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EXPANDING THE OPEN INNOVATION CONCEPT: THE CASE OF TOTVS S / A

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ABSTRACT

The aim of this study is the process of open innovation in the growth development of a technology-based company. We used the case study method to research Totvs, a company that is the largest producer of information systems in Latin America, for medium and small businesses, as an illustrative case to support the evidences of new approaches to implement the open innovation processes. The main conclusions regarding the expansion of the open innovation concept can be seen taking the following distinct factors into account: (a) technological dominion, not business protection, is the main motivator for acquisition of external technologies, directly or through other enterprises acquisition, (b) adherence to technological footprint is the main inducer of the open innovation processes, (c) market pull technologies determines the length and range of technological dominion, and (d) incremental instead of radical type of innovation would be the preferred way to implement the open innovation process.

Keywords: open innovation, TOTVS, innovation process, information systems

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1 INTRODUCTION

The era of "Open Innovation", or global sources of innovation, begins to emerge as a new paradigm to design competitive businesses. The premise is that, to compete well, companies must revolutionize their business design. Some authors such as Hamel (2000) and Hagel III (2001) already indicated earlier in the decade, the importance of a new business logic model: that a single strategy would no longer be enough to support a winning business. For both authors, building a winning business means to opt for alternative paths in order to manage value attributes underlying the construction and access to goods and services. Such ideas are closely linked to the centrality of innovation to support the model and the flexibility of the business processes.

However, , where the importance of this new paradigm for business would come? The answers are in a gradual and irreversible modification of common elements that are part of all the surrounding businesses: life cycles of technologies, products and markets. Technologies support processes and products for smaller periods and then they are replaced. Products also have an elasticity to demand, associated to design, technology, performance, and functionality, for even smaller periods. When products lose sales volume, they need to be redesigned, refurbished or simply be replaced. In the same vein and for the same reasons, markets and market segments keep profitably attractive to be explored by businesses, for shorter periods, quickly becoming unattractive because of reduction of the demand.

The fact is that the way many companies are doing business is becoming less efficient. Chesbrough (2007) identified four important points that undermines the effectiveness of the traditional business and refer to businesses in search for new models. One argument is the increasingly high mobility of tacit knowledge. Expert people change jobs today much more than in the past. Another argument is the increasing lack of venture capital to test new ideas. The pressure to increase profitability of companies has induced executives to see development as a cost item, not as an investment. A third reason, the author points, refers to the inefficiency of the management of the innovation processes. The bureaucracy associated with the development and innovation is time lengthy and costly. And a fourth reason, the author relates, is the shortening of the life cycle of products, technologies and markets.

1.1 Problem and objective

The current context of the business environment, described above, undermines the effectiveness of both the competitive and corporate strategies. In terms of corporate strategy, executives face challenges that bring them before dilemmas when they need to decide on priorities for investments. Companies stand before a more complex business environment that needs great breadth of knowledge to decide well what technologies would enhance their business sustainability. This is mainly the case of technology-based enterprises, such as Totvs, the subject of this research. For this type of business,

technological dominion is a key factor. However, expanding technological dominion or the technological footprint of a technology-based enterprise involves the expansion of its internal scientific and technological basis. For such cases, it is a must to consider the growing interdependence between science and technology, a phenomenon long pointed out by Stankiewicz (1986). The phenomenon is clearly valid today and means that advancements in the frontiers of one of them (science or technology) are not possible without a contribution from one to the other. As scientific knowledge increasingly needs technological sophistication to reach new frontiers, so does technology. Thus, the development of special capabilities in the business of a technologically based enterprise undergoes difficult decisions to select technologies adherent to the company's technological footprint or to determine prior capabilities that would be required to expand technological dominion.

In this context, the implications for a business based on technology, as the case in question, stand on the kind of technology or of innovation that will support business profitability. There are, apparently, two elements that must be matched when determining the direction of a company in this situation. First, the innovation to be incorporated or developed, and made available to market, must be coherent with the company's technological footprint. And second, it must be, as often as possible, market proof, which means that it must be within market standards of acceptance, to decrease risks of failure.

For competitive enterprises, especially for the technology-based ones, the importance of innovation to business competitiveness seems to be a common place. What is still not consensus is what the best innovation strategy would be to keep business profitable. Traditional corporate strategies protect their business investing in technologies in their internal research and development centers. But, they run the risk to restrict the viability of innovation by drowning into development costs and by reducing marginal profitability of innovation. More recent corporate strategies drive business in opposite direction. They go outside the enterprise to search for ready-to-use innovation that could be brought inside and used directly or with some specific adjustments (Chesbrough, 2003; 2007). Thus, they decrease the time to market, to introduce new technologies and to keep up with the pace of innovations. Technology-based enterprises tend to match the second case, reflecting the apparent strategy of the research subject of this paper.

The concept of open innovation, introduced by Chesbrough (2003; 2007), indicates that a company should find its innovation or new technologies outside its walls in the world, select it and incorporate it. Many companies, small and big, technology-based or manufacturers, and from different economic sectors, may enhance their business model by opening it under the premises of the open innovation rationale. The open innovation concept, however, has been interpreted in different ways by enterprises, according to their best interests. Evidences from a technology-based enterprise, subject of this research, seems to show alternative strategies to access external technologies and innovation that could be understood as an expanded concept of open innovation.

Within this context, the aim of this article is to discuss and explain the growth strategy of a selected high-tech company, in the information technology sector, that has been growing well above the average in its economic sector, apparently based on the

principles of open innovation. The target issue is not the nature of the subject enterprise (IT enterprise), but the innovation strategies that shape the company's business behavior.

2. THEORETICAL PRECEDENTS

Chesbrough (2003) coined the term "Open Innovation" to mean innovation brought from elsewhere on the planet and into an enterprise. Before we discuss open innovation, however, some key concepts on technology and innovation used in this paper would be necessary. Generally, we can consider two dimensions in the concept of innovation. One dimension refers to the type of innovation related to the flexibility of business processes (Hamel, 2000). The other one involves the technical origins of innovation, that is, the innovation of product or services associated with the technological domain (Twissa, 1992; Christensen, Raynor, 2003). Therefore, innovation could happen in administrative procedures and in business models as much as in manufacturing processes, design, performance, quality or safety of a product or service. In this article, we consider innovation in both dimensions, that is, a phenomenon brought up in any area or product of the organization.

2.1 Innovation – Concepts and Generalities

Borrowing the concept of innovation from the different views of innovation, observable in the thought of important scholars of innovation, such as Skarzinski; Gibson (2008), Christensen, Raynor (2003), Kelly; Littman (2002, 2005), Davila et al. (2005), we can define it as the changes in processes, products and businesses that trigger strategic renewal and cause profit in corporate investments. Seen under these parameters, innovation has basically three essential dimensions: value, cost and strategy.

The value dimension refers to customer perspective. When innovative changes increase price elasticity in products, then innovation increases the value of the product or service to the customer's eyes (Christensen, Raynor, 2003). Innovation, thus, leads to the strategic renewal of the business, consolidating market positioning of the company and causing a correspondent performance improvement in its profitability.

The side of innovation related to costs represents gains in manufacturing processes, from the introduction of innovations. In other words, a company can achieve a manufacturing downturn of costs by increasing productivity and assuring the quality level of products. This type of innovation will directly influence customers because of the price lowering of products in the market.

Finally, the innovation of strategic characteristics focuses on the business model. In this case, the company remodels its business design and aligns strategies to gain or increase competitive advantage (Skarzinski; Gibson, 2008). Strategic innovation concerns the development of the cultural environment in the organization to create and sustain ideas throughout the innovation process. It concerns on how to reduce risks in opportunities that involves innovation, maximizing the return from innovations. It is also about the

establishment of mechanisms and systems that drive innovation as the basis to develop and assure the core competence of a company.

In terms of object, nature and degree of influence, we could roughly group the types of innovation into three categories. In the object category, innovation could be promoted in products, processes, services, business models and, especially, in markets (Maital; Seshadri, 2007). In the object category, innovation is fairly self-explanatory. It is the type of innovation that involves the elements in which innovation happens or where it can be observed.

A second category of innovation is linked to its nature. The disruptive innovation type belongs to this category (Christensen, 2003). These are innovations that stop the development of the traditional way of managing and launching innovation. This happens through new business models or emerging technologies, making new businesses, which do not have the same capacity to invest in innovations, become leaders in their industries, side by side with traditional businesses (Christensen, Raynor, 2003).

The third category is the kind of radical innovation, as defined by Leifer et al. (2002, p.18), as a "product, process or service that provides unprecedented performance features or characteristics known to promote significant improvements in performance or cost and transform existing markets or create new markets." One of the most important differences between radical and disruptive innovation is that the latter is usually linked to the company's business model and processes, while the former is basically associated with enabling technologies for new product applications and services.

Once the major forms of innovation are defined , object of this work, it is possible to recollect and synthesize the main concepts of innovation strategies. Due to focus and space in this paper, this synthesis is limited to the main currents of thoughts in the latest innovation strategies.

2.2 Innovation Strategies

The competitiveness of a business based on technological domain and innovation is now "needed more than ever," Prahalad, Ramaswamy point out (2003, p.12). It is not just a matter of traditional prescriptions, such as cost reduction, better management, tighter control, better organization, reengineering or outsourcing, but it is essentially a matter of creating value in perceived ways that sensitize consumers. This is the way in which innovation affects the business in all its dimensions and activities, and the only way companies can achieve profitable growth.

A quick analysis of the development of innovation strategies shows that in the last 80 years, innovation has been studied in typified waves. Starting with the thought of Schumpeter's (2008) "creative destruction", corporate strategy considered innovation as a management tool capable of changes in the economic sectors. According to Schumpeter, creative destruction occurs when the death of an industry or an industrial activity gives way to another with greater economic potential (e.g., the carriage industry gave way to the car industry, or the mainframe gave way to a personal computer). Thus, creative destruction represents the evolutionary steps of a free-market economy.

In the 1980s, the strategy of innovation in industries considers the technological discontinuities as a dominant mechanism of the innovation process, as a lever, driving the industrial evolution. Tushman, Anderson (1986) defined the technological discontinuity as the competence of an innovation over a dominant technology (or model) in order to perfect it or to destroy and replace it. Technological discontinuity, of the competence-destroyer type, makes the replaced technology totally obsolete (for example, the technology of valves tube became obsolete with the use of the integrated circuit technology). On the other hand, the discontinuity of the competence-creator type perfects the technology, based on accumulated know-how (e.g., turbine technology has evolved as a result from the accumulated know-how from the previous technology of turbo-propellers). It is during this period that we distinguish radical innovation, usually associated with the concept of discontinuity, from the competence-destroyer type (Anderson; Tushman, 1990).

In the 1990s, Christensen (2003) introduces the concept of disruptive technologies as a way to use innovation to break leaders' rules of dominance of an industrial sector. It is still in the 1990s that the concepts of exploitation and exploration are introduced (internal exploitation and external exploration) of technology assets as a way to build organizational resilience (March, 2008; Puhan, 2008).

More recently, in the 2000s, studies by Leifer et al. (2003) originally published in 2000, show new ways of using innovation strategy, now in a radical way, as an alternative to answer issues of incremental strategy, which could lead incumbents to be surprised by disruptive innovations. Christensen; Raynor (2003) argue against Leifer et al. (2003), incremental vs. radical approaches, with a more focused view on business innovation, the concept of sustaining innovation vs. disruptive innovation, more centered on innovations in business processes. Finally, Chesbrough (2003, 2007) notes that there is a clear move towards a new format of innovation strategy, emphasizing the pursuit of external cognitive sources, which he called "Open Innovation".

2.3 Open Innovation

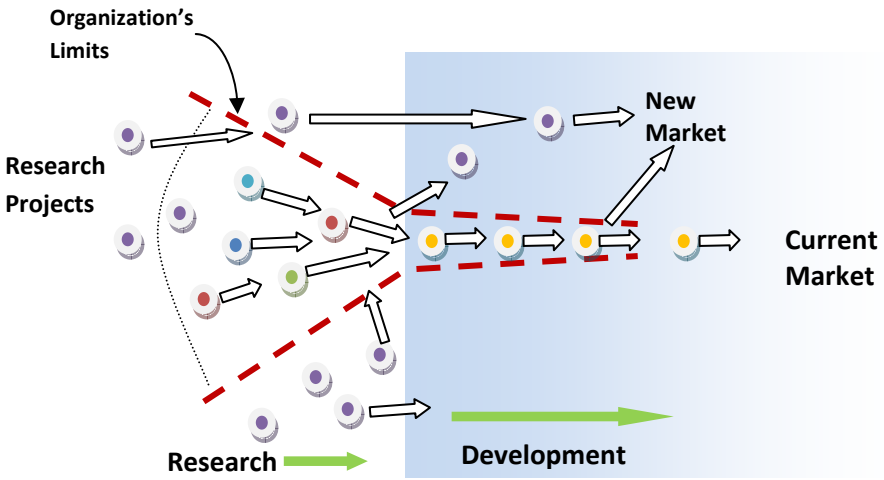
Chesbrough's (2003, 2007) open innovation idea is not really new. Under the perspective of open business beyond the limits of the company, other authors have already noticed the needs for pursuing external cognitive sources of knowledge, the kind of knowledge not available internally. March's (2008) concept of exploration/exploitation in the early 1990s, was an early bird of this phenomenon. Other authors such as Hruby (1999); Von Hipel (1985); and Jonash; Sommerlatte (1999) have indicated the urgency for the cutting-edge companies to adopt (and leverage their business) innovation generated outside their limits. In designing business, Hamel (2000), Bovet; Martha (2001) and Hagel III (2001) also have identified the new paradigm explored by Chesbrough (2007), the paradigm that strategy only would no longer be enough to sustain winning business. Companies need to build or redesign their business models in an open format, focusing on the exploitation of internal competences and on the external exploration of opportunities while developing new value logic.

Traditionally, the way to generate innovation in large organizations is to maintain control over its development, ensuring its subsequent market launching. This form of innovation is known as the Closed Innovation type or model. Under this model, the

company creates, develops and commercializes its own ideas, based solely on their internal capabilities. But, according to Chesbrough (2003), if firms need greater breadth of knowledge, or more specialized knowledge to innovate and also need to spend large amounts of money to gather the required dispersed expert knowledge to innovate, we must consider the closed model of innovation not responsive enough to generate innovation.

This new context suggests that innovation strategy must consider ideas, technologies and knowledge available outside the company, combining in the innovation process, their own ideas, ideas from other companies, or ideas from a company's operating environment, allowing them to remain in their own segments, entering new markets or using distinct strategies to expand their own market. Figure 1 illustrates the model.

Figure 1.- Open Innovation Model



Source: Chesbrough, H. (2003), p. 37.

Chesbrough proposes the open innovation process containing at least four distinct elements (What - Find - Get - Manage): (a) Role, (b) Mechanisms, (c) Processes and (d) Management of innovation. Thus, initially, we should identify the role and purposes that the open innovation model has (or will have) in the current format of a company's business. If the role of the innovation model is essential to the business model, we should be able to appropriate the processes and organizational design to support the innovation model logic.

Mechanisms include the IT applications and internal databases, the performance evaluation systems, the technology selection systems and the integration architecture of the model of innovation into the business model. Processes should support the traffic of information, in terms of volume, content and time, allowing for the open innovation model to work the best way as possible in the context of the organization. Finally, management involves the use of administrative tools and systems for planning, organizing, directing and controlling what will be used to manage the model implementation.

Santos et al. (2004) discuss the idea of seeking external cognitive technical sources within the same reasoning of Chesbrough, which they called Global Innovation. According

to these authors, the rational principles of global innovation lead to three basic processes: (a) Prospection; (b) Access; and (c) Mobilization. Prospection refers to the search on the planet for pockets of expert knowledge that could support the desired or necessary innovation, identified from explicit business needs. The prospection processes of global innovation are very close to the processes of Technical Competitive Intelligence.

Access to specialized knowledge that underpins innovation is closely linked to the footprint of that knowledge (number and dispersion of sources). The optimum footprint for a company is determined by identifying its competences and experiences, its competitive strategy, history and strategic objectives. Finally, the mobilization of knowledge is what brings the real benefits from global innovation. But to do this, it is required that the company be able to move and put together the distinct pieces of the dispersed technical knowledge. Secondly, it is required that the company provide an organizational format appropriate to innovative efforts. The reason is that moving knowledge from one place to another is an easier task, in most cases, than redesigning the organization to optimize the purposes of the incorporation (of innovation), which is a far more arduous task.

3. METHODOLOGY

The research supporting this article has a qualitative approach, for which we used a case study research method. Yin (2005) argues that the case study method is appropriate when we are looking for "how" and "why" a phenomenon or event happens. In spite of being limited in nature, the case study is a very powerful research tool. Eisenhardt (1989) reasoned on this issue saying that it is perfectly possible to indicate the presence of emerging paradigms and to create new theories through a case study method. For the author, the key is the proper division of the problem, the collection of systematic and reliable data and a rational analysis of information. Thus, we designed the research as an empirical and descriptive study, using an interview script that allowed for free answers, as a data collection tool.

3.1 Instrument for data collection

The information collecting instrument was an interview script with questions that searched for or explored a set of new evidences observed in the research subject organization. Questions explored, therefore, how Totvs does the technological needs assessment; how it does the exploration or the search for innovation that might be of interest of the company; how it makes the assessment and selection of innovation needed; how the decision-making process to search for and assess external innovations is; and how it does the incorporation of innovation.

3.2 Social subjects

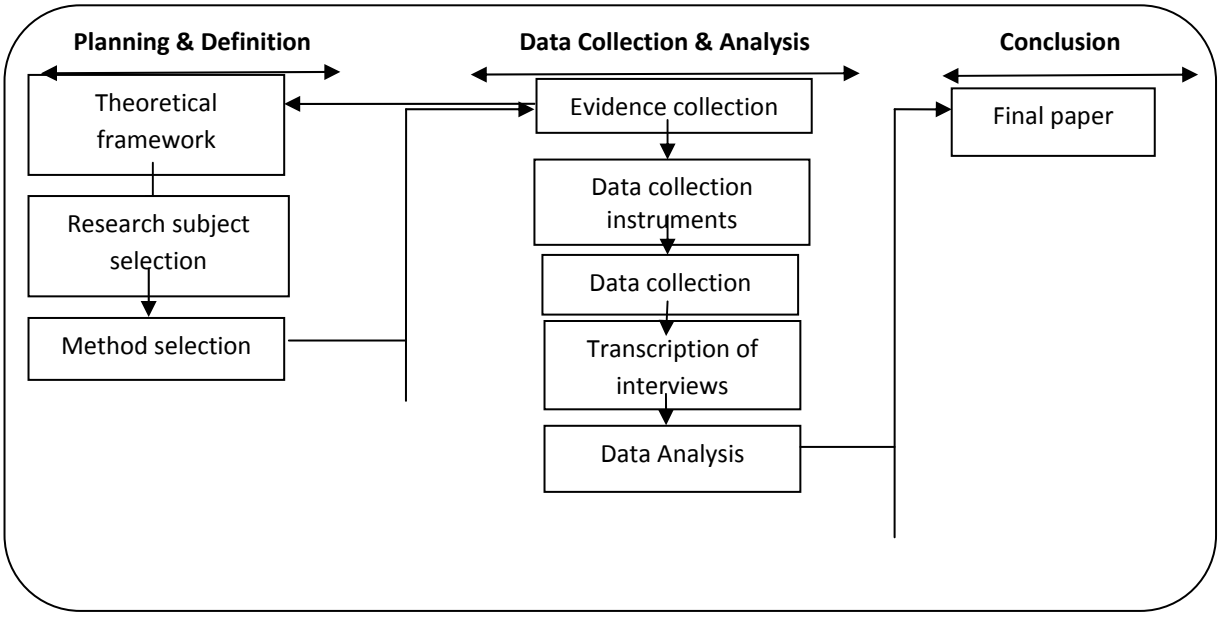
The interviews were conducted with four social subjects. Interviewed social subjects involved managers of the technology area (technology vice president and director) and strategy managers of the company (marketing and communication) as well as an

advisor and a systems implementation member who deal directly with the company's customers. Other information was obtained by assessing official documents and publications of the company.

3.3 Research Protocol

According to Yin (2005), the development of case studies needs to maximize the conditions related to the research quality, the validity of the research construct, internal e external validity and realiability of the research. To assure these features, the case study must be conducted under a research protocol, which, for the present paper, is represented in the Figure 2.

Figure 2. - Research Protocol



Source: Adapted from Yin (2005).

The research that supports the conclusions in this paper was planned under a theoretical framework, based on the concept of open innovation and evidences from the field research. Once the research subject was defined, on the basis of novelties shown by evidences in field research, the research method was determined. Then the theoretical framework helped develop the data collection instrument, an interview script, whose content was transcribed after the interview was made. Then data were analyzed through content analysis technique.

To analyze the results, data were first organized according the rationale that drove the construction of the data collection instrument, discussed above: technological needs assessment; innovation prospection; innovation assessment and selection; decision-making process; and incorporation of innovation. The resulting information was interpreted using the theoretical framework of concepts that gave birth to the proposed research.

4. RESULTS ANALYSIS AND INTERPRETATION

Totvs´s growth strategy is also analyzed from the characteristics that would place its growth strategy under the principles of open innovation. To better understand this analysis, however, it is important to make a company description within a historical perspective, involving the company's evolutionary trajectory.

4.1 A brief history of Totvs

Totvs S/A is a company devoted to computer systems and applications developed as a solution for automated management of enterprises, management of services in the private and public, and for the management of production. Today´s Totvs initiated its operations in the segment of computer solutions and applications in 1983, under the name of Microsiga Software. Initially focused on developing software for personal computers, the company soon began to specialize in the market for integrated enterprise management systems. The target market of Totvs has always been the small and medium enterprises (TOTVS, 2009b). To maintain continuity and expand its market share, Totvs adopted two distinct but complementary strategies: internal development of systems and acquisitions and mergers. In its 26 years of operation, the company has concentrated on the market of small medium enterprises, initially acquiring a series of small enterprises (around 60 companies). Each acquired company has helped to respond more quickly to the demands of applications in the market. Its bigger movement of acquisition, however, has occurred only in the last four years.

In 2005 Microsiga bought Logocenter, a company operating in the logistics market and from this fusion Totvs Ltda was created. A year later the company bought the RM Systems, which operated mainly in the area of human resources and relationships, and then went public, becoming the current TOTVS S/A. From that year on, the name Microsiga was definitely abandoned (TOTVS, 2009b). In 2007, Totvs acquired BCS and Midbyte, becoming able to also operate in the field of Law (through BCS) and in the retail market (through Midbyte). In that same year Totvs did a joint venture with Quality and created, as a result, the TQTVD company to produce a market-consumer middleware for digital TVs.

Sufficiently consolidated and dominating the market of small and medium enterprises, Totvs turned to the segment of large enterprises. To do so, Totvs acquires Datasul, thus consolidating a leadership in the market of big and small companies, becoming the largest provider of management software in Latin America, with revenues of $ 845 million in the year 2008 (TOTVS, 2009a). Totvs has been growing at very high rates in recent years, with 121% in the last quarter and 27.6% in 2008 (TOTVS, 2009), Totvs showed high liquidity in its business. Today Totvs has 9,000 employees and operates in 23 countries worldwide. Totvs has subsidiaries, in addition its headquarter in Brazil, in four other countries in South America, Mexico and Portugal.

With the incorporation of Datasul, Totvs moves to a new stage of expansion in which the operations of both companies complement and strengthen the positioning of Totvs in the market. Datasul was focused on the segment of medium and large companies

and Totvs was driven to market of small and medium companies. The solutions that reach the market by joining the two enterprises also increase, by combining ERPs targeted for small demands with vertical solutions for midsize and large enterprises, taken by both companies (TOTVS, 2009b). Totvs's software can be used in different segments such as public, legal, logistics, business, financial services, and agribusiness and extractive activities, involving more than 25 fields of applications, totaling 23,300 corporate customers and embracing 38% of the Brazilian market segments for these applications. Currently, TOTVS occupies the 9th place as an ERP supplier in the world, the first in Latin America and the leader in providing integrated solutions for the Brazilian market (TOTVS, 2009b).

4.2 Content Analysis

The collection of information related to this research interest, that is, the identification of the technology strategy that has guided or has been associated with Totvs´s growth strategy and its association with the logic of the processes embedded in the open innovation system, was incorporated in the interview protocol, applied to the social subjects. These same principles guide the development of this analysis. They involve five basic processes: (a) needs assessment, (b) exploration, (c) access and selection, (d) decision-making process, and (e) incorporation of innovation.

4.2.1 Needs assessment

In the process of technology analysis needs, we embed the development policy and technological dominion of the company. "Our policy of technological development comes from the need to innovate, determined by market demand," says the Vice President for Technology of Totvs. It is this policy that establishes the limits of the needs and of the interest in specific technical information for the company. The responses of all social subjects indicate transparency and consolidation in the policy that indicates the directions in which the company moves. First, market demands of clients' businesses determine the investments in competences and in the development of internal capabilities. Market demands determine the type of technology needed. Second, the protection of the business also determines the investments, considering the technology dominion base. Thus, if Totvs is to engage in a new business project, it is necessary to identify the explicit market demand from clients for a service or for a specific application. However, the commitment of Totvs to the demand will only happen if the required competence from the company is in its footprint. This guideline is clearly summarized by the Director of Technology of Totvs, when he states that:

> This desire to be capable, regarding the supply of technology to market and to always be innovative and market-driven, is a feature that Totvs keeps as a never changing policy ...

According to the opinion of the interviewees, there are four factors that shape the type and format of the technological need demanded by the company. First, the needed technology, to be sought within or outside the company, must be a subject of market demand (maybe an opportunity, maybe an identified need). It is always the company's business associated with a customer demand that drives the decision and, consequently, the

direction of the internal technological need. Second, as the decision to respond to the demand is contingent to Totvs´s technology footprint (combination of technical competences, experience and technological capability), the technological needs are linked to technical aspects, under the dominion of the company. Third, as the market demand is a determinant of the company's portfolio, the danger is the horizontal spreading of the business without a proper corporate support. Thus, the process of deepening the technological domain (vertical integration of the technical basis) constitutes a major source of technological need for the company. And finally, the technical support, represented by the central module of Totvs Tech, gives to Totvs the strategic control of the business and makes the company independent of external complementors (groups outside the company that are responsible for a technology used by the company). The maintenance of strategic control requires constant technical evolution and it also becomes an important source of demand for technology information.

4.2.2 Prospection

At Totvs, the prospection is done through three primary channels: the company's client base, market observation and exploration of trends, and technical experts. The client base is wide and the pressure it exerts on the company is twofold. First, it forces Totvs to look inside and outside for innovations ready to respond as quickly as possible to those demands. Second, it leaves Totvs before its client to find or develop, together with the client, the solution that best meets his/her demand. Essentially, Totvs's client base (more than 23,300 organizations) gives the first alert on technical innovation needs. These needs are identified by the marketing people, or by the people from the systems implementation. In addition, marketing has also been concentrated in identifying opportunities for technological applications, making the company less reactive and more proactive in turning their skills into new sources of revenue.

Another way to prospect information used by Totvs is to observe technology trends, especially those that appear in trade shows and technology fairs and that are seen next to big companies' booths like Microsoft, IBM, Oracle and the like. The observation of the technological direction taken by these major companies is always explored by Totvs with strategic interest. As noticed by the Technology V-P:

> "... at the fairs, I always say to them [Totvs people].... look for crowded rooms and empty rooms. Empty rooms means - this technology is done!...- crowded rooms indicate that something is happening, a trend, a novelty is there... "

The interest of Totvs in this case offers the basis of its technological dominion, which in turn defines its technological foot print, one of the determinants of the decision making process for the company's growth direction.

Also, at Totvs there is a common platform for prospection of technologies, the Protheus Intelligence, which connects the entire base of systems analysts and programmers. This intelligence, the third channel used by Totvs to prospect technical information, represents a very efficient prospection network to identify technological innovations that may be of interest to the company, especially because they, the experts, are the ones who understand the value of technological innovations for the company the most. Admittedly, the economical value of the resulting applications is determined by other means and under additional value parameters, but this is an important way of prospecting valid technologies

and innovations that last for a significant future time at Totvs, under the technological point of view.

4.2.3 Access and Selection

The access to technologies follows a process that is not formalized, but it becomes natural through functional means. According to the Director of Technology, information about technological innovations identified by Totvs experts, by the marketing people and that are incorporated in the demands of new technologies, are normally submitted and discussed with the development people. It is in the Development department that technological contents are accessed in the innovations sought by the company. If these contents are compatible and consistent with the internal technical expertise (technological footprint), they are recommended to Totvs´s administrative board, for adoption by the company.

There is not a formally implemented system of technologies and innovations evaluation, whose parameters should be followed. The technology's selection criteria are based on two platforms of guiding vectors: (a) scientific and technical knowledge existing in the company and (b) knowledge of the market technical needs. The first platform evaluates the consistency of the new technology with the collective expertise of the company and its contribution for the construction of the collective expertise. In the words of the Chief Technology Officer:

> "...if the technology is in the DNA of the company, then we seriously consider it!..."

In practical terms, it is evaluated how much Totvs's basis of experts knows and dominates those contents in order to cope with or to develop with mastery new applications and new solutions that could be relevant to the market. The second platform considers the market technical needs, that is, if the technology is sophisticated enough to be understood [or rejected] by Totvs's market. If technology is too much complex and if it requires heavy investments in infrastructure, human capabilities, or even radical changes in vocabularies and significance of IT to users, for example, the technology is left alone or simply it is not recommended.

4.2.4 Decision

The adoption or incorporation of a technology decision making process receives contributions from two internal sources. One is the area of technology itself that, as discussed above, accesses the content of technologies and technological innovations and recommends them, based on technical criteria, despite the distinct sources. The other comes from contributions and considerations from marketing and corporate strategies.

The decision to incorporate technologies, however, is taken by the top management of the company, in the format of governance. The analysis and considerations from the two sectors (marketing and corporate strategies) of the company are evaluated by a board, composed of the president and vice presidents of the company. This is a whole new process, distinct from the administrative board that, in spite of using the same criteria, assigns different weights to the distinct factors involved.

At this stage, marketing considerations have much greater weight than the other parameters and indicators. The vision of the VP of Marketing and of the VP of Strategy indicates that the most important parameters and indicators are those that show the implications for the company's business, from: 1) the current size of the market, 2) the potential of this market to grow, 3) current unmet demand, 4) the level of competitive pressure, 5) the potential profitability; and 6) possibilities of new applications of this technology. In short, this is the logic that determines the kind of decision from the top management board on technology adoption and incorporation.

4.2.4 Incorporation

The incorporation of new technologies happens under a process of broad dissemination of the desired innovation. The Protheus intelligence system, which prospects and feeds specialists, has a very efficient internal dissemination channel: the program called I-9 (innovate). This program is a strong catalyst for prospecting innovations, technology assessment and stimulus to corporate entrepreneurship. The I-9 Program is a program to stimulate the company's managers and employees' free enterprise, to format the internal network of knowledge management targeting at the generation of useful innovations to the company's business objectives.

It is the innovation network, stimulated by the I-9 Program, which helps the prospection and evaluation of technologies, by encouraging the integration of those who develop applications and products to be sold, with those who develop the motherboard platform (known as Totvs Tech) that houses the applications of the company. Thus, the technologies developed for specific purposes and sought through acquisitions and mergers are evaluated, refined and incorporated by the network supported by the Program.

5. INTERPRETATION

Considering the strategies of innovation and technological dominion as the foundation of Totvs´s competitive strategy, we can find a close link with the evolution of incremental innovations (Nelson and Winter, 1982; and Leif et al. 2000; Hughes, 1987). All of them focus on the technical, organizational and political dynamics arising from the incorporation of innovations and their influence on the evolving pattern of the enterprise.

The roots of open innovation (Chesbrough, 2003, 2007, Santos et al., 2004) are present in Totvs´s business model, but on a broader scale. The market penetration by demand was always primarily supported by internal competences. These competences have been, over time, expanded through acquisitions and mergers of enterprises that had technologies not mastered by Totvs, but of its interest. So, Totvs´s business model assumes technological dominion as the supporting basis for the competitive strategy into segments with proven potential for profiting. Technology dominion, in part, developed internally [for instance, the middleware - TotvsTech, written in ADvPL (Advanced Programming Language), a language developed by Totvs], as a premise for understanding external technologies, and partially fueled by mergers and acquisitions, is the area of Totvs´s strategic business control. In other words, mergers and acquisitions do not represent just a

mean to penetrate the market, but a mean to incorporate technologies that allow Totvs to expand its technological dominion and use it in other market segments.

The process of Totvs's growth through open innovation allowed the company to also grow through the disruptive innovation process (Christensen, Raynor, 2003), more than simply grow based on incremental innovation. Considering Totvs´s historical perspective, we noticed that its market growth was initially concentrated on the segment of small and medium enterprises, a segment neglected by large software developers. The process of mergers and acquisitions of small software developers, who had technologies of interest to Totvs, allowed the company to consolidate and dominate the market of small and medium size businesses. Totvs latest acquisition, Datasul, put the company on the same level of the large software developers. By combining both Datasul and Totvs market, the latter now became a market leader in the segment of systems software for business management.

6. CONCLUSION

The analysis of Totvs´s strategic development as a leader in sales in Latin America, in its economic sector, leads us to specific conclusions, related to the profile and behavior of this company business. For instance, technical competences in the company are built by addition to its technological dominion, other technologies acquired directly or through mergers/fusions with other technology driven enterprises. These technologies, if adherent to the company´s footprint, are emulated into Totvs Tech, the Totvs middleware that supports the applications generated by the company. Thus, the company incorporates new or lacking technologies and innovations.

It is important to notice also that the logic behind the acquisition of technologies used by Totvs also follows the trend of dominant technologies, through the processes of exploration (external innovations) and exploitation (internal innovations)(March, 1990; 2008, Puhan, 2008). In fact, the Totvs I-9 (INNOVATE) Program is the main vehicle to exploit internal competences to get contributions from expert employees and to explore external technologies using internal knowledge to assess contents and usefulness of external technologies. This means that external technologies are acquired if they match or are adherent to the company's technological footprint.

The prospection process of new technologies and innovations, under the premises of open innovation, is still less formal and more reactive to market demands, rather than proactive in terms of planning and direction of the technical prospection. Thus, at Totvs, the process of Open Innovation followed by the incorporation of technologies and innovations is determined by the company's business model, with an open design, as indicated by Chesbrough (2007).

It is observable that Totvs's business model has created an apparent paradox. On the one hand, the simplicity of its programming language leads to an apparent technological obsolescence. But, on the other hand, this same simplicity of language has historically been the lever for market leadership in the segment of small and medium enterprises. The main

reason to that is the low level of hardware requirements, and thus the low investment in infrastructure required.

At last, the concept of incremental innovation used at Totvs to develop or adjust the acquired technologies, also maintains total similarity with the concept of sustaining technologies, proposed by Christensen; Raynor (2003). In addition, the permanent pursue of technological domain (through acquisitions and merges) to penetrate new markets, allowed Totvs to cause a disruption in its sector. The move to acquire Datasul pushed Totvs into a much bigger market share, involving small, medium and large business segments. This move allowed Totvs to quickly become one of the incumbent companies in its economic sector.

Because of the representative role of Totvs in its economic sector, some conclusions may be drawn, in terms of expanding the concept of open innovation. One conclusion is that technology driven enterprises may use technology dominion expansion and consolidation as the main motivator to acquire other enterprises, not the rationale of protecting their own business. At Totvs, the acquisition of ready- to-use external technologies (directly or by enterprise acquisition) and the subsequent combination with internal capabilities based on market potential became a key rationale of the growth strategy. This value logic (strengthening technological dominion led by market demands) is so consolidated that it became its business configuration factor. Therefore, in technology driven enterprises, technological dominion, not business protection, may be the main motivator for implementing the open innovation process.

Another conclusion is that in technology driven enterprises adherence to technological footprint is one main inducer of the open innovation process. Prospecting new market demands (requiring new technologies) and reacting to them in the case of a matching technology from outside the enterprise adherent to the technological footprint is an evidence of a distinct format of implementing open innovation that may be critical to technology driven enterprises, because of the nature of their business. Strategic decisions, on what technologies or what businesses to buy, are, therefore, dependent on the adherence of the prospective technology to the technological footprint. Thus, the main inducer of an open innovation process may not necessarily be the interest in a specific technology or the interest because of the lack of it, but because the matching with its technological footprint.

Still another conclusion, in terms of expanding the concept of open innovation, in technology driven enterprises, the market-pull technologies determines the length and range of technological dominion. Some technology driven enterprises may use the concept of technology push to introduce innovation in its market segment, but a technology driven enterprise and market oriented might better use a market technology demand to decide on acquiring external technologies to respond with fewer risks of failure to a market opportunity.

Finally, in technology driven enterprises, the incremental instead of the radical type of innovation would be the preferred way to prospect external technologies. Since the technological dominion base of a company driven by technology contents is a strong conditioner of prospecting and acquiring external technologies (thus implementing the open innovation process), then the option for technologies that will increment the existing technological base becomes a common rationale. This option, again, represents fewer risks

of failure, be it to incorporate the technology or to launch it in the market, and an advantage because of the expansion of the technological dominion and thus, strengthening the enterprise competitive strategy.

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