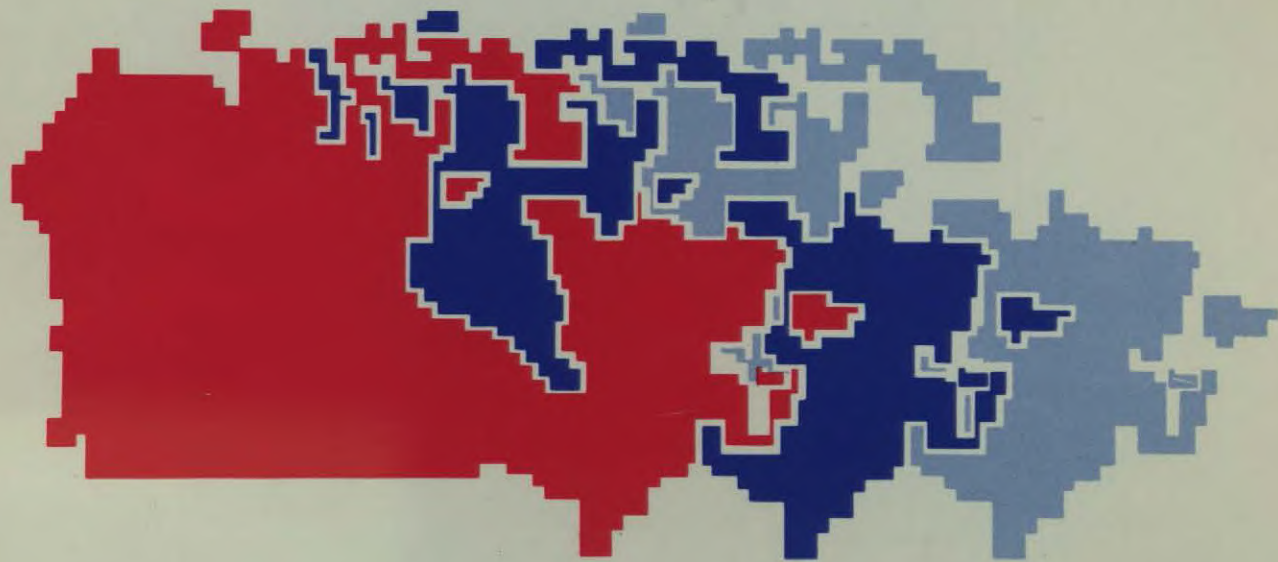



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Canada Tomorrow Conference

November 6-9, 1983



SUMMARY

Canada 

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Ministry of State

Ministère d'État

Science and Technology
Canada

Sciences et Technologie
Canada

Canada Tomorrow Conference

November 6-9, 1983

SUMMARY

FOREWORD

Seldom in our history have we been so aware of the technological changes that are taking place around us. It is an exhilarating time for those who are bringing about the revolution and it holds out great promise for us all in opening up new industries, bringing down costs, improving the quality of our lives, and broadening our horizons.

Along with the excitement and activity, however, have come concerns that the impact of the changes will not all be favourable. These concerns include the possible loss of jobs in traditional industries, or shrinking opportunities for certain skills.

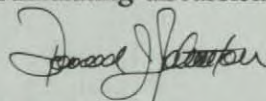
The CANADA TOMORROW CONFERENCE was part of our government's efforts to place these issues before the people of Canada. It marked the first time the Government called together so many people, from all walks of life and from abroad to discuss the impact of technology, in all its aspects, on Canada and Canadians.

The Conference was held from November 6 to 9, 1983 at Canada's Capital Congress Centre in Ottawa. On the first day, international keynote speakers described the approach their nations are taking in managing technological change and two panels of eminent Canadians discussed the critical issues related to the new technologies in a Canadian context. On the second day the 700 participants discussed the four themes of the Conference in a series of workshop sessions. This allowed leading participants in the process of technological change in Canada to voice their concerns and debate their ideas on actions needed to effectively manage that change.

The Conference was very successful in meeting the objectives we had set for it. It allowed representatives of business, labour, academia, government and various interest groups to identify issues and exchange views about technological change, its impacts and the actions needed to manage the change. Not all the issues identified could be resolved, nor could a consensus be reached on many of the suggested actions. The Conference is a starting point for the continuing consultation required to mobilize Canadians to maximize the benefits offered by the new technologies.

The only certainty upon which a consensus was clear is that technological change is coming at an ever increasing pace. This presents problems and opportunities and I am confident that we have the resources, wisdom and sensitivity to confront and resolve the problems and to seize the opportunities.

I hope you find this summary of the CANADA TOMORROW CONFERENCE to be a thoughtful vehicle for stimulating discussion on the issues of technological change.



Donald J. Johnston
Minister of State
Science and Technology
Economic and Regional Development



WELCOMING ADDRESS

**The Right Honourable Pierre Elliott Trudeau
Prime Minister of Canada**

"People have a distressing habit of being ill prepared for the future. Whether it be the direction of the stock market, the likelihood of an earthquake, the size of the school population, or the fanaticism of a dictator, somehow history seems to record very few instances of man's preparedness. It seems that we are always being caught off guard."

With these words, the Prime Minister initiated the discussion on the management of technological change which was to continue over the next two and a half days.

He outlined the Government's approach to preparing Canada and Canadians for technological change:

"The Government's approach to the management of change is threefold: first, to encourage the development, growth and use of state-of-the-art technologies; second, to protect Canadians against any negative effects

of that technology; and third, to ensure that all Canadians share equitably in future benefits."

"The Government must be more than a patron of technological enterprise, more than a source of funding, for even more fundamental is the Government's responsibility to help manage the impact of technological change, and to act as an honest broker between competing forces in the movement towards a technologically sophisticated society. Government's preoccupation must be to ensure that the benefits of this revolution outweigh the costs."

The Prime Minister described some of the measures being taken to ensure jobs are created as a result of technological progress:

"This year we will spend 1.2 billion dollars on the teaching of occupational skills. As well, we are encouraging a climate of cooperation between labour and management, so that decisions to use new technology will be planned and monitored with a view to

minimizing harmful results for workers."

"We have restructured taxation rules to create a simple process for claiming research and development tax credits. This change will bring benefits to industry this year alone in excess of 200 million dollars. As well, we have directly committed 100 million dollars to new technological initiatives over the next two years."

Mr. Trudeau stressed the need for more cooperation among the various sectors in implementing new technologies for the benefit of all Canadians:

"Producing more, and producing more cheaply, are laudable goals – they are crucial if industry is to survive and prosper – but such goals cannot be pursued blindly. They cannot be pursued at the expense of human dignity. The Government wants to engage in

further dialogue with organized labour, so that the concerns of workers will be fully respected in the formulation of public policy."

"Canada must be both competitive and compassionate. To be both, we must be aware of what lies ahead."

WORLD CONTEXT SESSION

The management of technological change in the world's leading industrialized nations.

Dr. George Keyworth (United States)
Science Advisor to the President and Director
Office of Science and Technology Policy

Dr. Keyworth's speech provided an analysis of the management of technological research and development in the United States:

"How technological change will be addressed depends on the relative roles of the Government and the industrial and academic sectors in a country, as well as on the stage of economic development and current state of economic health of a country. There is a growing consensus among industrial nations that technology is critically important to economic growth and that government must be, above all, responsive in supporting the development of technology."

Dr. Keyworth pointed out the influence that existing economic conditions have in implementing technologies:

"These circumstances must be considered in addition to the relative roles of the various sectors. That doesn't mean that the government shouldn't be pursuing new energy technologies for the longer-term, for example, but it should recognize the real constraints that an active marketplace places on the introduction of technology."

The U.S. government considers education to be the first priority in managing technological change:

"We're emphasizing the development of technical talent – the scientists and engineers who are needed to keep the remarkable twentieth-century revolution going. Over the next few years we expect to see continuing strong growth, even preferential growth, in federal support for university research."

"One thing we know, the industrial world will not be conducted on a business as usual basis, and the firms – and countries – that emerge in a strong economic position will be those that are best at using new technologies to create new industries and modernize old ones. It's developments such as advances in computers that may have immense impact on technological development – and pose the kinds of problems we can anticipate and should be doing something about. There will be a tremendous premium on knowing how to use that capability."

One direct step being taken to train people for the new technologies is the establishment of a program of Presidential Young Investigator Awards:

"All indications so far are that these flexible research awards will attract and retain outstanding recent PhDs for university research. These are some of the very good people who might otherwise pursue non-teaching careers in industry."

The involvement of industry is considered essential to all training programs and research activities:

"If we expect to do a better job of moving ideas and people back and forth across the boundaries between basic research and its applications, we have to move those parties (government and industry) closer together.

So the government and the nation are now faced with the challenge of how to capitalize on this growing momentum and to convert it."

**Mr. Masahiro Sakamoto (Japan)
Councillor to the Minister of the Economic Planning Agency**

Mr. Sakamoto's address dealt with the impact of technological development on the Japanese economy. He attributed the positive influence of these developments on the Japanese economy to three factors:

"Japan actively imported foreign technologies making the introduction of new technologies relatively smooth compared to other nations. Secondly, the world economic situation which existed, favourably ensured technological advancement for the Japanese economy. Thirdly, however, it should be borne in mind that Japan had the potential to accept new technologies and

develop them. The aggressiveness of Japanese enterprisers, who had been encouraged by fierce competition among themselves, has played an important role in the active introduction of foreign technologies."

"All of this progress was essential for Japan's survival, as it is a country with very poor natural resources. Furthermore, the new technologies have supplied new products and services which Japan will need in the coming decades."

Mr. Sakamoto cited three primary reasons why increased microelectronization has not resulted in a sizeable increase in unemployment:

"Firstly, Japan has maintained a relatively high economic growth, coupled with the international competitiveness of industrial goods. Secondly, Japanese enterprises have positively dealt with the impact of microelectronization on workers within the flexible

labour management relations. Thirdly, the utilization of microelectronic technology still remains in the beginning stage."

The Japanese government is playing a supplementary role in the introduction of new technologies:

"Profit-motivated competition among private companies is the most powerful force for technological innovation. The role of government should be a supplementary one in the introduction of technology."

Mr. Sakamoto cited four main areas where the Japanese government is stressing technological development:

"Amplifying or increasing the foundation for technological development; cultivating human resources for training technology; the development of social technologies; and, technology linked to local development and international cooperation."

“Technopolis” is a project recently introduced by the Japanese government to encourage continued technological development:

“Nineteen cities across Japan have been chosen as sites for these projects and are given preferential treatment in fiscal and financial support. These places will have a university with science and technology faculties, high technology factories and qualitative labour forces. They

would be developed as a technological, economical and qualitative living environment.”

“Japanese technology has attained a high level in developing new technologies. This potential should be used to vitalize the world economy.”

**Mr. J. J. Servan-Schreiber (France)
President, World Centre for Information and Human Resources**

Mr. Servan-Schreiber’s address dealt, to a great extent, with the social effects of the technological revolution:

“It [technological change] has led to the setting aside of tens of millions of men and women in the full flight of life.”

“Forty years after the last World War we are now faced with the same problem – giving new birth to a ravaged world. The world stands alone, we have to deal with this problem alone and we must solve it. It is not the result of fate, but rather of sheer blindness.”

Mr. Servan-Schreiber observed that the resources needed to deal with the problems existing in Europe and North America are available:

“The same source of strength which has led to robots and factories without workers can be used to train and equip men and women of all countries, regardless of the level at which the country finds itself. No country has put forth a public or private effort, using the best scientific instruments available, to train men and women for new jobs. This is a collective crime which we have overlooked too long and which we must begin to correct starting here at this conference.”

He described the approach being taken by the French government in this regard:

“Over the past 18 months President Mitterand and the French government have attempted to take concrete action which will lead men and women, not just machines, to take advantage of science. First of all, we examined how computers could be applied to the widest areas. We questioned whether fifth-generation computers, which we call artificial intelligence, will be able to contribute. The conclusion we reached was that immediate action was required over the next two years to use expert systems for production. We, in France, must reduce costs in three particular areas: health, agriculture and education.”

Mr. Servan-Schreiber stressed the need for a collective international approach:

“There is no longer north and south, nor industrialized and developing countries. We are not dealing with simply one small part of humanity, but with the entire world. If, through blind indifference, we were to allow the third world countries to go bankrupt our own growth would immediately suffer and fail. We must create a world market. That is to say, we must give the poorer countries the means to live comfortably and the means to purchase goods.”

The World Centre for Information and Human Resources, founded by Mr. Servan-Schreiber, is designed to meet these needs:

“The World Centre is intended not to train machines, but to train men and women of all ages, of all cultures. It is a centre where fifteen nationalities are to be found. It developed quite naturally because the demand is great in the fifteen countries, as well as various regions of France, where other centres have sprung up.

Let us not talk of the year 2000. By then it will be too late. It is possible in the next three or five years to achieve these goals. It is now that we are going to win or lose.”

CONFERENCE THEMES

First Theme: "Technology in Canada's Future"

"Technology in Canada's Future" incorporated issues such as the significance of technological change in economic development; the important role of technology in productivity improvement; what new technologies are needed for Canada; the diffusion of technology within Canada; and how technological change will affect Canada's international competitive position.

Second Theme: "Concerns About the Consequences of Change"

"Concerns about the Consequences of Change" discussed such issues as the possible loss or downgrading of jobs through technological change; the impact of increased productivity on the job market; mismatching of skills and jobs; the question of appropriate education, training and retraining in the changing job market; declining job security; risk to health and safety in new technologies; effects on the home environment; and changes to the form and substance of industrial relations.

Third Theme: "Putting the Technology in Place"

"Putting the Technology in Place" incorporated the issues of developing and using new technologies, along with ways of introducing and diffusing innovative changes within Canada. The role of governments, private industry, labour and academia related to these issues was also addressed.

Fourth Theme: "Adjusting to Change"

Some of the issues discussed in "Adjusting to Change" were whether the existing adjustment arrangements – the social "safety nets" – are adequate for the challenges being posed by new technology; how to provide for groups in the population which tend to be concentrated in occupations that will face significant change; and who should bear the burden of the cost of adjustment.

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PANEL DISCUSSIONS

Each of the panels addressed two of the Conference Themes through a series of 15 minute speeches. The panels were composed of a leader and four panelists, representing various sectors of Canadian society.

PANEL NO. 1

Leader: Dr. John Evans
Chairman, Allelix

Dr. Evans introduced the members of the first panel and the themes to be dealt with, "Technology in Canada's Future" and "Concerns about the Consequences of Change". He also explained that the afternoon sessions would build on what the participants had heard during the session on "the international context for the development of technology" which stressed the scope of the changes, the profound nature of the changes and the speed with which those changes are taking place.

Dr. John Madden
President, Microtel Pacific Research

Dr. Madden observed that Canada, in managing technological change, can set a model for other nations to emulate:

"Tomorrow's Canada will depend, most importantly, on the ability of our global society to adapt successfully to the changes which these technologies imply and only secondly on the success of Canadians relative to peoples living elsewhere in adapting to these changes."

He questioned the wisdom of simply debating measures to remedy "today's ills":

"We might be better off determining whether our existing social organizations are flexible enough to deal with our complex environment and the major changes taking place within it."

Dr. Madden stressed a cooperative approach to decision making:

"They [problems related to the quickening pace of technology change] require a consensus on the nature and the severity of the problem, and almost certainly, a common resolution to work together to implement the agreed upon situation."

Mr. Guy Saint-Pierre
President and Chief Executive Officer, Ogilvie Mills Limited

Mr. Saint-Pierre observed that "technology has no nationalism":

"We are not going to invent everything in this country. Luckily, no one else is going to invent everything either. We must buy it, lease it, licence it or otherwise borrow it if we cannot create it ourselves. Public policy should recognize and support the facilitative role that multinationals can play in the transfer of technology."

Even with her rich natural resources, Canada will rely heavily on technology:

"Technology is a competitive weapon and Canadian industries must advance its use or they will be left behind. We must begin to realize that our riches for the future lie in our human resources."

Mr. Saint-Pierre spoke of the potential for job dislocation:

"I believe management has a paramount responsibility to demonstrate a sensitivity to these legitimate concerns about job loss, retraining and relocation."

Dr. Margaret Fulton
President, Mount Saint Vincent University

Dr. Fulton questioned what is more important in the new technological world – "the project or the people"?:

"We ignore people at our peril, for products are of little value if the people have an insufficient share of the wealth with which to purchase the products."

She pointed out that the resurgence of the women's movement forces us to look at the moral and ethical implications of technology – "a question of changed attitudes":

"The demands for change which recognize the need to consider questions of moral and ethical significance, in addition to those pressing concerns dealing with economics and employment, take on a note of compelling urgency. Women are the catalysts for such change because they are outside the present structures."

Mr. James McCambly
President, Canadian Federation of Labour

Mr. McCambly emphasized that organized labour's approach to technological change is basically positive:

"Technological change and the increased productivity it usually brings has, on the whole, been good for Canadian labour."

He spoke of three key elements needed to ensure changes bring increased opportunities for workers:

"An early adaptation of broad goals, shared by business, labour and government in planning and implementing technological improvements at the workplace; the pursuit of economic development; and, expansion to ensure that short term job losses, the result of increased productivity in a particular industry, aren't compounded by losses across the country due to stagnation and recession."

He illustrated some of the reasons behind a resistance to technology:

"The obsolescence of familiar industries and trades has been shattering to many workers, particularly when compounded by massive unemployment, erosion of real income and a wavering commitment, by government, to some of the social programs most important to labour. In light of this fact it is hardly surprising that labour should be largely resentful, even fearful, of technological change."

"As a society we have a lot of thinking to do about the content and structuring of jobs in the technological environment. This planning must contain provisions for retraining, relocation, early retirement and other measures in order to reduce human hardship."

PANEL NO. 2

Leader: Mrs. Lucie Pépin
President, Canadian Advisory Council on the Status of Women

The second panel dealt with the third and fourth themes of the Conference: "Putting the Technology in Place" and "Adjusting to Change". In the introduction to the second panel, Mrs. Pépin referred to the session as a "nuts and bolts perspective". She pointed out that the Conference had already illustrated the dual-face of technology. "On the one hand, there is the tremendous potential for economic development and prosperity; on the other hand, the alarming possibility of social dislocation and upheaval", Mrs. Pépin said.



Mr. Marcel Pépin
Associate Professor, University of Montreal

Mr. Pépin spoke of the need for taking a cautious, but nonetheless active approach in dealing with technological change:

"A cautious approach is essential in order to ensure that the changes being made are in the interest of all Canadians and will lead to progress in various fields."

On the subject of organized labour, Mr. Pépin said he could understand the tendency for unions to resist technological innovation:

"Their [unions'] attitude is not surprising, as they are not always given the opportunity to be actively involved in the process of implementing these innovations."

He stressed that more government control is essential in planning for the impact that the new technologies will have on employment patterns – for women in particular, and questioned whether there is really any other way of approaching and dealing with the situation:

"It is important to emphasize the objective, rather than the means. We have to act."

"This speech does not bring any answers. What I wish is a concern for the social consequences. It is understandable that concerns exist, this conference is an example. But we cannot only be preoccupied with these concerns. We have to act now, in order to find the adequate solutions."

Mr. Larry Clarke
Chairman, Spar Aerospace

Mr. Clarke observed that Canada has the potential to either control, or be controlled by, new technologies:

"There is a need for Canadians to make technology our servant, rather than our master."

He stressed the importance of involving all sectors in decision making:

"In order to compose the mosaic of technological activities from the simple to the most sophisticated, which every developed industrial society must have, each sector must realize the need for a common perception on the challenges faced and the goals which must be achieved."

Mr. Clarke outlined the responsibilities in this cooperative approach:

“Government must develop a greater reality in dealing with technology; industry must accept technology as a fact of life and be prepared to forecast and provide for its impact; and, labour must work with industry to ensure that its members are equipped to deal with such change, and those who are not are treated in a socially dignified manner.”

“Academia must review its roles and priorities in light of the technological age. It must ensure that, while continuing to provide the specialized training required, its courses give students humanitarian understanding to develop the flexibility to adjust to continuing change.”

**Dr. Wendy Dobson
Executive Director, C.D. Howe Institute**

Dr. Dobson focussed on the economic factors influencing technological innovation:

“The basic goals of economic activity are to raise living standards and create employment. The success of technological change has always been judged by the contribution it makes to these goals. These changes are always made more easily when rapid economic growth acts as a lubricant. But today they are being made in a slow growth environment for a number of reasons.”

She cited several related factors which will also have an influence:

“Flexibility in prices and wages, increasingly competitive developing nations, and how Canadians make the choice between temporary disruption and the loss of security in the short run and a higher standard of living in the future, will all contribute to determining the success with which we adjust.”

“The challenge is to reorganize our policies and institutions to facilitate adaptation. This means the role of Government and public policy is to facilitate, not obstruct change. The role of the private sector is to experiment, and take risks in response to profitable opportunities. Applying these policies to smooth adaptation to change strengthens, rather than weakens, the social fabric.”



Dr. Norman Wagner
President, University of Calgary

Dr. Wagner spoke on "technology, education and Canada Tomorrow" – a future where he sees "knowledge as having more leverage than oil or gold":

"The means by which this knowledge is obtained and its successful application will depend, to a great extent, on the degree to which we realize the role of our educators. Innovation immediately leads us to the centrality of education, not only the expectation that our

researchers will produce the highly significant breakthrough, but to teach us how to adjust with dignity to a different lifestyle."

He stressed the importance of all the sectors making a commitment to an improved educational system:

"No nation can expect to stay in this new game unless a major part of its industrial strategy is focussed on improving its "brain power" and brain power is a human resource."

"My challenge to politicians, business people and fellow educators is to debate, in detail, the question of whether education is to be treated as an expense or an investment and only then can we intelligently move ahead."

"Education is the key to our future because it harnesses our most important renewable resource – human beings. And if it is to perform its proper societal role, educators must not lose sight of the difference between process (the potential for a life of learning) and product (the grasp of a specific skill)."

WORKSHOP SUMMARIES

During the second day of the Conference the 700 participants were involved in a series of workshop sessions on the four Conference themes. At the conclusion of the day's sessions, the 20 workshop leaders and their notetakers met with four workshop coordinators to summarize the findings from the sessions. The following morning the coordinators presented summaries on each of the four themes, to the plenary.

Dr. Stuart Smith
Chairman, Science Council of Canada
Theme 1: "Technology in Canada's Future"

Dr. Smith reported that participants tried to assess where Canada stood in comparison to its international competitors in the field of technology and whether protectionism represented a genuine option. Considering the potential negative social aspects related to the rapid changes, participants questioned whether new technologies could be delayed in their application in certain sectors or situations.

It was agreed that new technologies must be applied to traditional industries in view of an increasingly competitive market; and also that this should not be the only application of the new technologies in Canada:

"An additional diversification of Canada's industrial mixture into knowledge-intensive industries is seen as a desirable and essential goal. Unless we are active in this sector ourselves, we are poorly placed to import and to apply other people's technology in our own traditional industries."

It was agreed that Canada should focus on developing excellence in a number of technology-related areas, rather than on one aspect of the new advances. In this regard, it was virtually unanimous that Government has a major role to play in supporting research and development. This would include: encouraging the transfer of technology from government labs into industry and from the universities into industry; the support of small business; the training of people; and, arranging for the gathering and sharing of information on a timely and efficient basis.

Protectionism, participants said, should only be used to prop up older, non-competitive industries for a short period of time, as Canadians can meet difficult international competition by becoming aggressive traders and marketers.

Dr. Smith cited a number of areas of disagreement among participants:

"Many participants voiced a deep distrust for Government choosing areas of specialization or running businesses, saying they preferred the market mechanism."

Some felt the market was efficient for handling short-term decision making, but is not useful in preparing the country to seize opportunities coming in the medium to longer term."

The roles of government and others involved in technological change were actively discussed:

“Again participants voiced a concern over the Government’s ability to make choices, pointing out the need for some strategic thrust lest our education and research effort become too fragmented.”

“A rapid and efficient consultative mechanism by which areas of specialization can be identified and supported seems essential to Canada’s participation in the new industrial order. That mechanism has yet to be identified, but should be the focus of our attention as a nation.”

**Ms. Heather Menzies
Freelance Author**

Theme 2: “Concerns About the Consequences of Change”

Ms. Menzies reported the mood in the workshops was decidedly upbeat:

“The consensus was that the opportunities outweigh the problems; that we’ll weather the transition all right. There was little discussion about job losses, redundancies, deskilling.”

The participants discussed in general the possible negative effects of the coming technological changes:

“There was a consensus that certain occupational groups, and possibly even certain regions of the country would tend to bear rather more of the negative consequences of change. There was a general assumption that the social safety nets would take care of those people who are dislocated by technological change.”

“Several workshop participants worried as well over a possible bimodal distribution of the labour force, with a relatively small technical elite of knowledge workers using technology in creative value-added ways and then a large mass of relatively unskilled people doing menial work.”

It was agreed that many needs are not being met:

“Better linkages between centres of research and traditional Canadian industries wanting to modernize and apply new technologies; better intelligence on possible marketing opportunities; planning and nurturing growth, not reacting and protecting redundant industrial processes and technologies; and, a closer liaison between workers and learners, or centres of learning/research and centres of work/applied technology, were cited as being among the needs to be met.”

Both government and industry had come under criticism during the discussions:

"An opinion put forth in several workshops was that managers tend to be too short-sighted, to not emphasize marketing enough, to connote management with control rather than long-range planning and the true managing of change."

"Participants seemed to feel that the post-war model of Government as welfare state, providing everything, no matter what, is no longer viable. It was felt that Government must move towards helping plan and bring about the generation of wealth. Participants anticipated Government moving to a more pro-active role providing the enabling environment for innovation and new industrial initiatives, an effort requiring more long-term planning."

Ms. Menzies sounded a note of caution in her report of the workshop discussions:

"I wondered whether that pleasing tone of confidence was valid, since we'd spent so little time talking about job losses for men as well as women, deskilling, the health and safety issues and so on. I worried that the upbeat note had been achieved at the expense of full participation by labour at this conference, at the expense of looking at all the items in our management-of-change mandate."

"We mentioned dislocations and redundancies, but only as concepts; we didn't take a hard look at the reality behind the words."

She provided several examples of job loss and dislocation to challenge the hypothesis that we should be optimistic about how we are managing the transition period and continued:

"Despite the rather bleak note I have just introduced, I am confident that we will succeed, that we will turn the modern technologies into opportunities for Canadians. But we won't succeed if we hide away from some of the tougher aspects of the challenge we face: the full social adjustment challenge. That requires coming out of our isolated corners, our isolated boxes and involving all the participants in the dialogue which workshop participants felt was so urgent."

Dr. Roger Blais
Director, Industrial Innovation Centre, École polytechnique de Montréal
Theme 3: "Putting the Technology in Place"

Dr. Blais reported a strong consensus on a number of issues:

"Canada has all the essential ingredients for developing and benefitting greatly from high technology developments, what is needed most is a collective will to make these good things happen; Canadians must develop technological superiority in a number of key areas and thus, invade successfully a number of lucrative world markets; and, we need to reach the critical mass needed both in research and development and the worldwide commercialization of our best technologies."

He said it was agreed that in order to successfully put the technology in place:

"A deliberate concertation needs to be established between Government, industry, and labour. It was agreed that industry will be the major player in putting the right technology in place."

There was a strong consensus on adapting an aggressive marketing strategy:

"Exports of fully manufactured goods should be one of our top priorities. It was felt that new employment-generating companies should not be sacrificed on the altar of high technology. A concerted effort must be made to upgrade the quality of their management, improve their financial position, assist their technological development and promote their innovation capabilities and their ability to export."

Dr. Blais reported agreement on the need for a more active role for government:

"One area of possible improvement would be a more effective integration of regional aspirations and capabilities into the federal activities leading to the necessary concertation of efforts of different sectors."

There was also, he said, a general agreement that government research and development should be more directed to the needs of industry:

"Almost all of the workshops emphasized the need for importing technology from abroad in order to satisfy Canadian needs. The idea is to adapt and incorporate these foreign technologies to reach greater profitability and, then, for our companies to generate new development themselves and eventually to capture new export markets."

"Participants felt that universities should be encouraged to establish technological institutes with industry funding while maintaining a strong capability in fundamental research."

Miss Jennifer McQueen
Commissioner, Public Service Commission of Canada
Theme 4: "Adjusting to Change"

Miss McQueen reported unanimous agreement on the critical factor of education:

"At the moment education is not a funding priority and some of those best qualified to teach the new technologies are being hired away to government-financed research laboratories. Numerous participants put forth the idea of relocating this research in universities to stimulate and involve the faculty and students and practically every workshop urged a close cooperation between industry and academia."

There was a need expressed for better management skills:

"If the management skill is not there, everything else is a waste of money. Small business needs help in getting up-to-date management training and one participant suggested that small business be encouraged to form a consortia for training and retraining."

Participants called for fuller, more sophisticated coverage of developments in science and technology in Canada.

Miss McQueen also reported on a number of suggestions for government regulations and incentives:

"A deregulation of growing industries where technological advances are in danger of being restricted was one suggestion. Early retirement and a shorter work week were suggested as means for job sharing. It was also the general consensus that Government funding should not be allowed to influence the location of an industry, but rather economic factors should determine this."

"It was agreed that tax incentives would encourage industry and individuals to undertake risks in new areas of endeavour. In this regard, participants suggested that costs associated with research and development of software should be tax deductible in the year in which the expenditure is incurred."

"There is a desperate need to create an improved investment climate for high tech venture enterprises, to promote greater investment from abroad, for relaxation of taxation on production tools, for more joint Government-industry ventures and for better education of small investors."

Government, it was felt, must also provide a coordinated, aggressive international marketing program for Canadian projects and expertise through tax incentives:

"Tax deductions for individuals should be broadened to include more types of training or self-education relevant to high technology skills."

"It was also suggested that Government must assist in financing the cost of technological transfer, in particular between research institutions and small high technology companies, and subsidize the high cost of entry by Canadian businesses into targeted industries such as sea-bed resources, aerospace and telecommunications."

MINISTERIAL PANEL

A panel of selected federal Cabinet Ministers provided their individual departmental perspective on some of the issues discussed during the Conference.

The Honourable Francis Fox Minister of Communications

Mr. Fox addressed the topic of telecommunications, in particular how communications technology can help Canadians to create an economy that is "comfortable with change":

"Central to our capacity to adapt to new technologies and to benefit from the productivity improvements associated with them is the requirement for a high-quality technologically advanced telecommunications infrastructure."

"The future of telecommunications may be the single most important issue facing us in the transition to the new information order and a policy of competition in this area will be one of the most important questions facing Government in the coming years. We must recognize that telecommunications is the largest, most sophisticated of the new information industries. It was the first industry, anywhere, to be extensively automated."

Mr. Fox also spoke of the wide-ranging effects of advanced communications on Canada's economic and social environment:

"It sets the stage for an array of new, information-based technologies, that includes robots, word-processing machines and automated factories. Collectively these technologies will open new sources of wealth and affect the productivity of established

industries."

"These changes will, quite obviously, exert great stress on the Canadian federation. There will be horizontal stresses between regions that are quick to adapt to the transformed environment and those which are not so quick. And there will be vertical stresses between individuals and groups who are able to take advantage of new opportunities and those who are not."

At the conclusion of his speech, Mr. Fox announced that an agreement had been concluded between the Department of Communications and Jean-Jacques Servan-Schreiber's World Centre for Information and Human Resources. The agreement will place a priority on the social consequences of technological change and will involve a close collaboration between the World Centre and the research institute to be based in Laval, Quebec.

**The Honourable Judy Erola
Minister of Consumer and Corporate Affairs and
Minister Responsible for the Status of Women**

Mrs. Erola first addressed the Conference in her capacity as the Minister Responsible for The Status of Women:

"Women have reason to be apprehensive about technological change. However the challenge really facing us is not the technology, which should be seen as an opportunity, but its adaptation."

Despite increases in the employment of women, Mrs. Erola pointed out that 50 per cent of the persons employed in the areas which will be most affected by the application of new technologies are women:

"Women shouldn't take these gains [in employment] for granted. They don't want to lose them in the process of adaptation. The fact is the majority of Canadians who face the challenge of adaptation are women. The cards are being re-dealt and women want to make sure they don't get lost in the shuffle."

Mrs. Erola then spoke in her capacity as the Minister of Consumer and Corporate Affairs, observing that the Canadian Patent System will play an important role in the technology research and development:

"A great underutilized natural resource, the system serves to protect the rights of innovators and is a stockpile of detailed information about new technology throughout the world."

She said she hoped that making the information available across the country through a computerized network will serve to increase its use:

"If we focus too narrowly on Canadian technology we miss 98 per cent of the picture and clearly a nation of 24 million cannot expect to produce all the technology it needs at home. By expanding our perceptions to 100 per cent we can harness this resource to the task of building the Canada of Tomorrow."

**The Honourable Roy MacLaren
Minister of State for Finance**

Mr. MacLaren stressed the importance of government and the private sector "embracing coordinated and complementary roles" in the implementation of new technologies. He outlined some of the measures being taken by the federal government in that regard:

"Government grants are available to the private sector to undertake research and development and to apply productive technology; the Government is funding a network of technology centres — one in every province — to spur the application of microelectronics; a federally-sponsored productivity service examines specific industries and helps participating companies to define their productivity performance and advises them on how they

might improve their productivity; and, a national productivity centre – announced in April's budget – will assist business and labour in addressing jointly the human issues, arising from a rapidly changing work environment."

He spoke of the particular challenge facing government:

"From the perspective of government policy the challenge is to remove as many of the impediments as practicable to the effective operation of the information economy."

Mr. MacLaren warned of the negative side-effects which could result from a failure, on the part of the various sectors, to take a collective approach:

"Implementation of technological change is a joint responsibility. The impact of new technology is so far-reaching – the potential for good or ill so great – that to impose it without proper consultation or planning will provoke worker resistance in labour-management relations."

**The Honourable Herb Gray
President of the Treasury Board**

Mr. Gray outlined what the federal government is doing, through the Department of Employment and Immigration, with respect to helping workers adjust to technological change:

"Such programs as our Career Access activities are designed to help people, especially those new to the labour force, to become more 'labour-market ready'. There are also our skill development measures, with expenditures in excess of one billion dollars on national institutional training, general industrial training and critical skills training."

"The Unemployment Insurance Program is the largest single adjustment program. Not only because it pays benefits to those who are temporarily unemployed, but also because it is now being used increasingly in a developmental way – to pay benefits to individuals undertaking approved training or working on approved job creation projects or work-sharing agreements."

He also described a follow-up activity of Employment and Immigration that is expected to have important implications in overall labour-market adjustment:

"A series of conferences, aimed at bringing into place some consensus on the part of business, labour and provincial governments with respect to occupations in demand – both by province and sector – as part of the development of the Canadian Occupations Projections Systems."

CLOSING REMARKS

**The Honourable Donald J. Johnston
Minister of State
Science and Technology
Economic and Regional Development**

In his closing remarks Mr. Johnston said that he had found the "Canada Tomorrow" Conference to be "a constructive and stimulating exercise", adding "the objectives we had in mind have been met."

While pointing out that it was difficult, at the time, to measure the extent to which public awareness had been raised, the Minister of State for Science and Technology and for Economic and Regional Development said that "something had been initiated and there seems to be a momentum building here". He continued: "The Conference can be considered as the beginning of an ongoing process of exchange which we are committed to continue in the weeks, months and years ahead."

A record of the proceedings of the Conference and the papers which had been commissioned for it are available. These may be purchased from the Canadian Government Publishing Centre using the attached order form. In addition, a one hour video tape which highlights the issues raised at the Conference is also available. The video tape has been prepared to stimulate discussion on the management of technological change. For more information contact

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