“Managing innovation, human resource and corporate governance in technological SMEs: lessons from cases studies in Canada”

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Managing innovation, human resource and corporate governance in technological SMEs: lessons from case studies in Canada

Abstract

This research paper examines the conditions related to managing innovation and corporate governance in Canadian technological SMEs. In today's world-based knowledge economy, innovation is the key to competitive advantage, long term growth and organizational product differentiation. However, innovation in a SME depends crucially on how the firm manages and mobilizes its resources. This happens only through good corporate governance. This research paper illustrates the difficulties of managing innovation in technological SMEs in Canada and calls for a better corporate governance based on trust and responsibility of human resources.

Keywords: Human resource management, corporate governance, innovation management, SMEs.
JEL Classification: M1, M12, D83, J24.

Introduction

In unstable economic environments in which technological evolution is constant, innovation is an essential factor in competition, growth and creating value for businesses (Niosi, 2003). Responding to the challenges that innovation brings is a constant concern today. The proof is that businesses invest important funds for research, development of new products and constant improvement of efficiencies at all levels of the value chain. In order to remain competitive, large organizations rely on innovation when confronting problems due to the rise of competition from Asian countries and the constraints of sustained development (Cloutier and Saives, 2003). In a 2004 study, the Boston Consulting Group (BCG) surveyed 236 leaders and found that industrial companies were increasing their budgets for the development of internal innovative procedures for services and products. In almost all industrialized countries, governments are investing massively to create innovative conditions for businesses. In Europe, for example, there are several programs for accessing innovation while in Canada, the government has created innovation centres and innovation support organizations. These initiatives demonstrate that innovation is, once again, at the heart of development and competition between businesses (D'Aveni, 1994). What is understood by innovation? The French dictionary *Le Petit Robert* defines the verb innovate as being the introduction of something new in a specific area of interest. An innovation has to meet three important criteria: it has to be new, concrete and effective.

From a great idea such as life annuity, we have progressed towards continuous innovation that allows businesses to remain competitive. At the same time, the concept of innovation itself has widened and is no longer solely an attribute of technology. The majority of new businesses are service oriented and innovation is linked mainly to procedures and organization. A manager today must be capable of harnessing and multiplying the creative potential of his collaborators through all-around continuous and collective innovation procedures to ensure the development and long-term survival of a company. Generally speaking, in the dilemma exploitation and exploration, differences exist between real or radical innovation and incremental or continuous innovation (March, 1991).

However, the firm innovation is directly related to issues of corporate governance. This innovation is reflected in the manner a firm identifies and organizes skills and information, how a firm arranges for financial flow and how marketing relations provide feedback to manufacturing. Corporate governance refers to the power to arrange for such resources from both within and outside the firm. This managing innovation is thus dependent on the accumulated capability to govern human resources.

1. Managing innovation and corporate governance in SMEs

There has been a recent growing call for the application of corporate governance from large companies to SMEs. In this, corporate governance and value creation for stakeholders require that organizations obtain and maintain competitive advantages (David, 1997). Managing innovation is a privileged means of achieving this because it allows an organization to gain a quasi-monopolistic advantage for a certain length of time (Liouville, 2006).

1.1. Two innovation strategies for organizations. The first innovation strategy is one in which a company benefits from either knowledge or competencies that competing organizations don't possess yet. Some refer to this as being a "pioneer" advantage in a new market or the attacker's advantage (Foster, 1986). For his part, Danneels (2002) suggests a model based on two categories of competencies that are needed for creating innovative products: competencies related to technology and those related to

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clients. Radical innovation is defined as an innovation that requires new competencies for an organization, both on a technological level and a client level.

The objective of the second innovation strategy is to create barriers to protect innovative technology for as long as possible – in order to maximize direct profits – until the monopoly is destroyed by market forces. This type of innovation strategy, known as incremental, is based on the increasingly rapid and successive introduction of new products (Brown and Eisenhardt, 1998). Intel is probably the most well known example of this: it determines the rhythm for the renewal of products for the entire microprocessor sector. The rapid introduction of new products in the market is linked to the priority given to incremental innovations that reduce the turnaround time on investment and risk (Thomke, 2001). In order to maintain a competitive advantage for a long period of time, an organization must set up a corporate governance structure and mobilizing competencies for relevant managing innovation.

1.2. Which corporate governance in SMEs? Corporate governance is largely associated with larger companies and the agency problem. The agency problem comes about when members of an organization have conflicts of interests and within a firm, the separation between ownership and control of firm is often cited. The SMEs are likely to have a few employees who might be the heart of the owner. Since there is no separation between management and owner in SME, some argue there is no need for corporate governance guidelines. Further, SMEs are not accountable to the public since they have not accessed the investing public for funding leading to the questionable applicability of the disclosure and transparency often associated with corporate governance. However, in today SMEs, corporate governance must manage innovation process through two dimensions: a structure that is more adaptable to innovation and an effective management of key competencies.

1.2.1. Setting up a management structure adapted to innovation. Choosing a management structure that supports innovation is linked to several factors such as the line of business, the size of an organization or its management style (Verona and Ravasi, 2003). The first studies on organizations adapted to innovation suggested that the more supple structures that encouraged innovation were organic forms (Burns and Stalker, 1961) and adhocracy (Mintzberg, 1984).

However, several authors question these structural forms and suggest, to the contrary, new forms such as semi-structural (Volderba, 1996), dynamic structures (Dougherty, 2001) and hybrid structures (Verona and Ravasi, 2003) that conciliate real and incremental innovation imperatives. However, these new structures require certain flexibilities and an accountability that are not at all adapted to the realities of SMEs.

It is therefore clear that the issues surrounding performing management structures in innovation are not only linked to choosing an adapted management structure but also to the management of personnel.

1.2.2. Mobilization of the actors' competencies: valuing innovative behavior and specific management for researchers. In today's world, innovation and production of knowledge depend on the creativity of all the actors in an organization and their willingness to take risks (Ferrari, 2005). For example, real innovation requires that the personnel is responsible for the idea to be capable of convincing their hierarchy and being successful in getting the approval to change strategies and structures that are often synonymous with inertia and conformity. In SMEs, the entrepreneur is the essential motor of change because, very often, business development is linked to a particular innovation (Moore and Johnson, 2003).

However, in large organizations, entrepreneurs are often replaced by managers who don't necessarily share a culture of risk, a factor that is not conducive to innovation. Therefore, senior management must play a fundamental role to mobilize and involve all staff at all hierarchical levels, by facilitating the movement from a planning logic to an intrapreneurial logic (Julien and Jacob, 1999).

Most business innovations come from researchers and organizations must create specific management styles to meet their needs, both in order to attract researchers and to keep them within the organization (Ferrari, 2002). However, these needs are very specific and cannot be compared to motivation factors that interest other staff. Researchers value a cooperative and friendly atmosphere at work. This is not surprising when one realizes that innovation in today's world is rarely the result of a single person or of a random event but rather the result of team work that creates synergies between different types of specialists (Ferrari, 2005). However, it is vitally important to establish loyalty with researchers because loosing a researcher can sometimes be a catastrophe for an organization. An analysis of the literature on innovation indicates that the choice of innovation strategies, either real or incremental, is a complex process. In large organizations, the choice can be more or less planned and standardized while in SMEs, choosing between real and incremental innovation is more the result of circumstances or of the entrepreneur's desire. As for innovation management, the literature indicates that large organiza-

tions rely on significantly more important technical and financial means when they want to adapt their structures and recruit more competent personnel. In SMEs however, the choice of innovation strategies and innovation management styles is not very well explained by current literature (Niosi, 2003, Cloutier and Saives, 2003).

In order to more fully understand how SMEs manage innovation and corporate governance, we have conducted a qualitative research with two SMEs in the technological sector in the province of Quebec (Canada).

2. Research methodology

2.1. Presentation of two cases. The province of Quebec plays a central role in the biotechnological field in Canada, both regards to the number of technological organizations and the dynamic role they play (Queenton and Niosi, 2005). Data obtained from the Quebec Department of Economic Development, Innovation and Exportation show that the health – and biotechnological field in 2005 – one of the backbones of the modern economy of this province – is comprised of 450 organizations that provide jobs for 25,000 highly qualified workers and more than 10,000 scientists. The two examples of our study are both dynamic organizations: the first one, LMS Systèmes médicaux, is specialized in the medical technological field while the second, Inatech International, is specialized in animal biotechnology.

Case 1: Radical innovation at Systèmes médicaux LMS Ltée

LMS is a Montréal based business specialized in medical technology. It is a leader in advanced mathematical modeling and neural networks that provide obstetricians with tools in real-time for making decisions regarding women who are in labour. The company is dedicated to reducing the complications that arise during labor and to improving outcomes for women and their babies. The first and most important LMS product, Computer Assisted Labour Monitoring System (CALM^{mc}), provides information to the physician through visual obstetrical data in real time. It is therefore possible to determine if labour is progressing normally and safely or if a caesarean is needed to prevent any damage to the newborn's brain.

Case 2: Incremental innovation at Inatech International: better farming methods

Inatech International inc. is a new organization regulated by federal laws on business corporations with headquarters in Saint-Hyacinthe, Quebec. The company develops and produces natural ingredients for human and animal consumption. Through R&D projects, the company created and developed four original formulations for nutrition products based on probiotic bacteria and natural ingredients for animal food. However, developing new organizations in the biotechnological feeding industry requires important funding that only large organizations or venture capital companies can provide. Therefore, several very dynamic organizations, mainly SMEs who rely on their innovative capabilities, attempt new developments but lack the necessary funding for bringing new products to the marketing level. We shall explain our research method and our main observations on innovation management in these two organizations.

2.2. Research method within the two organizations. In 2002, writs of consultation allowed us access to LMS Systèmes médicaux and, in 2004, to Inatech International. This gave us the opportunity to obtain first-hand knowledge and documents from senior executives of these two organizations. For our research, we conducted semi-structured interviews with senior executives involved in innovation management within these organizations. We also created an interview guide that contained questions pertaining to the key dimensions of innovation and innovation management. The guide was a useful tool in obtaining information on the conditions that permit innovation and how innovation works. During the interview process, facts were noted as presented; all subjective information was deleted. On the other hand, several information sources were useful as complementary tools: general documents on the organizations, specific documents concerning each organization, reports of public interviews (written press and other media) and data banks. The combination of these different data sources provided not only depth to our analysis but also a diversity in perspectives. Data processing was done by content analysis in three phases: pre-analysis; re-transcription of interviews and complementary data that had been taken manually: data processing: done manually because of the length and relatively small number of interviews and then completed by manual processing through document consultation; interpretation of results: limited to two elements, creation of innovation and innovation management. It must be noted that the results of this qualitative research were validated by two university professors who are specialists in innovation management and by two experts from the Centre Québécois de valorisation biotechnologique (CQVB).

3. Results

3.1. Which innovation strategy: radical versus incremental. Because competitive advantage is the guarantee to long term competitiveness, organizations require both real and incremental innovation

strategies. When competition is fierce, businesses must be capable of creating organizations that can respond to the dictates of both actual management competencies and future management capacities. However, this deliberate and planned manner of viewing innovation is not well adapted to the innovation realities of SMEs. In the two organizations surveyed in this paper, innovation appeared almost by chance and, as explained by an Inatech International employee, evolved considerably:

"We started from the realization that most of the organizations in our field were using more and more antibiotics or chemical preservatives when making animal foods. In itself, this method represents potential and serious dangers to animal and human health. The innovative factor in our project was the development of new natural products that increase animal research performances and gradually or totally eliminate the use of antibiotics as growth factors".

As well, Inatech International executives became business people by happenstance. As research scientists, they learned their management skills on the job. The president indicated: "At the beginning, it was very difficult to strike a balance between the scientific and the managerial aspects. All our efforts went to producing a high quality scientific product and the management aspects were somewhat neglected. The competition may have been ahead of us in that respect".

At LMS Systèmes médicaux, the promoter remained active as associate professor of the Faculty of Medicine of McGill University for several years. She explained that the idea of starting a business came about quite by chance:

"Many students were asking questions about caesarean births and, because I was often unable to provide them with adequate answers, I decided to undertake a research project that would look at the difficulties associated with caesarean births and the reasons why specialists were unable to prevent them from happening".

When the promoter started her research project, she was surprised to learn that the specialists she met during scientific gatherings were as keen as she was to find the answers to her questions. This realization encouraged her to act and provided her with some elements of response in order to help the many women who were either preoccupied by the question or suffered because of lack of answers. As a woman and mainly as a mother, this was sufficient to convince her that her contribution to caesarean birth research would be to provide answers to these questions. As a pioneer in the field and desirous to help in a very real way, she decided to invest a significant portion of her time to the adventure that would become know as LMS Systèmes médicaux.

Which innovation management process: organizational structure versus organizational governance.

A review of the literature suggests that innovation management requires a flexible structure adapted to innovation; an organization that welcomes innovation and a specific type of management for research teams (Ferrari, 2005). In the SMEs of this research paper, Inatech International inc. has a small management team of two associates, one who is president, the other, vice-president R&D. The two founders work with a team of scientific and management advisers whose main role is to support and guide them in the development phase.

Right from the start however, the organization functioned in a relatively informal and unstructured manner. Even though specific tasks were given to each associate, no formal hierarchy existed. Work was done in a collegial manner and most decisions were taken by the management team as a group. Discussions within the group centered mainly on operations and, occasionally, on short and long term planning elements. However, the organization lacked an external vision that individuals not involved in the daily operations of the business could provide. Such persons would also have the responsibility of questioning management team decisions and, predominantly, their capacity to create the necessary conditions for effective competitive intelligence. In fact, the vice-president of R&D admitted that the competition's aggressiveness had created an atmosphere of panic and unease in the organization:

"At the management level, we were very busy with daily activities. But the environment was such that we needed to be aware of what our competition was doing and which new products and needs were being identified. It became a priority for us to get some exterior support so we created a consultative council whose members were similar to a board of directors".

The management team at LMS Systèmes médicaux is adamant that it is impossible to motivate personnel unless an emphasis is directed towards working as a group in a friendly and agreeable manner. The management of the organization is very supple and of the "open door" type; however, staff is extremely competent and experienced.

The distinctiveness of innovation management in organizations such as LMS Systèmes médicaux and Inatech International is linked to organizational governance objectives. Because of the legal responsibilities attached to the status of administrator and the difficulties of risk-taking with regards to insurance, Inatech International managers opted for a more supple organizational governance structure. Their consultative council is comprised of both ex-

terior representatives and internal managers. The president explains:

"With a consultative council, we have the best of both worlds: we have access to strategic counselling from members and we maintain the control of our organization. Several council members are industry people while others are business people with lots of experience. Because of their involvement, we have made fewer errors and have been able to better understand the major directions of our organization and our sector. As well, members play a role as assistants to senior managers".

Management also benefits from some flexibility as to whether information and suggestions brought forward by consultative council members will be implemented. The Vice-President for R&D explains:

"With the consultative council, we were able to hand-pick our members and decide whether of not to accept the suggestions and/or information brought forward. Given the fact that most appointees were our friends, there existed one line of thought between them and us. We were able to obtain state-of-the-art knowledge but at a lesser cost than that normally required from a board of directors".

But there was also another side to the coin: members of the consultative council worked as volunteers and were not obliged to participate. The president mentioned that some members were no longer according a priority to Inatech International.

"When we started, people would call me, would come over to the office and were ready to help management at any moment. Over time however, they no longer participated in council meetings. We realized that we had no way of ensuring their commitment to our organization. Worse yet, one of our members accepted a position as board member in a competitive organization… Yet, we had explained to council members that they benefited from proprietary interests.

While we were involved in these situations, business activity was on the upswing: we went from one to four commercialized products on the market. Our work force also went from three to almost a dozen people. We also identified some interesting development perspectives. But in order to achieve these projects, funding was required and the organizations interested in providing funds want to be involved in the management and control of activities. It was therefore critical that Inatech International adopt a board of directors' structure".

The board of directors at LMS Systèmes médicaux consists of two categories of members; on the one hand, members who represent investors and, on the other, team researchers. When start-up began, funding requirements for research purposes were so significant that managers were obliged to call upon institutional investors whose short term objectives were a fast return on their investments, a philosophy that contradicted the long term philosophy of researchers who inevitably had long term objectives mainly because scientific research is a path strewn with occasional breakthroughs but also with setbacks. Rapidly, members became entrenched in their opinions, the representatives of the institutional investors looking for results as soon as possible. The former president of the board of directors evokes the atmosphere that existed during board meetings:

"There is a difference between being a member of a board of directors and a shareholder or an investor. A board member's role is to protect shareholder equity but also to ensure that the organization is well managed and that it adheres to its vision and strategic planning. This is the first theoretical objective of each and every board member. But in reality, when people intervene or comment, each board member reacts according to his or her training and history. Financial people react as financial experts and researchers react as research experts. She adds: "At the beginning, the members of our board of directors were mainly investor representatives and financiers from institutional organizations that were trained as financial experts. Some of them were quite young and didn't have a lot of experience in managing an organization. In that context, whenever minimal over expenditures were noted, they interpreted that as being mismanagement. Their reactions, as financiers were rather touchy".

For this organization, the injection of substantial funds became a source of motivation for researchers. However, in a sector such as biotechnology, expected results don't necessarily happen overnight. Rather, they come about because of prolonged and patient research work in which doubt is the main ally. This medium and long term logic is therefore in contradiction with an investor's logic. Clinical research, testing, experimentation, all these phases seem to be in perpetual and constant motion and repetition. The director general explains:

"The person responsible for the research team is always on the lookout: she wants to know if something is not working properly. She is a pure scientific who wants to make sure that everything works right. As a clinician and practitioner, she does not want to risk a product that looks good but that in fact doesn't work. She does not accept bandying with risk".

This type of rigorous behaviour is essential for two reasons. On the one hand, researchers work in a scientific domain where a certain number of con-

straints and ethical rules exist: on the other hand, they often work on real people, in situations where decisions taken too rapidly can have fatal consequences. Under such circumstances, the experience of members of the board of directors is important for instilling confidence and guiding the actions of the organization.

Disparity between these two logics can create a credibility gap in organizational governance. On the one hand, investors wish to strengthen their position on the board of directors while researchers, on the other hand, want to focus on research objectives while at the same time respecting scientific constraints and demands. This disparity can be detrimental both to the efficient functioning of an organization and its board of directors. The climate of interpersonal mistrust can be so great that it becomes a threat to the survival of the organization.

4. Discussion

Our analysis looks at two SMEs in the technological field who are involved in a dynamic of innovation management. Although these two organizations chose two different types of innovation, they both encountered serious problems in the daily management of the innovation process. This is a reality that is specific to SMEs that have neither the financial backing nor the technological capacities of large organizations. In order to survive in such an environment, SMEs have no choice but to constantly adjust and permanently innovate with regards to all aspects of the innovation process (technology, process, organization). Their capacity to resist is explained by contingent management of the innovation process, a type of management that is different than the one adopted by large organizations.

4.1. The importance of trust for the choice of innovation strategy and organizational structure. Our results tend to suggest that in the two SMEs we have studied, radical and incremental innovation strategies are incompatible. This is contrary to what some authors believe, mainly that in order to remain competitive, organizations must rely on both types of innovation logic (Foss, 2003). In both cases in our study, we noted, on the one hand, that LMS Systèmes médicaux, who had a radical innovation strategy, encountered major difficulties in creating an organization able to meet the principles of radical innovation. Specifically, radical innovation needs to be supported by a competent and motivated management team, a simple and flexible organizational structure and effective management of human resources. However, all these elements are very costly and are difficult to bring together in an SME such as LMS Systèmes médicaux. On the other hand, the example of Inatech international demonstrates that an incremental innovation strategy is not easy to implement. Management problems co-exist with recurring funding requirements and different perceptions about the environment.

In both cases, therefore, it is noted that the chosen innovation strategy was neither deliberate nor planned but that it was rather an emerging and trusted strategy that could be adapted to unforeseen circumstances or constant change.

In deciding which innovation strategy to adopt, it is important to consider the type of organizational structure that is appropriate. The challenge is to develop an organizational structure that creates a link between radical innovation and incremental innovation. A synthesis of the main research papers on the subject suggests that organizational structures must be flexible, dynamic and hybrid (Verona and Ravasi, 2003). The organizations studied in this paper have simple structures with some flexibility with regards to the nature of responsibilities attributed to staff and staff involvement. For the most part, managers are overworked, do not delegate and have very little time for creativity or giving serious thought to specific problems. In this context, it is difficult to create an organization favourable to innovation. However, the managers of these organizations developed other methods that offset the absence of adapted structures: they worked with independent experts, developed strategic alliances with organizations of the same size and shared basic knowledge within their own business network.

4.2. The importance of responsibility for team management and human resource. We have seen that the manner in which research teams are managed within these two SMEs doesn't create a culture of innovation. It is clear that researchers need to work in an environment that encourages creativity and provides some freedom of thought. However, in the organizations studied, the work of researchers largely depends on the good will of management. On the one hand, at Inatech International, research depends on the motivation provided by the associates and by volunteer members of the advisory council. However, because advisory board council members are unpaid volunteers, they do not feel directly responsible for the development of the organization. On the other hand, with LMS Systèmes médicaux, the research team must follow the dictates of the board of directors. However, the directors, for the most part, are financial analysts preoccupied with short-term returns on investments rather than long term goals associated with rather unstable research activities. In efforts to counteract loss of motivation and possible departure of researchers, managers reluctantly agreed to having some researchers develop other projects (outside the organization). At Inatech International, for example, one star researcher received ap-

proval to cooperate on research projects with researchers at Agriculture Canada and will leave.

Conclusion

This research paper examines the conditions related to managing innovation and corporate governance of SMEs in the technological field in Canada. Although this study has identified several problems regarding innovation management in SMEs, it is clear that the list of challenges is incomplete. However, this study illustrates the difficulties encountered by SMEs for managing innovation and corporate governance efficiently.

In our cases, the SMEs have neglected to create "bridges" between researches and managers within the organization. To be capable of managing innovation and corporate governance, SMEs must improve trust and responsibility between human resources. As shown in this study, the objectives of each group seem to be incompatible. This leads to power struggles that consume time and energy. However, if there were one or two persons capable of understanding the concerns of both groups in the organization, they could act as intermediaries between groups, an idea that is essential in the theory of organizational networks.

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