a faster and earlier process of internationalisation (in accordance with Vernon, 1966; Madsen and Servais, 1997; Crick and Jones, 2000; Andersson, 2004).

Finally, we believe that within the existing literature, the original contribution of this paper lies on its comparison of innovation management of IT companies in two countries in different stages of development and with different dimensions of domestic market. This comparison allowed reflection on the traditional innovation model through the perspective of the impact of companies' internationalisation on their innovation process.

Additionally, the study identified clues and suggests a set of testable propositions that could be empirically confirmed or disproved. Considering the scarcity of comparative studies applied to IT companies, particularly in the cases of Portugal and Brazil, further work could investigate other companies, and develop some studies related to the findings of these study, such as: the relation between development degree and internationalisation strategies; R&D and type of market; mindsets in different countries and public policies to promote innovation and R&D in different countries, etc. This paper may also contribute to future formulation of policies through the influence of policy makers who become more aware of the role of IT companies and promote a more close international trade policy between countries in similar trajectories/paths.

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Appendix

Interview guide (semi-structured interview)

<i>Main goal</i>	<i>Specific goals</i>
How can ideas for innovation be find? (PHASE: SEARCH)	Find internal sources of innovation Find external sources of innovation
How are the ideas assessed? (PHASE: SELECT)	Identify methods to evaluate the ideas
How to protect the new ideas? (PHASE:IMPLEMENT)	Innovation typologies
How to management the patent portfolio, internationalisation strategy linked with new products or innovation process, etc. (PHASE:CAPTURE)	Understand the options for commercialisation of products and strategies to protect innovation Identify the strategy for selecting markets to commercialise new products