

Business Strategies in Contexts of High Uncertainty: A Case Study on the Innovation and Internationalization Processes of a Technological Portuguese SME

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Abstract: Innovation and internationalization of small and medium enterprises are widely cited as decisive factors, for the sustainable growth of European economies, which are facing a deep crisis. The European Union launched in March 2010 a European strategy, called Europe 2020, to prepare the EU economy for the future, where growth is based in three dimensions: smart, sustainable and inclusive. In the Portuguese case, these factors become even more relevant, since the country is facing an unprecedented crisis that brought to the surface the vulnerabilities of its economic and financial system. This article is a case study of a small Portuguese technology based firm, where we will examine, in the light of the literature on strategic management, and the evaluation and selection of technologies, its innovation and internationalization processes, which are critical to its survival in a hypercompetitive global industry. The evaluation of new ideas and business concepts is a challenge for companies, especially in its early stages of development where there is not a tangible commercial product. This organization is launching a worldwide pioneering product, as a result of its research and development and innovation activities, and will have, if things go right, a huge successful impact on their competitiveness. The identification of the organizational characteristics that enabled the company to enhance its innovative stance, and to embrace the challenge to internationalize its activities, may help similar organizations improve their innovation and internationalization processes, which are critical to increase their competitiveness.

Keywords: innovation, internationalization, strategy, SMEs, innovation management, RDI certification

1. Introduction

Through this case study, we aim to increase the knowledge about the main motivations, barriers and facilitating factors concerning firms' innovation and internationalization processes, with a focus on the relationships between innovation, internationalization, financial results and public policy influence. This case study highlights a set of practices in the design of structured processes of innovation and internationalization of small and medium enterprises. We begin this work with a short review of the existing literature about the concepts related to companies innovation and internationalization processes. Then we identify the methodology adopted in this work and finally, the Tekon Electronics case will be analyzed.

2. Conceptual framework

The current competitive landscape of companies is marked by the global economy and rapid technological change. Firms face increasing and difficult challenges, regarding those factors (particularly the hyper competition and the development of disruptive technologies that destroy the value of existing technology and create new markets), and struggle to understand the factors behind them, to develop appropriate response strategies (Tidd, Bessant and Pavit 2008) and to manage effectively and efficiently the information in order to become an important source of competitive advantage.

In this way, companies are urged to seek new ways of implementing and acquiring technology (Salas 2009). They have to make choices and the consequences of failure are serious (Rumelt, Schendel, and Teece, 1991).

Technology evaluation is a fundamental aspect in the process of decision making, and this term is often used in the literature, in a way that leads to confusion and imprecision, to identify the whole process of evaluation, selection and adoption (Wang 2006). Nevertheless, researchers have already identified many methodologies and critical aspects of this process (Jolly, 2006).

Insufficient knowledge of evaluation methodologies and techniques is often a constraint in the decision processes of SMEs. Small firms say that a major barrier to implementation of an innovative idea is the lack of an appropriate valuation technique and, very often, are guided by intuition and experience (Ordoobadi, 2006).

Thus, it assumes significant importance the establishment of appropriate metrics for evaluating investments in new technologies and a systematic process of technology management (Drucker, 1993) according to the nature of the technology and its level of maturity.

The evaluation of new ideas and business concepts, and the concurrent management of innovation processes is a challenge for companies, especially in its early stages of development where there is not a tangible commercial product and uncertainty is high (Damodaran, 2001). Most approaches suggest that most evaluation methods used are essentially quantitative and derive from traditional financial evaluation techniques, but they do not include non-quantitative factors (intangibles, both in terms of benefits, or in terms of costs or risks) that may have great importance in terms of evaluation and adoption, and which seem to be more appropriate to less resourceful organizations such as SMEs (Ordoobadi,2011).

The case study addressed in this article shows the importance of such items.

According to Hoch (2011), when the market of innovative firms at national scale shrinks or new business opportunities arise outside, these companies have a tendency to start their internationalization process, whose relationship with innovation has been little explored by researchers.

Vásquez and Doloriert (2011) state that the main drivers for the internationalization process are the constraints related to the internal market (the competition level, market growth and the saturation level) and the opportunities related with the external environment: demand, attractiveness and knowledge of the potential markets.

In addition to the ability to develop technologically advanced products that add value and ensure competitiveness and growth of business enterprises, it is of particular importance the factors behind the choice of target markets, which conditions the establishment of an effective internationalization strategy.

The entry mode choice in a foreign market is a challenge and a critical decision, and will have a great impact in the company's performance. Researchers have identified a large number of practices and models concerning the entry choices modes that a firm could adopt, but there is not an agreement on which is the best entry strategy in foreign markets (Nakos,2011).

A widely known model on internationalization processes is the Uppsala process model developed by Johanson and Vahlne (1977). This model reveals two patterns of the internationalization process: 1) the *establishment of a chain*, which represents the gradual order that firms follow in their international operations: no regular export; independent representative; sales subsidiary and manufacturing; 2) Companies make their investments in the markets that they can better understand in order to reduce the uncertainty in new markets – the notion of *psychic distance*.

This concept is related to factors that hamper information flows between firms and the market, such as differences in language, level of education, business habits, cultural environment, legal environment and political systems,

The Uppsala model was updated by the authors (Johanson and Vahlne, 2009) to incorporate the effect of networks on the internationalization process, acknowledging that learning processes of companies, and their commitments, are as much linked to the network of relationships as to national institutional aspects.

Tykesson and Alserud (2011) found evidences that the Uppsala Model is applicable to SMEs and argued that the network effects on the updated version of the Uppsala Model are more significant than the psychic distance factor, which plays a huge role in uncertainty, but that it can be overcome if company is part of a strong network.

Wu and Zhao (2007), regarding the case study of Huawei Technologies, argued that hi-tech firms do not always follow the Uppsala model, using as an entry mode in new overseas markets joint ventures or FDI or contractual arrangements.

Driscoll (1995) developed a framework based on three choices to enter in external markets which are export-based, contractual-based (includes licensing, franchising, management contracts, turnkey contracts, non-

equity joint ventures, and technical know-how or co-production arrangement) and investment-based through acquisitions (stock acquisition control, joint venture and start-up investment).

Some of these conclusions are applicable to the present case study, as shown below.

3. Research method

We use the case study methodology as valid way of exploring existing theory and as a exploratory way to provide an integral vision and a general understanding of a phenomena (Yin, 2009). In this research, we analyze the innovation and internationalization processes and their relationships in a small Portuguese technology based firm and its foreign market entry mode decision. Following a literature review, two in-depth interviews were conducted with managers in Tekon Electronics. It was possible to relate the empirical data with several ideas advanced by the literature.

The methodology is not prone to generalizing the results, due to the specificity of the context, but it highlights a set of good examples concerning the key factors for the establishment of an innovation and internationalization effective strategy for small and medium businesses.

4. Company profile

The Tekon Electronics parent company began its operations in 1982, having specialized in the commercialization of equipment and systems for industrial automation. The Company offers a full and very comprehensive range of products, as a sales representative of several national and international brands, so as to provide a number of solutions capable of responding to a broad range of needs and requirements.

An engineering department was created in 2000, responsible for the design, development and integration of automation components and systems, tailored to customers requirements. At the same time, it started to produce temperature and level sensors, diversifying the business areas of the company.

The company has 37 employees, and it is a young, highly skilled team (62% of the employees have qualification level VI or higher). The development of the company has always been sustained by a policy of recruiting skilled technicians and supported by a policy of continuous training, with the aim to be able to create innovative solutions and to generate responses to an evolving and increasingly demanding market.

5. Innovation process

The process of internal product innovation on Tekon Electronics began when, about twenty years ago, the company decided to manufacture temperature and level sensors, reducing exposure to the commercialization of electric and electronic material. To achieve this goal, it became an importer of automation systems, acting as a sales representative of recognized global brands in Portuguese territory. This strategy led the company to a major change, since the commercialized products were high technology products, and it was essential to provide the company with highly qualified human resources specialized in engineering. The Engineering Department naturally arose in 2000, with the intention to develop automation systems and, at the same time, produce some sensors. This strategy had some drawbacks, including the fact that it was not able to produce sensors on a large scale, and framed in a global offering. The parent company made some attempts to become manufacturer of this type of equipment, and acquired equity on four companies, notably one university spin-off, but the intention was never implemented, and the company left in 2011.

The same strategic direction continued to be pursued by the organization, i.e., to transform the parent company into a manufacturer of technology products in specific market niches that did not collide with the products commercialized by the firm. In 2010, it initiated their production, creating its own R&D department. Four new elements were hired exclusively to this department. The investment in this project was around € 1 million, in a countercyclical move relative to the economic and financial crisis in 2009, providing Tekon Electronics with a modern infrastructure. In 2011 the Tekon Electronics R&D team moved to the new and modern facilities.

The parent company began to foster the creativity of employees, in order to generate ideas for the development of new products. In order to support this effort, the company created a very simple system, called ideiatec, based on Outlook email, and that consisted in a dedicated email where all employees could

submit their ideas. These ideas would have to comply with pre-established criteria, being awarded with incentives. The system worked well, but it generated more ideas for process innovation than for product innovation.

Afterwards, the company applied to membership of the so-called COTEC SME Innovation Network, in order to conduct a benchmarking with companies that were part of this network. Through this same organization (COTEC), the firm certified its activities according to the RDI (Research, Development and Innovation) Management Portuguese Norm. Initially, the implementation of this norm complicated the process of innovation in the organization. Because it is a very recent norm, consulting firms are struggling in their analysis and interpretation. It moves away from the traditional scope of certification in quality management systems, the main playground of consulting firms. Considering the four dimensions of innovation on which the norm builds (product, process, organizational and marketing), it becomes difficult to standardize certain processes and transform them into measurable results.

However, certification was a good source of learning and it was useful to change some internal practices, and to structure the process. Of particular relevance to the organization was the systematization of learning processes (an activity not previously performed), the formalization and structuring of technology watch activities, the development of projects and the evaluation of research and development results. Performing evaluations in the Portuguese context is fraught with difficulties, because fear of failure is a strong cultural barrier that inhibits an attitude more prone to risk and to innovation. Another positive factor was the learning held at generating ideas.

Hiring people as a source of new knowledge, with expertise in the development of new products, and exclusively dedicated to R&D activities, proved to be a major challenge, both for the organization and for the new four employees. The new R&D function required a paradigm shift in the relations between the functional departments within the firm, and the reassessment of its mission. It demanded a change of mentality of people and work routines, installed due to a culture of 28 years of work geared only to the commercialization and marketing of products produced elsewhere. It was a routine that intrinsically did not embodied the perspective of design, development and production. On the other hand, there was a lot of pressure and expectations placed on the new team of employees to develop "genius" ideas. However, despite the resistance to change, there has been a continuous learning and adaptation process and the building of bridges of cooperation between these two opposite views. The organization realized that the implementation of the RDI management norm is just the first step of an effort that must be supported continuously at all layers of the organization.

On the other hand, these two apparently opposing and conflicting cultures (a commercial one, and a product development one), have proved to be a source of competitive advantage for the organization and a source of mutual learning. The high level of standards, know-how and feedback imposed by the organization's commercial perspective is a source of continuous challenges and high expectations regarding the R&D team. If the new internally developed product goes through all the different stages of the evaluation process in the commercial perspective, it is a sign of its appeal and market differentiation. There are very few companies operating in the automation sector in Portugal, and they are usually composed of small development offices that have a more limited, and a much less comprehensive overview of the market. The organization has a sales team that enriches the innovation process with real market inputs, allowing the detection of trends, opportunities and threats, and reducing considerably the risk of conceiving a product inappropriate to market needs.

The organization performs an active and focused technology watch that allows the detection of customers' needs or problems to solve, to survey competitive products and positioning, and the sensing of opportunities in niche markets and new customers. The meetings between technical and commercial staff are a source of information in this matter.

Regarding the management of ideas, and as previously mentioned, the company began with a simple process for idea management. When it began to implement the RDI management standard, and in partnership with a consulting firm, it developed a specific software for that purpose, in which the organization acted as a beta tester, providing feedback about the capabilities and functionality of the software, and incorporating into the

software the information needs of the company. It still uses it, and there was a gradual improvement in the quality of the ideas submitted over these four years.

The process of evaluating ideas also evolved within the organization. Initially, decisions about the continuity of ideas were taken by management and the marketing department, in order to have a faster decision. However, other views were not incorporated. Now this process consists of two phases. In a first one, the ideas are evaluated by an innovation committee that was created for that purpose, and that meets all the department heads, forming a multidisciplinary team with a high degree of autonomy, which incorporates multiple perspectives, and that has increased the effectiveness of the process. This new structure contributed to decrease the resistance to implement innovative ideas, since each department contributes in a systematic way in the process. If necessary, other collaborators may occasionally participate in this committee. Only in a second step, and once the idea has been validated by the committee of innovation, does it go to the management of the company.

The current criteria considered in the analysis of the potential of an innovative idea are related to five dimensions: technical feasibility, alignment of the idea with the firm's strategy; financial and economic viability, market analysis, competition and costs. The adoption of these criteria reveals a maturation of the process, focusing on key aspects, essential for a quick decision, so as not to neglect the time to market. The analysis was initially more complex, and several factors which were included did not add value to the process, and on to the contrary, it hindered and delayed it.

Following the technology watch process, and the generation of ideas and their evaluation, innovative ideas with commercial potential are classified as innovation projects. The parent company uses equity to finance each R&D project, leading to extra care in their analysis and prioritization. The firm does not use any specific methodology for prioritizing projects, only the calculation of the Internal Rate of Return, the Payback Period and items that give rise to those indexes, which are estimated roughly. An intensive market study can be difficult to make and it may delay excessively the project. At this time, the company has several projects underway, having difficulty deciding which one moves first. It also has a portfolio of projects in stand-by, either because they are not aligned with the strategy or because resources are allocated to other areas. Each R&D project is viewed as an investment project. The company invested €300,000.00 in 2013. The total amount allocated to R&D is not set in advance. The allocation is decided on a project basis. One of its strategic objectives is to have a broad portfolio of products, to be offered in international markets. In this sense, projects that take less time to execute, and that are in line with this strategy, end up being prioritized.

Typically, the project schedule includes four phases. The most important phases are the conception and design phase (phase 1) followed by the proof of concept phase (phase 2), which is divided into several sub-activities, due to the large amounts of resources and time that it consumes. The most significant deviations from planning occur in terms of schedule implementation and deadlines, followed by deviations in costs. The reason is due to the difficulty in managing subcontracted activities, particularly in the accomplishment of the lead time from suppliers. This is something that the firm wants to improve, and the solutions point to a greater involvement and partnership with suppliers, and the preference for the selection of suppliers who wish to participate proactively in product development.

The company still has no patented product and may not follow this type of protection. It is betting on a technology and a product (wireless sensors) that took about two years to develop. The product is being adopted slowly, due to a certain conservative attitude of the industrial customers, but the firm believes that it may be the trend for the future. The organization adopts a posture of second mover, because it is not yet prepared to be a first mover.

6. Internationalization process

The organization is now taking the first steps in its process of internationalization. Despite the decline in the internal market, this was not the main driver of the company's internationalization process. It wants to leverage the business, providing a range of innovative products, whether in the domestic or foreign market. The Portuguese market is too small to get a return on the investment made on the development of a new product, so that internationalization is a natural path to follow, once the innovation process is properly consolidated. The products destined to the international market must be prepared to compete on a global

scale and the firm bets, as referred above, on a differentiation strategy. The product was developed having in mind, from the beginning, the international market.

Small scale exportation was the elected entry strategy in foreign markets. It will be done primarily through the appointment of a network of distributors, which means that each country must have already a distribution network more or less defined. The goal is to find distributors who can implement the brand, and that connect with its values. Great care is taken in the selection of the distributor, to avoid damaging the incipient brand name. The appointment of a bad distributor could cause irreparable damage to the company's image and undermine the process of internationalization.

The target countries were selected taking into account factors such as macroeconomic analysis of the country, the rate of GDP growth, competition analysis and market maturity. It was combined with the knowledge that the company has from specific external markets where it is more active, generally linked to the brands that the firm commercializes in Portugal, or where it has established some relationships, through international sales meetings. The firm also resorts to consultation of people living in those countries, and with which the firm has commercial relations, or through experience brought by employees that are more or less active in those countries.

The culture of every country is an important factor that is taken into account in terms of defining the trading and commercial approach. It is possible to identify similar patterns in some countries. In Portugal, Spain, Italy and France customers are very sensitive to the discount, either as a percentage, or in monetary value, at the expense of the final product price. In the case of countries like Germany, Belgium and the Netherlands, this sensitivity is not as visible. In Germany, due to its industrial specialization, it is necessary to work with key potential customers in a different way that competitors do, and find a point of differentiation based on a combination of product and pricing strategy. In this market, the main difficulties in market entry are related to the awareness of the Tekon brand (incipient) and the not very good association between Portugal and industrial competence (Portugal industrial brand).

The pricing strategy depends on the way the company will position itself in the market, which is different from market to market, and is conditioned by the entry strategy in each market. The following questions are set in order to pave the way for strategic decisions: what type of customer we want to attract (final/retailer/wholesaler/distributor)? Should we develop a pricing strategy specific to each market? Should we develop a specific price strategy for each trading block? The discounts are visible and/or invisible? The final consumer price is attractive to the final consumer and/or distributor?

The company studied its presence in Portuguese-speaking countries. In these countries, the entry strategy was indirect exportation, due to several factors: these countries do not have properly formalized and transparent distribution channels, the share of manufacturing is less than 5% of GDP, and a direct presence would require a large initial investment whose risks the firm is not prepared to assume. In these countries there was the possibility of territorial extension of the representation of some brands (already represented in Portugal), and the language itself was a facilitator. The presence in some of these markets through indirect routes is made through national partners, who already have an established position in these markets, facilitating the introduction of the company's products.

The presence in the United States required a different technology certification process, more expensive and time consuming than the European one, and it also required a new technical configuration of the product. These were factors that would entail high costs and a high level of uncertainty of product acceptance, which led the company to abandon the idea of entering this market.

Under these considerations, the organization has set as priority targets the constituent countries of the European Union, since entry is facilitated due to lower risks in terms of various aspects, such as customs and monetary affairs, legal issues related to product safety and testing, and maturity of the markets. Although the rivalry between competitors in these more mature markets is fierce, they are appealing markets due to their size and international projection. The first market to be explored was the Spanish one and the company anticipated its entry, when the product was still in a prototype phase, to be able to be present at an important fair which is held every two years, and which marked the international presentation of the products offered. The company, at this early stage, opted to appoint an agent, with which it already had working relations, and

who knows very well this market. So far, the results are good, and sales are starting. The next market to be worked out is the German one, where the company will be present at one fair which will be held next month.

7. Discussion

The Tekon Electronics case provides an interesting insight into the relationship between innovation and internationalization processes in the Portuguese SME context. It also illustrates that the systematization and structuring of the innovation process inside small organizations is an extremely important factor that increases considerably the probability of success, as mentioned above in the literature review section. The systematic and continuous effort related to the improvement of the internal processes of the organization was coupled with a careful approach to the external market, and some approaches referred in the literature were indeed applied by the company.

The key successful factors, in this case, seem to be related to the continuous commitment from top management in innovation, the change towards innovation practices, the hiring of human resources with high expertise, global product thinking, multidisciplinary teams, organization learning with innovation processes, formalization and structuring of technological watch, R&D project development, evaluation of R&D results, entry choice mode in known external markets by small steps and the knowledge from the cultural aspects of each country. The commitment and deployment of external, dedicated managers and the systematic approach to innovation management seems to confirm other studies reporting the positive impact of these determinants (D'Angelo, 2013) in the internationalization processes of SMEs.

The key barriers are related to the fear of failure, Portugal brand name in the field of industrial technology, brand awareness of Tekon Electronics as well as a lack of cultural information about the country, and those findings are important to help similar organizations in developing strategies to mitigate them. Previous connections of the firm in terms of international markets account for the social factors that have facilitated, or at least not hampered, as reported in other instances the process of internationalization (Ellis and Pecotich, 2001). The fact that the firm is a representative of international brands, the knowledge of the market opportunities that such a position confers, and the existing social bridges that were built as a consequence, were extremely important factors affecting the decision to internationalize.

The firm adopted a product differentiation strategy with an high innovative content, in a technology that has not yet reached significant penetration in the target market (industrial market), relying on a gradual move towards increased adoption. The innovative content of the product seems to be an important determinant of success in internationalization efforts (Rees and Edwards, 2010; Pett and Wolff, 2009), and in this case we suggest that indeed it played a fundamental role.

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