

TECHNOLOGY AND ECONOMIC GROWTH IN CANADA

The following passage is part of a speech by Mr. C.M. Drury, the Minister of Industry, to the Canadian Manufacturers' Association in Toronto on June 7:

...The intensive application of science to industry has introduced a new and potent force in economic and commercial affairs. With our relatively "open" economy and the progressive reduction of trade barriers throughout the world, Canadian industry will have to face more intense competition at home and abroad. And that competition is no longer merely a contest of price — more and more it has become a battle of invention and innovation, in which scientific superiority and technical excellence are becoming major weapons. Thus, for Canada, the attainment of the desired rate of economic growth will now depend to a greater extent than ever before on the expansion of our manufacturing industry; this in turn will necessitate more effective exploitation of new technology. Therefore, in the final analysis, we must look to research and development in large measure to spark the process of industrial expansion and economic growth for the future.

STATE OF CANADIAN TECHNOLOGY

...Taken as a whole, Canadian manufacturing industry in 1963 displayed a "research intensity" of about 1.1 per cent, which was equivalent to a research and development expenditure of about one-half cent per dollar of sales. By comparison, British industry spends three times, Sweden four times, and the United States over six times as much relative to net output. While the foregoing may be largely a reflection of the subsidiary character of much of our manufacturing industry, it does not bode well for our future competitiveness in either domestic or international markets.

Since the research needs of different industries vary widely, perhaps a comparison on a sectoral basis would be more meaningful. The results of such a comparison between Canadian and U.S. industry (which is, after all, our main competitor) indicates that, disregarding defence-oriented industry, the research and development effort of U.S. industry exceeds that of Canadian industry by a factor ranging from 1.4 for paper to 5.2 for wood products. If we apply U.S. scales of research and development expenditure to the production levels of Canadian industry, we find that our total research and development expenditure would have to be four and a half times greater to match U.S. performance....

It is sometimes argued that it is not necessary for Canada to spend as much proportionately on research and development as other industrialized countries because of our extensive use of imported technology. The knowledge and skills which we have acquired from other countries have contributed greatly to the growth and productivity of our industry and to the high standard of living we enjoy today. We must continue to draw on these sources of technology in future.

However, it must be appreciated that undue reliance on imported technology can impose definite

limitations on the future viability and growth of Canadian industry. Any industry which is dependent on licensed or imported technology will lag behind the current state-of-the-art and hence forfeit the rewards which stem from technical leadership. Moreover, it is generally accepted that industry must actively engage in research and development in order to assimilate and successfully exploit new technology. The dramatic transition of Japanese industry in the last decade from an economy of "imitation" to an economy of "innovation" is an excellent example of the results which can be achieved by concerted effort.

ECONOMIC AND TECHNOLOGICAL OBJECTIVES

The Economic Council of Canada, in its first annual review, called for the attainment of a real annual growth rate for the Canadian economy of 5.5 per cent *per annum* so as to sustain a rising standard of living and to provide employment for a rapidly growing labour force (i.e. 200,000 new jobs *per annum*). This is a substantially higher average growth rate than has been achieved over any earlier period in our history. The Council identifies manufacturing industry as the key sector upon which the desired productivity expansion must be based and calls for the attainment by 1970 of "a high-education economy, a high-research economy, a high-innovation economy and a highly competitive economy".

In line with the foregoing, I believe that a three-fold increase over the current level of innovation activity in Canadian industry is essential if our manufactured goods are going to compete successfully in world markets. For these reasons, I have indicated the need for a target growth rate for industrial research and development of 20 per cent *per annum* to be sustained over a period of five years to bring us into line with other industrialized countries.

INDUSTRIAL RESEARCH INCENTIVES

As a matter of national policy, the governments of most modern countries recognize an obligation to stimulate technical progress and innovation activity in their industry by various forms of direct or indirect financial assistance. Relative to gross national product, the U.S. Government financed about 20 times as much industrial research and development as Canada; Britain about 11 times, and France and Sweden about six times as much. These expenditures produce a substantial upgrading of industrial skills and technology in those countries and place their manufacturers in a very favourable competitive position.

The importance of science and technology to Canada's economic well-being has been recognized by the Federal Government in recent years and several measures have been introduced to stimulate research and development activity in Canadian industry. The most comprehensive measure for this purpose is, of course, the tax-incentive programme, whereby firms are permitted to deduct 150 per cent of any increase in their research and development

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