

Building Long Term Capability Now: Canadian Human Resources Study in Biotechnology The Paget Report

EXECUTIVE SUMMARY

Biotechnology is about people: their ideas, their scientific discoveries, their drive to commercial success. It is also about jobs - good jobs. The Canadian Biotechnology Human Resources Study set out to identify the kinds of jobs that will be created in the next five years and the kinds of capabilities that will be required to fill them. We found that there will be a growing demand for more people and new skills across the Canadian biotechnology industry. We also found, however, that the experience base does not exist in Canada at present to provide all of the people needed to foster the growth and development of the industry.

Initiated and directed by the biotechnology industry and focused at the regional level, this was the first industry study to concentrate mainly on human resource requirements. A Steering Committee reflecting the national and regional composition of the industry set the terms of reference for the study and guided the process, seeking to identify:

- future directions in the industry;
- skills and capability requirements;
- the human resource supply situation; and
- capability gaps and the capacity to fill them.

The goal was to develop recommendations to address the longer-term human resource requirements of the industry.

CONTEXT FOR THE STUDY

Globally, the biotechnology industry is in a dynamic state of development, shaped by four key factors:

- the growing importance of alliances between biotechnology companies and the companies that use their results in industries such as pharmaceuticals, agriculture and food, chemicals, environmental remediation and waste disposal, pulp and paper, and others;
- the changing nature of biotechnology research, which is evolving from a technology focus to a product focus and is broadening and becoming much more multi-disciplinary, e.g., molecular biology, molecular pharmacology and bio-informatics;
- the changing focus of biotechnology companies, from wide-ranging research, development and commercialisation efforts to specialisation, rationalisation and consolidation around company strengths; and
- the increasing importance of human resources in the success of biotech companies.

Governments elsewhere are helping their industries meet these challenges through financial incentives and other forms of support for basic and applied research and by creating supportive regulatory and intellectual property regimes.

THE CANADIAN INDUSTRY

The Canadian industry is shaped by the same trends but the emphasis varies from one part of the country to another, reflecting the distinctiveness of each region's industry. Companies in each region tend to focus in one area - agri-food in Alberta and Saskatchewan, for example, and pharmaceuticals in Quebec. The degree of company development - from start-up to field trials to full commercialisation - also varies between regions. In addition, the relative significance of the industry in local economies differs from region to region, as does the extent to which regional clusters of companies have benefited from supportive government policies.

More than 300 companies in Canada are involved directly and indirectly in biotechnology. Although often referred to as an industry, biotechnology is recognised as well as a driving technology underlying transformation in many sectors of the economy, such as agriculture and food, pharmaceuticals, and environmental management.

This study concentrated on the 120 or so firms that are considered core biotechnology companies; that is, their principle business is 'new' or 'second-generation' biotechnology involving the industrial use of recombinant DNA, cell fusion and novel bioprocessing techniques. We looked at the human resource requirements of firms at each stage of development: early start-up, pre-clinical or field trials, clinical/field trials, and full commercialisation.

The industry employs more than 8,000 people and generates revenues of more than \$1.3 billion annually - and fully 65 per cent of these from exports. The study covered more than 100 organisations across the country that employ some 4,000 people - about half the employee population of the industry. Although the industry tends to be regionally concentrated and specialised, the challenges identified by companies were consistent across the country:

- the need for management and specialised expertise to accelerate the transition from research and development to commercialisation;
- adequate resources to gear up for manufacturing and the transition to commercialisation;
- a more efficient and hospitable regulatory environment for moving biotech products from the research stage to the market; and
- public awareness of and knowledge about the industry.

STUDY FINDINGS

Already a significant employer of highly educated and skilled workers - scientific and technical jobs in biotech firms are filled largely by people with post-graduate degrees - the industry can be expected to create nearly 1,300 new jobs in scientific research and technical and support activities by the year 2000, assuming moderate (8 per cent annually) growth in the industry.

Under the same growth assumptions, 2,000 jobs will be created in functions related to commercialisation - moving from the laboratory bench to the marketplace. An additional 700 management positions will be required to direct the financing and growth needed to support the transition to commercialisation and sustain company longer-term success.

The study found that universities and community colleges should be able to handle this demand for post-doctoral fellows, post-graduates, university graduates and technicians (although there is general concern about long-term funding to support basic scientific research in universities). The capability gap will relate more to the specialised requirements of emerging fields of biotechnology - such as the need for people with multidisciplinary backgrounds combining several scientific specialties, such as molecular biology and bio-informatics. This suggests a need for expanded and more effective working relationships between business and the educational system at all levels.

In addition, universities cannot be expected to provide the specialised expertise that biotechnology companies will need as they move toward full commercialisation of their technologies, much of which can

be acquired only through experience. Some of these specialised skills requirements can be met in Canada, through recruitment from firms in other industries; but, the future of the biotech industry will depend on strategic recruitment from abroad (supported by appropriate immigration policies), and intensified training efforts within the industry to develop the functions that are critical to commercial success.

Specialised skills include those relating to the protection of intellectual property by securing strong and effective patent protection, critical to being able to raise financing. Another specialised skill is the ability to advance a potential product through the regulatory process and meet the governments' requirements for market entry. Difficulties and delays in this critical period can spell the difference between success and financial disaster. People involved in regulatory matters - both in industry and in government – would benefit from greater exposure to each other's concerns and requirements. This could be accomplished, for example, through exchanges of personnel and joint training in communicating, negotiating, and problem-solving skills.

RECOMMENDATIONS

Fulfilling the potential of the Canadian biotechnology industry to create jobs and exports depends on the availability of educated, skilled and experienced people at all levels in companies. To realise these goals, the Steering Committee recommends initiation of a wide ranging human resources strategy for the industry that includes the following elements:

- A co-operative approach to strategic immigration to acquire skills not available in Canada, involving the industry, Citizenship and Immigration Canada and Human Resources Development Canada.
- A regionally focused training strategy to pool resources of firms in regional biotech clusters and to make the best available training affordable for companies of all sizes. Training in areas such as technology management and functional specialities, as well as advanced technician training are seen as being particularly crucial.
- Stronger strategic and operational relationships between the biotechnology industry and academic and research organisations.
- A co-operative approach, involving the industry and federal government, to developing personnel in the regulatory and intellectual property fields, so as to reduce the costs and increase the effectiveness of these processes. Joint training, benchmarking of the best practices in other jurisdictions and exchanges of personnel are among the activities envisaged.
- Partnerships with the educational system to improve general awareness of biotechnology and increase the level of academic attention to the field in the school system.
- Creation of a Biotechnology Sectoral Human Resources Council to develop and implement the agenda set out in this report.

The Canadian biotechnology industry is poised for unprecedented opportunities to develop and grow. Potentially, thousands of highly skilled, well paid jobs could be created. Fulfilling this promise will depend on the industry's ability to attract, develop and retain skills at all levels in the industry - not only outstanding scientists and technical personnel but also people with the regulatory, patenting, manufacturing, marketing, financing, and other business skills needed to translate scientific excellence into company growth and commercial success.

(May 1996, the Paget Group)