



# **INDUSTRIAL INNOVATION**

**ITS PLACE IN THE PUBLIC POLICY AGENDA**

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**KRISTIAN S. PALDA**



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Introduction by:  
Steven Globerman



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# Industrial Innovation

## Foreword

Few issues in recent years have occupied popular imagination and public policy as much as high technology, research and development, and industrial strategy. In a previous Fraser Institute publication, *The Science Council's Weakest Link*, Professor Kristian Palda provided an insightful critique of many conventional attitudes toward these matters. The Institute is pleased herewith to publish Professor Palda's second book on the subject—a constructive view of the role of public policy in the crucial industrial innovation process.

We are grateful to Professor Steven Globerman for his introductory overview and are pleased to have the opportunity to publish the views of these two leading analysts of industrial policy. However, owing to the fact that the authors have independently arrived at their conclusions, the views they express may not conform singly or collectively with those of the members of the Institute.

Michael A. Walker  
Director  
The Fraser Institute

## Preface

As this monograph was planned, researched and written, the industrial and technology policy scene in Canada was in continuous turmoil. Starting in 1980, but building on a long and incoherent tradition, the federal government of Canada has seriously contemplated or announced, provisionally and definitively, at least four policies touching on technological innovation to the end of 1983. These policies ranged from the superinterventionist to none whatever, from an emphasis on manufacturing development to an accent on natural resources. The policy travail at the highest decision-making levels of the land comes through in the glaring contradiction on two nearby pages of the Finance Minister's 1983 budget discussion paper directed to R&D tax policies:

The tax incentives now available in Canada are significant and compare very favourably with those elsewhere. The analysis leads to the conclusion that the overall level of incentives should not be increased. . . . (*R&D Tax Policies – A Paper for Consultation*, April 1983, p. 29).

The proposals of this paper would in 1984 add some \$100 million to the approximately \$225 million of tax support now available annually. In addition, other general budget proposals add another \$85 million a year as they apply to R&D (*ibid.*, p. 27).

During the same period the Science Council of Canada kept on dispensing its nationalistically flavoured interventionist advice on an industrial policy rooted in support of high technology (*Hard Times, Hard Choices*, 1981) while in the summer of 1983 the other advisory body to the federal government, the Economic Council of Canada, unveiled its major "consensus statement" on technology and trade policies, *The Bottom Line*, almost diametrically opposed to that of the Science Council's position.

Thus the challenge in writing this volume was to absorb, discount and digest a flood of official publications, news items and editorials and to combine it with a less hectic academic analysis. The aim is to

arrive at a reasoned reflection about federal policy toward technological innovation in Canada, a reflection not made obsolete by the next trumpeted ministerial pronouncement.

I am indebted to many people, directly or indirectly, for thoughts which contributed to the analysis and argumentation presented here. I would like to thank my colleagues at Queen's University, J. Baldwin, F. Chambers, B. Pazderka, and D. Usher, N. Swan of the Economic Council and D. de Melto of DRIE, W. Watson of McGill and especially Petr Hanel of the Université de Sherbrooke. The conclusions and the inevitable errors are mine. My gratitude also goes to Michael Walker of the Fraser Institute for constant encouragement and backing. C. Raymond, M. Hogeboom, J. Smith and H. Chiasson provided efficient secretarial backing.

This book is dedicated to my daughter, Valerie Anne.

## About the Author

Kristian S. Palda is Professor of Business Economics in the School of Business, Queen's University, Kingston, Ontario. Born in Prague, Czechoslovakia in 1928, he received his early education at the Real Gymnasium in Prague. He received his B. Comm. from Queen's University in 1956 and his MBA from the Graduate School of Business at the University of Chicago in 1958. Professor Palda received his Ph.D. in Business from the University of Chicago in 1963, when he was the recipient of the Ford Foundation Doctoral Dissertation Prize.

Professor Palda taught business and economics at the Ecole des Hautes Etudes Commerciales in Montreal from 1958 to 1962, when he was appointed Assistant and then Associate Professor at the State University of New York at Buffalo. In 1965 he went to Claremont Graduate School, Claremont, California where he was Professor of Business Economics until 1970. He was appointed to his present position at Queen's University in 1970. He held visiting appointments and has lectured widely in North America and Europe, especially in French-language areas.

Professor Palda's research interests, always coloured by economic analysis, have been devoted to two fields: the examination of advertising effects in commercial and political markets, and issues in technological innovation. He has published five books touching on these areas, the latest being *The Science Council's Weakest Link* with The Fraser Institute. Of late he has been using the so-called public choice approach (application of economic analysis to the political scene) in his investigation of Canadian electoral campaigns (articles in the *Journal of Consumer Research* and *Marketing Science*) and international comparisons of Canada's R&D spending (Economic Council of Canada research paper with Bohumir Pazderka).



# Introduction

Steven Globberman\*

Intervention into economic activities by federal and provincial governments is pervasive and profound. The well-publicized statistic that government expenditures account for around 25 percent of Canada's Gross National Product gives a misleading indication of government's influence over the production and distribution of wealth, since it ignores other major instruments of government policy including tax legislation, tariffs and other barriers to trade, regulation, marketing boards, and so forth.

Ever since Confederation, instruments of government policy have been directed at modifying (sometimes in major ways) the sectoral composition of economic activity determined by transactions in the private sector. The imposition of the domestic tariff structure in 1874 (and elaborated in 1879) was consciously designed to encourage the growth of domestic manufacturing industries relative to the growth of resource industries. More recently, the National Energy Program can be seen to have had, among its main purposes, an intent to shift oil and gas exploration activities from Alberta to the frontier and off-shore regions, and to increase the share of industry output produced by Canadian-owned oil companies.

These and other industrial policies (or industrial initiatives if policies is considered too grand an appellation) share certain characteristics. They are typically justified, or sold to the public, on the basis of alleged "failures" of the market system; however, their ultimate impact is usually to reduce economic efficiency and leave the bulk of the citizenry worse off economically than they would have been in the absence of the initiatives taken.<sup>1</sup>

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\* Steven Globberman, Professor in the Faculty of Business Administration at Simon Fraser University, is one of Canada's acknowledged experts on the economics of innovation and technological change.

The diligence with which vested interest groups lobby for government action suggests that a relatively small group of producers and (or) workers will benefit from policies that inflict economic harm on the many. Certainly, bureaucrats are typically winners, since increased ministerial and departmental budgets are a common companion of government efforts to "rehabilitate" the market system.

It might be argued that financial follies such as the National Energy Program are justified by non-economic considerations. The favourite recent justification for sundry initiatives is an alleged need to preserve Canada's identity and (or) her political sovereignty. Were the initiatives taken not so costly, the national sovereignty argument might be considered a quaint, if somewhat defensive, form of patriotism. Unfortunately, calls for promoting Canada's sovereignty are typically most strident when substantial financial gains or losses are at stake. Hence, one does not need to be a life-long cynic to remain unsurprised at a finding that the strongest private-sector apologist for the National Energy Program—Dome Petroleum—is the largest recipient to date of federal grants for frontier and offshore exploration.<sup>2</sup>

The *de facto*, if not *de jure*, bankruptcy of Dome Petroleum also underscores an ironic, but predictable, long-run tendency for market forces to overrule or outmode public policies that seek to contain or redirect those forces. As another case in point, the tariff structure of 1879 was certainly successful in encouraging the growth of manufacturing in central Canada; however, a substantial portion of manufacturing assets are owned by foreigners. Ironically, we are coming full-circle in the tariff debate, with some proponents of free trade arguing that one of the benefits of trade liberalization is increased Canadian ownership of manufacturing facilities.

It is becoming a popular sport to criticize public sector inefficiency and ineffectiveness, yet the juggernaut of government intervention rolls on.<sup>3</sup> To be sure, the emphasis of industrial policies tends to change over time, much in the manner of fashion design. For example, regional development policies received great attention in the 1960s, while energy and foreign ownership policies took centre stage in the 1970s. As we move through the 1980s, innovation policy seems to be emerging as a central focus of politicians and bureaucrats. While the activities of the Science Council of Canada and the Ministry of State for Science and Technology (MOSST) successfully placed industrial innovation on the public policy agenda in the early 1970s, the prominence of this issue has grown in recent years, as both federal and

provincial politicians look increasingly to “high-tech” as an elixir for their ailing economies.

As with past policies, government programs designed to promote industrial innovation are being justified on the basis of alleged inadequacies of the market to produce the “appropriate” quantity and quality of new products and new industrial processes. To date, the evaluation of this claim has been relegated largely to academic books and journals. Public debate, such as exists, tends to be concerned with the precise form that innovation policies should take, e.g., government grants versus tax incentives. As the costs of public sector initiatives designed to stimulate innovation continue to grow, it is imperative that the motivation for, and structure of, these initiatives be scrutinized more vigorously in the public arena.

The current study by Kristian Palda represents an important and particularly accessible contribution to the latter objective. The author provides a careful and comprehensive overview of both the theoretical and the practical arguments for and against industrial innovation policies, as well as evidence bearing upon the effects, to date, of major government programs. While the arguments presented and the evidence assembled are not unequivocal, they do raise grave doubts about the capacity of the federal government to improve broad economic welfare through innovation policies. In this respect, Professor Palda might seem to be iconoclastic given the broad support economists have provided for government intervention in this area; however, a growing number of economists are questioning the basic “market failure” justifications for innovation policies. They are also coming to recognize more explicitly that the direct and indirect costs of government intervention may substantially outweigh the costs of whatever inefficiencies exist in the marketplace. Hence, the sceptical position taken by Professor Palda is shared by a growing number of students of the innovation process.

Without diminishing the scope and depth of the insights presented in this study, it is possible to summarize Palda’s main points in a fairly straightforward manner:

1. The government’s preoccupation with promoting industrial research and development (R&D) may be misdirected, since R&D is one of the necessary conditions, but not a sufficient one for innovation;
2. Innovation policies tend to concentrate on manufacturing which, in

- any case, accounts for only about 20 percent of national output;
3. While theoretical arguments can be made that the private sector will underinvest in R&D, and while some U.S. evidence strongly supports the "underinvestment" hypothesis, it may typically be the case that the costs of public intervention to "correct" this failure of the market will exceed the benefits;
  4. The costs of government innovation initiatives will typically exceed the benefits because of the absence of accountability imposed by a profit constraint. Moreover, the bias of policy-makers is to concentrate on achieving technical objectives while slighting marketing objectives. But successful innovation requires the matching of technical possibilities to market needs;
  5. There is no persuasive empirical evidence that Canadian industry suffers from an innovation gap. Nor is the evidence encouraging that the government can efficiently stimulate innovation in the private sector, particularly when government assistance is "targeted" at specific sectors or projects;
  6. Infrastructure policies (such as assistance to education and promotion of competition) are far more promising government initiatives to encourage industrial innovation.

Most of these points are consistent with the bulk of what we know about the technological change process. For example, there is persuasive evidence that the returns to adopting already existing technology often approach the returns to developing new technology, with less risk involved.<sup>4</sup> Furthermore, even observers who are sympathetic to market failure arguments for government innovation policies acknowledge that the conditions under which government intervention is likely to be worth the costs are specific and frequently violated.<sup>5</sup>

Since the relevant evidence is primarily drawn from the U.S. experience, it is important to consider whether there is something unique about the Canadian situation that would modify conclusions drawn from the international literature. The most frequently referenced condition in this regard is the high degree of foreign ownership in Canada. The substantial presence of multinational subsidiaries in the Canadian economy is alleged to deprive Canada of the capacity to innovate, both because subsidiary R&D expenditures are centralized in the parent company and because talented scientists, engineers, and R&D managers must move to the United States to find interesting and rewarding careers.

Science policy-makers in Canada have a long-standing antipathy toward foreign ownership. Therefore, an evaluation of innovation policy should confront the charge that government intervention is required to offset the underperformance of R&D by multinational subsidiaries. Palda answers this charge in an economical fashion by providing evidence of the substantial amount of R&D that is "invisibly imported" into Canada through the multinational network. While the existence of R&D underperformance is difficult to establish in any case, it is clear that the reported R&D expenditures of foreign subsidiaries seriously understate the quantity of technical and marketing knowledge that is made available to Canadian factors of production.

Of course, this observation fails to deal with a second criticism of the innovation activities of foreign subsidiaries. Namely, that the technology imported from the parent company is mature and does not enable Canadian firms to compete successfully in world markets. This criticism was considered and rejected in a recent study by the Economic Council of Canada.<sup>6</sup> Specifically, the Council study found that imported technology was the basis of many successful innovations and was generally cheaper than indigenous technology.

There are several other reasons to argue that Canada may not suffer from substantial R&D underinvestment. Externality-type market failures are most likely to be associated with the performance of basic or generic research, since this type of research often has unanticipated commercial consequences that are exploited by other firms. Even where basic research is fairly well focused, e.g., demonstrating the theoretical feasibility of digital telephone switching systems, the results are typically not proprietary; however, very few Canadian firms actually do this type of research in any case. Furthermore, Canadian firms have an excellent opportunity to "free-ride" on the basic research performed by U.S. organizations. As an additional point, the relatively high levels of industrial concentration in Canada suggest that Canadian firms, facing less domestic competition than their U.S. counterparts, may be better able to internalize the benefits of their R&D programs.

Palda's chief concern is with the R&D underperformance argument and with evaluating whether the allocative benefits of innovation policy are likely to outweigh the costs. But he is also concerned (justifiably) with the distributive effects of the federal government's growing financial commitment to industrial R&D. Since it cannot be presumed that the beneficiaries of any set of policies will compensate the

losers, so that the latter will be at least as well off as they were before the policy, the distributive consequences of government initiatives are relevant information to the policy debate. In this regard, it can be argued that subsidies to industrial innovation provide direct benefits to a fairly narrow industrial segment at the expense of the broad tax-paying population. For example, about 80 percent of all Canadian R&D is performed in the manufacturing sector, which accounts for only about 20 percent of the national product, and about 45 percent of all Canadian R&D is accounted for by two industries: transportation equipment and electrical equipment.

Infrastructure policies, such as assistance to education, offer more broadly distributed direct potential benefits; to this extent, they are more promising forms of government intervention than targeted R&D incentives. While it is widely hypothesized that education allows for factor adjustment to changing conditions and enhances the ability to innovate, a fairly recent and comprehensive assessment of this hypothesis casts some doubt on its significance. Specifically, the study concludes that although the inventive and developmental activity in advanced economies is related somewhat to the existence of highly educated individuals and a technically competent labour force, there is no evidence of the existence of a direct relationship between the rate of technological change and the education level of the labour force.<sup>7</sup> There is evidence, however, that educated workers are more amenable to on-the-job training. This observation suggests that the social benefits of education are likely to be fully realized only in the context of a healthy private sector economy.

Notwithstanding a preponderance of evidence that education and competition promote industrial productivity, Palda's scepticism about the ability of government institutions to formulate and implement efficient policies to encourage innovation is well taken. While we may call education and competition policies "broad infrastructure strategies," they must still be implemented in the form of specific programs and budget allocations. There is no strong basis for confidence that increased public sector expenditures in pursuit of these policies will stimulate innovation more efficiently or effectively than the spending "sinkholes" (e.g., CANDU, Telidon, Canadair) that are so devastatingly reviewed in chapter 6.

One other particularly interesting topic considered in Palda's study is the role of government policy in Japan's enviable economic performance. Palda notes certain important differences between Japanese

government policies and those of most Western governments, including Canada's. But these differences seem to be matters of degree more than differences in kind. For example, governments in all developed countries make major contributions to education and to the provision of a highly skilled labour force. In most countries, the majority of R&D resources are oriented primarily to applied and developmental activities. Why have these basic policy thrusts seemingly been more successful in Japan than elsewhere? The Japanese experience is particularly troublesome for market-oriented economists, since the popular view is that there is extensive industrial targeting performed by the Ministry of International Trade and Industry (MITI).

Federal government ministers have recently pointed to Japan as evidence that the government has an important role to play in identifying successful emerging technologies for local entrepreneurs to pursue and encouraging the development of these technologies by the private sector. Whatever the evidence for Japan, it is clearly dangerous to draw inferences from the experience of other countries about the feasibility and desirability of comparable programs in Canada. But in light of recent scholarship that casts some doubts on the accomplishments of Japanese government programs and that suggests planning mistakes may be as numerous as planning successes, Palda's implied scepticism regarding government interaction seems justified.

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