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Industrial Strategy for an Ideas-Based Economy

*David Crane**

It is easy but simplistic to use aggressive trade policy as industrial policy. It is also appealing. It assumes that all of our own problems are the fault of someone else so that by adopting unilateral, protectionist policies we will, by the stroke of a pen, restore competitiveness. But it is also wrong-headed and dangerous - wrong-headed because it is based on a false assumption that the main cause of our economic problems are trade barriers and policies of other countries rather than poor policies and business mismanagement at home, and dangerous because it threatens to destroy the international trading system and precipitate costly trade wars that no one would win. Threatening to ban the sale of Airbus aircraft to domestic airlines or to impose strict quota or content rules on the import of Japanese cars may have a visceral appeal but it is dumb policy. What we need is a successful Uruguay Round, a strengthened set of international trade rules and disciplines, a strengthened international dispute resolution system based on multilateral rather than unilateral domestic trade law, and a new Multilateral Trade Organization that can lead the world in further strengthening of the world trade system in the future.

The real challenge for both our countries is not to find new ways to harass our trading partners, but to develop the new sources of wealth creation to support the kind of societies that we want to have. Although we must address the serious fiscal issues and cost issues in our societies, we face an even more daunting challenge in developing the sources of wealth necessary to sustain and improve the quality of life that we aspire to in our schools, hospitals, libraries, parks, clean environment, public transit, social justice, liveable cities or rising personal incomes.

Looking back over the last ten to fifteen years, both Americans and Canadians have experienced a serious problem of disappointing productivity growth and a stagnating standard of living. The economist Paul Krugman appropriately suggests we now live in an "age of diminished expectations." It is a world in which young people today are told they will never live as well as their parents, where middle-aged people are warned they may never collect their pensions. It is a world in which low-paying part-time jobs grow faster than well-paying full-time jobs and in which workers become contract employees without benefits in-

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The following text was compiled from the transcript of the remarks made by Mr. Crane at the Conference.

stead of permanent employees with benefits. It is a world, as well, where we are told there can be no job security and that a typical worker can expect to lose his or her job every few years.

I do not believe we have to accept a future of diminished expectations. Despite the problems we face, we also know that we have many bright and entrepreneurial people in both our societies, that we have an accumulation of knowledge and experience and capacity that still has great value, that we have many scientists and engineers who are producing more knowledge than the world has seen before, and many ordinary people who are ready to do whatever it takes to work for economic and social rejuvenation. However, to succeed in the future, we need a comprehensive, clearly-focused industrial policy to give our entrepreneurs, educators, scientists, and investors the tools they need to develop new sources of wealth in a twenty-first century economy in which wealth-creation comes from innovation, ideas, and knowledge.

Industrial policy gets a bum wrap quite often because of the way it is defined. Its opponents conjure up pictures of heavy-handed bureaucrats or pork-barrel politicians hand-picking corporate or technological winners and losers. The truth is, though, that every country has an industrial policy of one sort or another, even if it never uses the words "industrial policy".

Our tax laws are part of an industrial policy, the way we deal with competition or anti-trust is part of an industrial policy, trade policy is part of an industrial policy, the programs we have to train or retrain people are part of an industrial policy, the laws governing our banks and other financial institutions very much have an effect on part of industrial policy, our educational systems and regulatory practices, all of these things have an enormous influence on a society's ability to create wealth and achieve economic growth. These policies, along with the history, culture, and values of each of our societies, will ultimately determine how well each of our countries succeeds in international competition.

In both countries we have to recognize that our standard of living depends on our ability to be competitive producers of goods and services in the tradeable sector, which means in the world of international competition. Our publics have to understand that our success and prosperity is very much weighted to that success in the international marketplace. The Japanese public understands this, the German public understands this, and some of the North European countries, the Swiss and others, understand that their prosperity is directly linked to their ability to compete in the international marketplace. I am not sure that is yet understood by a typical Canadian or American.

It is also important that we understand that the basis for wealth generation, as Paul Romer has argued so well, consists of knowledge, ideas, and innovation. This means not just technological innovation but,

perhaps even more importantly, the capacity for innovation in the institutions and arrangements we have within our societies that allow things to happen, that allow savings to reach entrepreneurs, facilitate new partnerships, empower employees and restructure the workplace, connect universities and industries, facilitate strategic alliances and networks. Institutions and institutional arrangements are the enabling organizations that allow things to happen. As Paul Romer argues, the societies that are the most successful in creating these new institutional arrangements will lead the world in the next century because it is the institutional arrangements as much as anything that will govern our success or failure. So what we need is a capacity for both institutional innovation and technological innovation.

While there is still a reluctance to discuss industrial policy within the Canadian government or the Canadian economics and business communities, the situation seems to be quite different in the United States, where there is a fierce and ongoing industrial policy debate. Industrial policy is clearly a central theme of the new Clinton Administration. However, the fact is that the United States was already well along the road to an industrial policy under the Bush Administration. I had the opportunity to visit Alan Bromley, President George Bush's chief science advisor and technology advisor, at the White House. A Canadian who could not get a job at a Canadian university, he went out and got one of the best jobs in an American university, and ended up in the White House responsible for U.S. science and technology policy. Dr. Bromley took me through all the things that President Bush was doing, major generic or pre-competitive technology programs in the systems, software, hardware, and applications associated with the electronic highway, biotechnology, new materials, and plans for a similar major program in flexible manufacturing technologies, U.S. initiatives for an electric car, for new environmental technologies, and for the semiconductor industry, other programs to strengthen science and engineering education, new linkages between industry and government laboratories, and various initiatives on technology transfer and diffusion. So it is fair to say that the ambitious Clinton-Gore proposals represent an intention to build on past policies, not a break with the past.

This renewed interest in industrial policy is of fundamental importance because it recognizes that our futures depend on our ability to better organize our strengths and to deal with our weaknesses, that we have to take charge of our futures and not blame our problems on other countries.

Our poor productivity performance and the stagnating standard of living in both our countries since the mid-1970s are not the result of protectionism in other countries, but stem from the priorities, policies, and practices of our own public and private sectors. Paul Krugman argues that "productivity isn't everything, but in the long run it is almost

everything. A country's ability to raise its standard of living over time depends almost entirely its output per worker." This is the bottom line of the economy, and in both our countries we have had poor bottom-line results. This is why we have been unable to maintain our consumption of private goods or public goods except by accumulating enormous private and public debts. As we are now discovering, that is not sustainable.

Both in Canada and the United States, but especially in the United States, there seems to be an almost a paranoid fear of Japan. There is no doubt that Japan is highly successful, out-investing the United States in civilian research and development and in business investment in new manufacturing technology in recent years, achieving remarkable gains in international market penetration, introducing many of the new high-tech consumer products, and benefiting from a capacity to pursue long-term strategic objectives. Today, Japan is the world's principal creditor nation, the source of funds to finance Canadian and U.S. budget deficits. There is no question that Japan has worked the market to its own benefit whenever it could, that it has pursued its own protectionist or collusive practices, so Japan should be held to account for any practices that are contrary to multi-lateral trade agreements. However, let us not exaggerate the significance of Japanese policies in assessing our own competitiveness.

You cannot blame the Japanese for the performance of the North American auto and auto parts industries. The Japanese simply developed better quality automobiles and more efficient systems of designing, engineering, and manufacturing automobiles. Japan was the home of just-in-time inventory and the most recent industrial revolution, "lean production". Japan chose to learn from Edwards Deming and his theories on quality control, while North America chose to ignore the quality revolution until the Japanese forced it upon us. Maryann Keller's highly critical book on General Motors, *Rude Awakening*, describes a vast corporate bureaucracy, suffering from internal gridlock and an unjustified degree of arrogance, that simply dismissed the idea that the Japanese could build cars that would sell in North America. Just as General Charles de Gaulle once dismissed a Japanese prime minister as "a transistor salesman," General Motors scorned the capabilities of Honda, Toyota, or the other Japanese producers. She describes GM chairman Roger Smith, in splendid isolation in Detroit, personally deciding which senior vice-president will have which secretary and which parking spot will be allocated to each executive. You cannot blame the Japanese for that misallocation of executive time. Much the same story is spelled out in David Halberstam's great book on the auto industry, *The Reckoning*.

So if we are to succeed in the future, the kinds of policies we pursue at home, rather than a move to managed trade or protectionism,

will be decisive. To a large extent, the competitiveness battle will be fought out in the private sector, through the countless decisions made in the marketplace on what to invest and where. However, government policy is also fundamental; as Walter Mondale put it during his unsuccessful presidential campaign against Ronald Reagan, business does not need government on its back but can benefit from having government at its side.

What are the roles of government in this new economy, in which ideas, innovation, and knowledge are the sources of wealth creation? I believe there are five key roles for government: as macro-manager, as a facilitator, as a risk-sharer, as an infrastructure builder, and as an institutional innovator.

The fundamental role of government as macro-manager is the role on which there is the least disagreement. All of us, regardless of political or economic persuasion, recognize that government's performance in monetary and fiscal policy, with its consequences for inflation rates, interest rates, exchange rates, economic growth, and aggregate employment and investment, has an overriding implication for competitiveness. Trade policy and competition policy are also important components of macroeconomic policy. If macroeconomic policy is badly managed, industrial policy becomes ineffective. In both our countries, continuing budget deficits and rising public sector debt, including a growing portion owed to non-residents, represent major threats to future competitiveness and to our standard of living. We also need to recognize, though, that one reason for continuing deficits and rising debt is our past neglect of the wealth-creating capacity of our economies and our failure to make the changes and investments necessary for an economy in which high-value industries and high paying jobs depend on innovation, ideas, and knowledge. Government deficits are a function of revenues as well as spending, and economies with poor productivity growth do not generate tax revenues at the same rate as economies with high productivity growth.

What about the role of governments as facilitators? Governments can make things happen. They can do this by removing impediments, by changing incentives, and just by working to make things happen. I will give you a one recent example from Canada, which could have far-reaching changes for the way in which we supply equity to industry but which has not cost the taxpayer five cents. We changed the legislation regulating our financial services industry - our banks trust companies, investment dealers, and insurance companies. Now one of the big concerns in both Canada and the United States is the availability of patient equity capital for small and medium-sized businesses. I think in both countries we agree that if we are going to grow these new companies, and develop the new jobs, products, and exports, we have to find better way to help people with ability and entrepreneurial ideas obtain

the equity capital that allows them to grow.

Now, in Canada, with the recent reforms in financial services legislation, we have taken a partial step towards some of the things that can be done by financial institutions in Japan and Germany to foster the growth of industry. In effect, now we have financial institutions that can do almost anything; for all intents and purposes we now have universal banks. Our banks own investment houses that provide underwriting and stockbroking services; they own major mutual funds; they can own life insurance and trust company subsidiaries; they can offer information systems services and real estate services. Trust companies can do all these things. Life insurance companies can do a vast majority of them.

One of the changes made in our financial reforms, which could have major significance for Canadian industry, allows Canadian banks, trust companies, and life insurance companies to establish merchant bank subsidiaries. These subsidiaries, in addition to providing traditional merchant bank services, such as advising on mergers and acquisitions and corporate restructurings, can also hold equity of up to ninety million dollars in other corporations. This creates the potential for an enormous new source of equity capital from small and medium businesses in our country. The government did only one dumb thing: they said this equity can only be held for ten years. Imposing an artificial deadline creates timing problems which can become a disincentive to our financial institutions. We have not gone as far as the Germans and Japanese, and I am not sure we should. But this change in financial legislation is one example of how government can play a constructive role as facilitator in industrial policy.

I will give one other example. In Ontario, we have set up something called the Ontario Sector Partnership Fund. It is a program which is available to help industry develop infrastructure important to its capacity for productivity growth, retraining, or innovation. This money is only available to industry sector groups. So industry associations have to organize for it, they have to have labor participation, and they have to put up part of the money themselves. And so there are those kind of constraints, but they are important constraints because they force companies in an industry to work together in key areas such as training or pre-competitive research and development. These constraints also force companies and their unions to develop partnerships or cooperative arrangements.

The plastics industry has established a specialized training institute in Ontario as a result of this program, with one of our community colleges. It is a timely investment in an industry which has been enjoying strong growth in Ontario. But the industry is worried about running out of moulders and other skilled workers. In the past, it has been able to rely on bringing skilled workers from Europe. But many of

these workers are approaching retirement age; at the same time, skilled Europeans no longer find it as attractive to move to Canada as they did in the 1950s and 1960s, while Canada's poor apprenticeship system has failed to deliver the skilled workers needed. So this initiative by government is another example of a productive facilitator role.

Government also has an important role to play as a risk sharer. To some extent this is done through the tax system, for example, when we provide a refundable tax credit for research and development. But there are other ways in which government can help companies share the risk of innovation. The argument for a government role is that the costs of bringing new technologies forward are now so high that companies alone cannot carry them. In the United States, this is the reason why the Bush Administration participated in the high performance computing and communications project, funded similar pre-competitive R&D in areas such as new materials and biotechnology, and entered into specific agreements with industry for new technologies such as with the semiconductor industry to develop new manufacturing technologies or with the Big Three auto producers for new battery technologies to fuel an electric car. This need for risk-sharing is even greater in Canada, where we have few large corporations.

One approach we have adopted in Canada, starting in Ontario and copied by the federal government, is to establish centers of excellence that link our best universities and industry in pre-competitive R&D projects. Government has provided much but not all of the funding. Industry and university teams put together proposals for various projects, and scientific peer groups—including scientists from other countries—recommended which projects should go ahead. The centers of excellence are subject to ongoing review but there is a feeling that they are playing a positive role and both the Ontario and federal governments have announced a new five-year cycle of spending for the centers. While the centers of excellence represent an interesting institutional innovation in Canada and have pushed forward precompetitive research and development, we still need to do more in Canada in the area of risk-sharing.

One way is through sharing the risk in commercializing research and development. One model is the Sweden Industrial Fund, which perhaps would be better administered at the provincial or state level than at the national level. The Swedish government invested a pool of capital a number of years ago to share the cost of commercializing new products and established an arms length investment board to decide which company projects would be supported. Companies seeking funding assistance for commercialization of a new product apply to this board. The board does not have a large staff; instead, it retains independent technology assessment consultants to review the applications. Their recommendations are put before this board, which determines

which projects will go ahead. The board itself is made up of business, labor, and scientific members. It also has representatives from the Swedish government, but they do not have a vote. If a commercialized product is successful, the money has to be repaid in full at market interest rates. The industrial fund may also acquire a royalty right as well. The fund is basically self-financing now. That is another example of risk sharing that we should consider in North America.

This brings me to the next area where government has an important role to play in fostering competitiveness and that is in ensuring a modern infrastructure for a knowledge-based economy, one in which ideas and innovation are the driving forces. In this new kind of economy we must redefine what we mean by infrastructure. While the quality of roads and highways, airports, water and sewer systems, urban transit, ports and other traditional physical infrastructure remain important, infrastructure in the knowledge-based economy must be redefined to include telecommunications, the electronic highway, research institutes, education, and training facilities.

One U.S. example is the high-performance computer and communications network, which promises to become an important part of the research infrastructure for the research and education communities. In Canada, we have a similar though somewhat more modest project, the Canarie Project. Both of these are networking projects of research and education which initially will serve high-powered research institutes, university research centers, government research labs, and business research centers. However, they will have the capacity to be utilized in a much wider sense in the future for education, health systems, and financial service industries and elsewhere. This is learning curve infrastructure, which also provides considerable opportunity for companies and researchers in telecommunications, software, networking, switching system, and applications to upgrade their skills.

In the new economy, infrastructure also includes areas such as training, specialized training institutions, the quality of schools and universities, the role and breadth of apprenticeship training systems, and other sources of support for the development of human capital. While government does not have to create and operate all of these facilities or institutions, it has an important role to play in ensuring that high-quality human capital infrastructure exists in the community. No economy can pay high-productivity wages for low-productivity work; our future depends on ensuring that everyone has access to education and training that equips them to pursue high-productivity work.

Considerable research now exists that clearly demonstrates the connection between high-quality infrastructure and rising productivity. It is a fundamental responsibility of government to make sure that modern infrastructure is in place and to constantly redefine infrastructure to meet the changing needs of an innovative economy.

Governments also have an important role to play in fostering competitiveness by taking the lead in institutional innovation. Institutions are critical as the organizing bodies that are able to take ideas and translate them into action, or products and services. Just as we need technological innovation to be competitive, we also need institutional innovation. In a rapidly changing world we need the capacity to get rid of old institutions, redesign institutions, and create new and different ones.

In Canada, for example, we are creating new institutions to manage our worker retraining programs. A new Canadian Labour Force Development Board has been established, in which labor and business together have the responsibility for overseeing the country's retraining programs, apprenticeship systems, literacy initiatives, and other measures to provide workers with necessary skills and to retrain unemployed workers. The board will have an important role to play in the design of the training system, the review of programs, and the planning of changes in various programs. Our provinces are setting up parallel boards, since this is an area of shared jurisdiction under our constitution, and they will take this model down to the community level.

No one can guarantee a success, but this institutional innovation has the potential to improve the quality and relevance of training, to take a major step forward in bringing apprenticeship into a greater range of industries as well as to integrate the apprenticeship system into the school system, to raise the quality of workplace training in Canada, to increase the role of business at the national and local levels in forecasting future skills demand, and to improve the quality of labor management relations in our country as well. In both our countries, while there are some examples where labor and management work well together, the overall record is not encouraging.

There are other examples of institutional innovations. The major U.S. projects, such as the high performance computing and communication project, and the Canadian centers of excellence are new institutional arrangements for pre-competitive research and development. In the area of finance, the Ontario government is in the process of creating what it calls the Ontario Investment Fund. It is a fund of about \$300 to \$500 million which will be established jointly by the Ontario government, various pension funds, and banks and other financial institutions. It will be managed by an independent board and its function will be to provide equity capital for growth-oriented companies whose needs are not being met by existing private sector institutions. The fund will operate as a holding company and the resources as its disposal will, in turn, be invested in specialized or sector investment funds, in fields such as health sciences, software, and environmental technologies. The money that is committed by the Ontario Investment Fund can never be more than fifty percent of any investment that these underlying funds

make, in order to lever the resources of the fund and to introduce an additional commercial discipline for any investment.

In Ontario, we are also looking to see whether it is possible to create a Canadian version of a Japanese Keiretsu. The Premier's Council, which is an advisory body of business, labor, and academic leaders to our premier and his government, has published a report discussing what it calls the innovative business enterprise. This is an attempt to graft on some of the risk-sharing and information-sharing advantages of the Keiretsu system onto our system of business organization. It would create a network, built around a financial institution and bringing together companies from different areas that have a shared interest in an underlying core technology. For example, the automotive, appliance, and office furniture industries could have a common interest in certain new materials. In the Ontario report, one of the areas suggested for an innovative business enterprise was the "smart house". This was seen as a technology that could bring together the building materials industry, the fiber optics and communications industries, the electronics industry, companies and researchers working on new materials, building systems companies, house builders, and financial institutions involved in the housing industry. There is a lot of work going on to follow up on the idea of an innovative business enterprise. A number of Ontario industrialists, including a number in the aerospace industry, believe the concept has merit and are looking for others in industry and finance to see what can be done.

The key point is that if we are to be competitive in the future, we have to be prepared to consider institutional change, including new institutions, that reflect new partnerships or alliances in our respective countries. Government has an important role to play in helping bring about institutional innovation, not only in the way it delivers its services to the public, but in the new public-private partnerships that will be essential in an innovation-based economy.

At this conference we have been talking about North American issues, and that raises the question of whether it is possible—or desirable—to have a North American industrial strategy. I think it would be very difficult. The countries are quite different and their interests are not identical. But it should be possible to work together on specific initiatives. However, even here, there are significant difficulties, as we have found in the space station project. Canada is building the robotic arm which will be used in the assembly and operation of the space station.

Canada had two goals when it replied in the affirmative to an invitation by the Reagan administration to participate. First, if we were to participate we wanted to have responsibility for a technological activity that would have an ongoing value and not simply be an assembler of U.S. black boxes. Second, we wanted an arrangement where there was

shared management. In other words, we did not want just to be waiting at the end of a phone to hear what NASA had decided to do. If there was to be shared financing of the space station, there had to be shared management and decision-making as well.

In pursuing participation, Canada targeted the robotic arm technology. We had already supplied a robotic arm system for use in the U.S. space shuttle and the work for the space station would represent an opportunity to further develop this technology. It had other potential applications and it would provide an important learning opportunity in areas such as robotics, artificial intelligence, sensors, and vision systems. What we found, however, was that the U.S. Congress strongly opposed the idea that another country, even its closest neighbor, should be allowed to share in the technology development of the space station if there was a commercial benefit that could be gained. Even though Canada was putting up the money for this, it did not matter to Congress. It created a parallel robotics program as a second source for the same technology. This did not go ahead because of budget problems, but the reluctance of the Congress to see Canada share in the technological development of the space station demonstrated the difficulty in pursuing joint projects which can deliver competitive advantages in the future.

Co-management has not been a happy experience either, although it has improved. The basic problem is that the United States is not accustomed to working with other countries and sharing decision-making. The United States is accustomed to calling the shots, doing things its way, and then expecting its allies or partners to fall in line. So as far as management of the space station is concerned, we did not get everything we wanted. Moreover, and this is perhaps an even more serious issue, it is still far from clear the space station will actually be built. Canada and the other partners of the United States have gone ahead with their financial commitments to the project, but U.S. administrations and the U.S. Congress keep on changing the design and timetable of the project, largely ignoring the fact that the space station is supposed to be an international partnership. Unilateral U.S. actions have already resulted in a series of redesigns that have led to cost overruns in the Canadian portion of the project. NASA says the United States accepts no responsibility for these additional costs. This too demonstrates how difficult it is for other countries to engage in shared technology projects with the United States.

So, for the time being at least, despite the Free Trade Agreement, the two countries are likely to go their own respective ways in industrial policy. But in both our countries it is imperative that we pursue industrial policies to create the wealth and generate the productivity we need to sustain our own standards of living and to play a more constructive role in addressing the major problems of the twenty-first cen-

ture. These include the integration of the developing world into the global economy, a major relocation of industrial activity around the world, and the implementation of sustainable development. Our own societies must adapt to an ideas-based economy based on innovation and knowledge, rather than turning to protectionism, if we are to achieve better and more fulfilling lives. If we do not, then we will inhabit Paul Krugman's world of diminished expectations.