



CANADIAN FEDERATION OF BUSINESS SCHOOL DEANS
FÉDÉRATION CANADIENNE DES DOYENS DES ÉCOLES D'ADMINISTRATION

*Fostering Innovation, High Technology and Productivity
Through Effective Management Education*

Management Education and Productivity in Canada

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Introduction

Education, innovation and international commerce are among the factors that can stimulate productivity in Canada. Innovation is one of the main factors that promotes productivity. Innovation is not, however, a phenomenon uniquely associated with technological development. The concept encompasses the entire managerial process leading up to the actual marketing of new ideas, not only on the national market but also—even more importantly considering globalization—on the international markets. Unfortunately, there is good reason to believe that Canadian managers show a significant weakness in innovation management and international commerce—two crucial elements needed to increase productivity in Canada.

Canada is lagging behind in innovation

Innovation represents an opportunity for economic growth. It is a key factor in the stimulation of productivity in an economy that is becoming increasingly globalized and competitive. Innovation within the corporate structure enables companies to increase sales and improve their share on both the national and international markets as well as strengthen their position in the global marketplace. A study conducted by the Conference Board of Canada (1999a) indicates that highly innovative businesses perform much better than less innovative companies with regard to profit, total sales, employment and international market share. On a national scale, an economy based on innovation favours employment and the creation of wealth, thus improving the standard of living.

Canada is lagging behind other industrialized countries in the areas of productivity and innovation:¹

- Real GDP growth per capita has fallen over the past 20 years.
- Labour productivity in Canada is significantly lower in Canada than in the United States—15% to 20% lower between 1980 and 1998.
- Labour productivity in Canada showed the second lowest growth rate of all G-7 countries in terms of production per employed person and ranked 19th among the 22 countries of the OECD in 1996.
- Canada's capital productivity is ranked lowest among G-7 countries and came in 21st out of the OECD's 22 countries in 1996.
- Canada's total factor productivity is also the lowest among G-7 countries and ranked 21st out of the 22 countries of the OECD in 1996.
- Private sector resources earmarked for R&D in Canada as a percentage of the GDP are significantly lower than in other industrialized countries.
- The number of patents pending per 10,000 employed persons is lower in Canada than in most industrialized countries.

As a result, the Government of Canada set itself the goal of supporting innovation. In the Speech from the Throne on October 12, 1999, the Right Honourable Jean Chrétien, Prime Minister of Canada, expressed the following views:²

Our goal is to take the necessary measures, along with our partners, and make the investments needed to foster an even stronger and more dynamic economy in the 21st century, to make Canada the country that best personifies the globalization of a knowledge economy.

Our goal is to encourage innovation and productivity in a Canada that wastes no time in embracing advanced technology, investing in the development of skills and seeking new business opportunities throughout the world.

In the new economy, technological knowledge and innovation are the cornerstones of a higher standard of living and improved quality of life. Research and development are the catalysts of innovation.

In his 1999 fiscal update, Finance Minister Paul Martin underlined the importance of innovation:³

“The economies that will thrive over the next decade will be those that excel at innovation. All of us have a role to play in building an economy that can innovate and compete with the best in the world.”

“We must continue to support the kind of ground-breaking research and development that will provide innovative ideas and methods that can generate even more economic growth 10 or 20 years from now.”

There are many ways to support innovation, however. Subsidizing only R&D and basic research is not enough. Particular attention must be paid to the managerial process involved in innovation, which is perhaps even more important for Canada than technological development.

Management as a support for innovation

It is not discoveries or inventions as such that increase productivity, rather it is the conversion of these discoveries and inventions into added value. The management of innovation involved in this process is as much or even more important than the innovation itself. The Conference Board of Canada (1999a) defines the term “innovation” as: the process through which economic value is extracted from knowledge by the creation, development and implementation of ideas to create or improve products, processes or services. Innovation is therefore a much more substantial process than simple technological development. The process of innovation consists of three steps (Conference Board of Canada, 1999a):

- Formulating new ideas
- Developing these ideas
- Marketing these ideas (sales and marketing)

The first step refers to basic technological development; however, steps two and three are closely linked to the managerial process. Corporate organization must provide innovation with effective support throughout the entire process of transforming the initial idea

into a product on the market. Porter (Porter and The Monitor Company, 1991) states that Canada generates 2% of the world's R&D, while producing approximately 4% of all published scientific documents, which shows that the problem seems to be in converting fundamental knowledge into a commercial product.

In order to support innovation, businesses must possess the following characteristics (Conference Board of Canada, 1999a):

- Management quality and leadership: commitment to innovation
- Flexible organizational structure: responsive to new ideas and to the development of new processes
- Effective management of the innovation process
- Culture geared toward innovation and commitment to innovation: new ideas, initiative, learning and change are encouraged, and the risk involved in innovation is accepted
- Environment that welcomes innovation opportunities (techno-watch)

Thus, a company's capacity for innovation depends mainly on the quality of management and leadership at every step of the innovation process.

Baldwin and Johnson (1995) show that a company's success is intimately linked to its capacity for innovation, not only in the field of R&D, but throughout the innovation process, from the development of an idea right through to product marketing. Moreover, a study conducted by the Conference Board of Canada (1999a) indicates that companies with excellent management habits are 25% more successful in introducing new products or services. Baldwin (1995) notes that the most innovative companies are likely to place more emphasis on management and not limit themselves to concentrating on R&D. These companies put more energy into human resources, marketing strategies and development, financing, flexibility of the organizational structure, etc. They show a stronger commitment toward innovation. McGinness and Little (1991) confirm that while efforts in the field of R&D represent a way to ensure a company's competitiveness, the number of products in terms of R&D is less important for productivity than the quality of management.

According to Martin (1998), the effectiveness of R&D spending is maintained in as far as the organizational structures that support innovation keep up with R&D growth. Similarly, government R&D programs are more effective for businesses that have the organizational structures as well as the human, technical and financial resources suitable for taking on R&D projects (Gasse, 1988).

Michael Porter's report on Canada's competitiveness (Porter and The Monitor Company, 1991) proposes a strategy based on the creation of distinct Canadian comparative advantages by producing unique products and/or by using unique processes within a specific system of business activity. This framework makes use of the entire innovation process. Unfortunately, according to Porter and Martin (2000), Canadian businesses seem to be concentrating more on duplicating existing processes than creating new, innovative ones:

“Seeking to compete on the basis of producing generic commodities with standard technologies at a lower cost because of factor endowments, or producing generic product/services with lower labour cost will not produce sustainable advantage for Canadian firms” (p. 20).

It seems that Canadian managers and businesses show significant weaknesses with regard to the innovation process. Porter and Martin (2000) conclude that there is good reason to improve the level of Canadian managers' skills:

“Canada needs to make an unprecedented level of investment in specialized education to support its industries. One area that requires special attention is managerial education to overcome Canada's weak position on seeking advantage through unique product and process (21st rank in the world), the capacity for innovation (20th), the control for international distribution (15th) and branding (14th)” (p. 27).

Furthermore, Industry Canada (1999) recognizes that the rate at which these leading-edge methods and technologies are being adopted is lower than in the United States. According to a survey of large Canadian corporations conducted by the Conference Board of Canada (1999a), the organization and structure of firms that encourage innovation are Canadian companies' biggest weakness. The same goes for the flexibility of the organizational structure and the leadership of managers when it comes to innovation:

“In Canada, the leadership gap appears to be a key component of the innovative challenge... Fewer than a quarter of respondents believe that company leaders are effective in supporting innovation, and 10% state that they are strong in managing creative talent” (p. 43).

The Conference board's analysis concludes that:

“Canadian management appears to have difficulty in creating the climate and culture, systems and processes necessary to generate successful innovation over time” (p. 9).

Rao *et al.* (2000) arrive at the same conclusion for the Canadian chemical industry. According to them, Canadian companies must strengthen their ability to develop and market products and the results of their research in order to become competitive on the international market, rather than sell the results of their research to foreign multinationals and lose the inherent added value of their discovery. Rugman and D'Cruz (1990) suggest that the innovation process is neglected by Canadian companies: whatever their capacity for innovation, these companies seem to be disproportionately focussed on the product and not on the innovation process.

A 1991 assessment of a program encouraging businesses to adopt leading-edge technology revealed that, although the program was supposed to emphasize technology right from the start, problems in management and human resources were detected in more than 95% of the cases (Newton 1996). According to a survey conducted by the CLMPC (Canadian Labour Market and Productivity Centre),⁴ approximately 62% of businesses indicated that the management abilities of small businesses were “poor” or “very poor.”

Moreover, Canadian companies budget fewer resources for R&D than other industrialized countries (The Centre for the Study of Living Standards 1998, Industry Canada 1999), which underlines how weak the commitment to innovation is among Canadian businesses. Porter (Porter and The Monitor Company, 1991) notes that the root of the problem lies more in the private sector than in the public sector. Public spending on R&D as a percentage of the GDP is on a par with other countries, and tax incentives for R&D are among the most generous in the world. There is little reason to believe that the government should substantially increase its overall R&D spending.⁵

On the other hand, according to the 1999 World Competitiveness Report produced by the IMD (International Institute for Management Development), Canada ranks among the top ten in technology:

- 4th for the development and application of technology
- 5th for basic research
- 8th for total R&D spending
- 5th for the number of patents pending

But here again, it is not in their capacity for innovation but rather in their management abilities that Canadian companies fail. According to the IMD, Canada ranks as follows:

- 16th for management effectiveness
- 22nd for companies' ability to adapt
- 11th for corporate performance
- 24th for education in finance (insufficient in Canada)

In conclusion, a company's success and productivity are therefore not linked only to its R&D efforts but also to the quality of its management. Canadian businesses and managers show significant weakness in innovation management and the marketing of new ideas, which explains in part Canada's low productivity compared to other industrialized countries.

The productivity paradox

The importance of innovation management is clearly demonstrated by the productivity paradox. Many Canadian and American studies (Lehr and Lichtemberg, 1999; Licht and Dietmar, 1999; Gera *et al.*, 1999) have shown that more computer equipment (or, more generally, information technology) does not result in increased productivity. Therefore, there is no link between the amount of capital invested in IT and the productivity of a business or country. One explanation stipulates that it is not how many computers you have or how powerful they are but how you use them: corporate organizational structures do not adapt well to the adoption of information technology (Lehr and Lichtenberg, 1999). The Centre for the Study of Living Standards (1998) suggests two other hypotheses. First, the effective use of IT requires a sufficiently qualified labour force to be able to fully profit from these technologies. Second, the organizational structure may not be well prepared to make optimal use of information technologies.

The example of the productivity paradox underlines how important it is for management and organizational structures to support innovation and technology.

Lehr and Lichtenberg (1999) state that in the United States, the effective use of IT positively correlates to level of education: 68% of managers and professionals use computers versus 15% of workers and operators. There would be reason then to improve managers' IT abilities to circumvent the productivity paradox.

Gera *et al.* (1999) show that, in Canada, it is not the level of IT that stimulates productivity, rather it is the external technological effect coming from foreign sources through international commerce (international R&D spillovers). The increase in international exchange encourages the sharing of ideas, knowledge and technology. This foreign know-how plays a key role in Canada's productivity (Gera *et al.*, 1999; Bernstein and Mamuoneas, 2000). The OECD suggests that during the 1980s, 42% of Canada's total factor productivity was the result of international R&D spillovers, which emphasizes the importance of being open to foreign business and investments, and sharing new ideas and knowledge to stimulate productivity.

International commerce stimulates productivity

It is a well-known fact that international commerce stimulates productivity. Global competition makes production processes more efficient and international exchanges contribute to the spread of knowledge and technology. International commerce opens up new markets and ensures economic growth.

It seems that Canadian managers do not have enough expertise in the field of international commerce (Porter, 1991; The Corporate Higher Education Forum, 1988; Conference Board of Canada, 1999b). Consequently, there is a notable absence of international perspective in Canadian businesses. The relative weakness of managers in this area results in a lack of international skills or experience needed to launch products on export markets.

This is confirmed by the International Institute for Management Development (1999). According to its 1999 World Competitiveness Report, Canada ranks 24th in its level of internationalization (participation in international commerce), places 46th for how diverse its exports are, 33rd for its degree of globalization, 17th for how open it is, 36th and 39th respectively for its imports and exports of goods and services, 33rd for exports of commercial services, 32nd for a national culture that is not very open to foreign influence, and 15th for its managers' international experience.

The business world has an urgent need for international management skills, yet in Canada, the academic resources in the field of international commerce are insufficient and of lesser quality than in Europe and the United States (The Corporate Higher Education Forum, 1988): too few courses, professors with no experience in the field, too few specialists among those who teach international commerce, not enough quality Canadian material (70% of international commerce material in Canadian universities is non-Canadian), and insufficient funding to increase the number of courses and programs (The Corporate Higher Education Forum, 1988).

The Corporate Higher Education Forum (1988) points out that the government's commitment to international commerce studies is more philosophical than realistic. The government must commit genuine support to this kind of education:

- Increase funding for international commerce research centres
- Increase and support the research and development of university-level academic material
- Support students with scholarships to study or intern in a foreign country as part of their program

Conclusion

The quality of managerial skills must be improved through better training so that Canadian managers can be able to:

- Manage innovation
- Understand and adapt to new technologies
- Develop skills in international commerce

One of the principal problems lies in the lack of funding for business schools to improve the quality of education and gear it more toward the requirements of an economy based on innovation, thus ensuring the development of management programs that offer students the best possible education in innovation management, a greater understanding of new technologies, and better international skills.

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Notes

1. Sources: Industry Canada (1999), The Centre for the Study of Living Standards (1998) and the Conference Board of Canada (1999b)
2. Translation from the original French.
3. Department of Finance Canada Web site: <http://www.fin.gc.ca/access/budinfoe.html>
4. Cited in Newton (1996).
5. Translation from the original French (p. 446).

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