OVERVIEW ON THE KNOWLEDGE ECONOMY AND SOCIETY

Prepared by Wendy MacDonald Research & Consulting

December 1997

Preface

Through the recent formation of the Knowledge Economy Partnership (KEP), the governments of Canada and Prince Edward Island have demonstrated their intent to move towards a more knowledge-intensive economy and society. Under the aegis of the KEP, the Institute of Island Studies at the University of Prince Edward Island has undertaken an initiative that seeks to build a foundation of public understanding about, and to shape some consensus on, how Prince Edward Island can benefit in the emerging "Knowledge Era." The project will employ a participatory approach in testing a methodology developed by the U.S. National Research Council to assess the readiness of a jurisdiction to participate in the knowledge economy. In an age of acronyms, the project is known as KAM: Knowledge Assessment Methodology. Prince Edward Island will be among the first two or three world test sites for the KAM.

This paper seeks to contribute to this initiative by providing an introduction to some of the concepts and issues related to the Knowledge Era. It is also intended to serve as a conceptual framework for a detailed review of the landscape of Prince Edward Island's knowledge economy and society. That paper will be completed as a second phase of this project.

The support of Prince Edward Island's Knowledge Economy Partnership for the first phase of this project, under which this paper was prepared, is gratefully acknowledged. Thanks go, as well, to the staff of the Institute of Island Studies Harry Baglole, Nancy Murphy, Ed MacDonald, and Laurie Brinklow for their encouragement, advice and patience, and to the many other reviewers who read the first draft and suggested improvements to it. Any remaining errors or omissions are those of the author alone.

Wendy MacDonald

December 1997

Introduction

Prince Edward Islanders are living through a time of far-reaching change, driven by national and global forces that are reshaping the roles and relationships of governments, the private sector, and citizens. These changes are so profound and so pervasive, that many would argue that we are moving into a new world era -- a fundamentally different economic and social future, variously

labeled the "post-industrial age," the "information age," the "new economy," or, in recent usage, the "knowledge economy and society." This paper will use the term "Knowledge Era" to reflect the central importance of knowledge considered in a very specific and specialized sense to this global transformation.

These forces of change cannot be ignored by a jurisdiction; governments cannot shut them out. The challenge facing Prince Edward Island, then, is to capitalize on the opportunities they create, and to use their benefits to sustain and develop our society, culture, and quality of life in an inclusive and equitable way. To do so, Prince Edward Island must understand these forces of change, for both good and ill, as well as our own strengths and weaknesses, so that we can ascertain our strategic position. We must then be prepared to make major changes to our priorities and our approaches what we do as a society and how we do it. These changes can best be achieved on a foundation of broad public understanding of the issues, options, and implications of the emerging Knowledge Era.

This paper begins by noting some salient characteristics of the Knowledge Era. Next, some terms related to the Knowledge Era are discussed, in order to promote common terminology for the discussion. The implications of the Knowledge Era for different spheres of our lives economic, employment, education, social, cultural, and governance are then considered. Next, the varying impacts of the Knowledge Era on individuals, communities, and regions within our society are outlined. The discussion concludes with an overview of the challenges raised for Prince Edward Island by these impacts and implications of the Knowledge Era.

A brief paper such as this cannot begin to do justice to the complexity and breadth of this topic, and as such, it has been necessary in many instances to simplify the issues and analysis. In many cases, the two extremes of the issues are presented in black and white, with none of the details and the subtle shadings of grey. Nonetheless it is hoped that the paper will serve as a starting point for discussion and consensus building, and that participants will shade in the grey areas as the project unfolds.

>>>top

Origins and Characteristics of the Knowledge Era

The application of knowledge has always been fundamental to human progress. During the 20th century, however, knowledge itself, not just as a tool but as a commodity, has come to be a dominant some would say transforming force in our world. The emergence of this phenomenon can be traced from the previous century, but it is only in the post-war era, and particularly in the last quarter century, that its impacts have been fully felt around the globe. We are currently in the midst of the transition, with the knowledge economy and traditional economies in various states of uneasy and turbulent co-existence around the world.

A number of developments during the past century or so helped lay the groundwork for the Knowledge Era. During the late 19th and early 20th centuries, for example, tremendous growth took place, both in scientific knowledge and in the influence of science. This, in turn, laid the

foundation for the increasing application of scientific principles and knowledge to technology and its use in society. At the same time, the spread of mass (and higher) education greatly expanded the potential appetite for knowledge, while the growing importance of the so-called "service sector" shifted the emphasis away from economic growth based solely on the production of goods. But the rapid emergence of "knowledge" as the dominant aspect of recent times has been made possible through two interrelated factors:

- the increasingly rapid expansion of the stock of human knowledge; and
- an enormously increased capacity, through information and communications technologies (ICTs), to set down, store, and disseminate this information quickly and at plummeting cost. To many, a turning point was reached in the early 1990s with the full convergence of the various forms of communications infrastructure (telephones, cable, broadcasting, wireless, etc.) and the associated capacity to convert and transmit all types of content in digital form. This development is expected to be synergistic in its impact: the whole will be greater than the sum of the parts.

In combination, these advances in the creation and handling of knowledge have vastly increased its economic and social role. While the impacts of this development pervade every aspect of our lives, as explored more fully later in this paper, some of its broader, cross-cutting impacts and implications are noted here.

The economies of the past were primarily based on tangible goods and resources, and premised on concepts of scarcity, depreciation, and consumption. Societal structures were built around concepts of control of information and knowledge, leading to hierarchy, regulation, and competition. Today, these assumptions must be rethought to take account of the fundamentally different attributes and characteristics of information compared to more traditional "products":

- Information can be used by multiple users simultaneously, and one person's use does not diminish another person's ability to use it. As well, it is not "used up" by being used, as other resources are; rather, in many cases, it gains value. These characteristics, in conjunction with the very rapid growth in the global stock of knowledge, mean that the challenge of the Knowledge Era is one of managing abundance of information and knowledge, whereas the challenge of the industrial era was one of managing and allocating scarce resources.
- While the production of information is costly, it can be stored and processed at minimal and decreasing cost. As well, it can be transported almost instantaneously, also at decreasing cost. These characteristics have led to assertions that the industrial era constraints of space, time, and distance have little relevance in the knowledge economy. They have also been a key factor in the globalization of the economy in the past several decades.
- Information can, and increasingly does, replace other factors of production such as capital, labour, and physical materials. To do so successfully, however, requires investment in human resources, the medium through which information is translated into knowledge and made profitable. This need is intensified by the rapid obsolescence of much information and knowledge. Successful substitution of knowledge for tangible factors of production also requires major changes in organizations, including flatter

structures (less hierarchy, more decentralization), more openness, more participative processes, a networking approach to other related organizations, and a continuous learning mode.
- Information is diffusive, or "leaky" in nature, a characteristic that has been intensified by the growth of the information highway. Since today more than ever, "knowledge is power," this characteristic is leading to major shifts in patterns of power within and among societies. For governments, it means growing roles for subnational and supranational governments, the private sector, interest groups, and individuals; a growing mismatch between its hierarchical structures and processes and its roles; and the continued erosion of control and regulation as instruments of governance.

It may seem academic to debate whether these changes are evolutionary or revolutionary, incremental or fundamental in nature. However, the debate is far from being an abstract one. If societies are to adapt to these forces and turn them to their benefit, they will need to make massive changes in how they function, many of them difficult and some of them painful in the short term. The social cohesion necessary to make these changes can only be achieved if there is broad consensus that the challenges and opportunities of the future are fundamentally different from those of the past, and require fundamentally different responses.

>>>top

The Terminology of the Knowledge Era

The Knowledge Era is at different stages of emergence in countries around the world. In all countries, however, it still shares the stage with other more traditional economic and social forms, ranging from subsistence to primary resource reliance to advanced industrial development. These qualities of newness, evolution, and varying contexts have given rise to a number of alternative terms to describe our emerging future. These terms, such as "new economy," "knowledge economy," "knowledge-based economy," "information society," and "knowledge society" are only just emerging, and there is no overall agreement about what they are, let alone what specific implications they may have for various societies. It may be useful, however, to explore these terms further, not in order to find the "right" terms, but rather to clarify them in a way that is relevant and useful for Prince Edward Island as a basis for clear communication, productive discussion, and a search for consensus.

It may be useful, first, to distinguish among data, information, and knowledge:

- Data are like unrefined ore, facts without context.
- Information is like refined ore, data that has been organized and is available for use.
- Knowledge is information that has been taken up and internalized by individuals. To extend the metaphor, the refined ore has been turned into a tool.

Some would argue that this typology, which has been developed by Harlan Cleveland, should be extended further by adding the dimensions of expertise and wisdom. While there is no agreement

on how these should be defined, it is suggested here that expertise might be viewed as applying the knowledge in the right way, while wisdom involves applying it to the right things.

In this typology, the emphasis in the knowledge economy and society is on the acquisition, internalization, and use of information by individuals. All learning, whether by firms, governments, or societies, is founded on this process of individual learning. This is linked to the view that people are the key resource in the knowledge economy, and suggests that the primary emphasis should be on human resources on facilitating the internalization, diffusion, and uptake of information. The "information society," on the other hand, connotes an emphasis on the production and distribution of information, rather than its reception, conversion into knowledge, and use.

While the above typology is useful, another definitional approach also has merit. This approach, found in the Organization for Economic Cooperation and Development (OECD) literature and some Canadian federal government papers, breaks knowledge down into "codified" knowledge, which can be written down and transmitted from person to person, and tacit" knowledge, which is in people's heads. Codified knowledge is further broken down into "know-what" (information and facts) and "know-why" (scientific knowledge underlying technological advances), while tacit knowledge is broken down into "know-how" (the skills required to do something) and "know-who" (regarding who knows what and who knows how to do what). Codified knowledge can be transmitted through various means, notably formal education and training, while tacit knowledge normally is acquired through experience.

Advances in information and communications technologies have allowed major advances in the ability to codify and manipulate knowledge. This in turn has given knowledge more of the properties of a commodity, which facilitates its exchange in market transactions. The emergence of the Knowledge Era worldwide is thus strongly linked to the pervasiveness of these technologies and the astonishingly rapid advances in their speed, power, and cost.

This increase in the codification of knowledge does not, however, mean that tacit knowledge has become less important. On the contrary, it is more important than ever, for the massive amounts of codified knowledge available in today's society can only be winnowed and put to use through the application of tacit knowledge.

In this regard, it might be noted that the literature suggests a characteristic pattern of adaptation to the Knowledge Era in different industrialized societies. This pattern begins with an emphasis on hardware, infrastructure, and technological issues. It then shifts to a focus on the policy and regulatory changes necessary to create a competitive, market-driven environment for the evolution of the knowledge economy. Finally, a recognition of the interdependence of social, cultural, and economic factors emerges: an awareness that the knowledge economy can only succeed if we have a knowledge society, based on the skills, knowledge, attitudes, and capacity for learning of the people. This leads, then, to consideration of the broader social context, impacts, and needs of the Knowledge Era.

>>>top

During the first two stages noted above, the debate is often dominated by experts, driven by a sense of technological determinism, and focused on purely economic issues. It emphasizes the worldwide forces linked to the emergence of the knowledge economy globalization, competition, deregulation, rapid technological change all pointing to a shift in favour of market forces and a diminution of the role and capacity of governments. The challenge is seen as one of adapting faster than the competition, or facing economic decline. The focus is essentially reactive, and emphasizes the role of the individual in adapting to competitive forces. Labour market issues are considered in terms of their economic rather than social implications.

As the debate moves to the third and more holistic stage, the "knowledge society," a more balanced view of the role of governments and the private sector emerges. Knowledge-based economic development is viewed as a means to achieve broader societal ends related to human, social, and cultural development and participation. The potential of the Knowledge Era to further disadvantage marginalized groups, communities, and regions in our society is acknowledged, and the need for collective action to ensure inclusion is stressed. The orientation is proactive, rather than reactive.

This latter direction was clearly favoured by the array of stakeholders who participated in a workshop organized by the Institute of Island Studies during the summer of 1997. Participants spoke of hopes that the knowledge economy would help their children and youth to remain or return to Prince Edward Island, to meaningful employment opportunities. At the same time, groups called for the knowledge economy to be developed in a way that would sustain those qualities that make Prince Edward Island an outstanding place to live: the sense of community, the social fabric, and the exceptional quality of landscape and environment.

A question arises here as to whether the first two approaches are necessary in order to enable the third. That is, does government have to first provide the infrastructure and liberalize its economic and trade regimes in order to achieve the knowledge-based economic growth needed to support its human and social development goals? If it cannot afford the infrastructure, or views the social and cultural impacts of deregulation and liberalization as too severe, what alternatives does it have? This fundamental question will be explored further as this project unfolds.

Turning now to the narrower term, "knowledge economy," a further issue exists: to what does it refer? Two main perspectives exist in this regard:

- A supply-side orientation looks to a separate sector in charge of the production and handling of knowledge. Various definitions include in this sector some combination of the following: research and development activities; all levels of the education system; the information and communications sector of the economy, including infrastructure, service providers, electronic equipment; and content developers and providers such as the cultural industries and the media. This view, in the Prince Edward Island context, would entail a focus on the public administration, educational, and IT sectors.
- A demand-side orientation sees the creation, diffusion, and particularly the application of knowledge as an integral and increasingly important part of all economic activity. Information and communications technologies, while playing an important enabling role, are seen as means to broader economic ends, rather than ends in themselves. This view

would see knowledge as transforming Prince Edward Island's "traditional" sectors, accounting for a rapidly growing share of their value-added and activity. In this view, the cluster of research and development facilities related to plant, animal, and human health and food quality at and near UPEI would constitute a leading element of Prince Edward Island's knowledge economy.

Both perspectives have validity. They are outlined hereto promote clarity of discussion, as the perspective being used has significant implications for economic development priorities and approaches.

>>>top

A Shared Framework

This section of the paper seeks to outline some of the major impacts of the Knowledge Era across a range of domains: economy, labour market, learning systems, society, culture, and governance. It should be borne in mind that these are not watertight compartments, for one of the integral characteristics of the Knowledge Era is that it pervades all these domains and makes them interrelated, interdependent, and interactive. They are separated here in an effort to map out more clearly the implications of the Knowledge Era. These impacts have been synthesized from the various sources noted in the Bibliography. Some of these sources emphasize the opportunities created by the Knowledge Era, while others dwell more strongly on its threats. This paper seeks to balance these views and to outline both the positive and the negative dimensions of the Knowledge Era.

Economy

While a short paper such as this cannot begin to do justice to the complexity of the global economic changes that surround us, a few of the major trends and impacts are noted below. It should be noted that a number of these trends are not caused by the emergence of the knowledge economy, but rather are forces in their own right. These forces are, however, tightly interwoven, both driving and being driven by each other.

- Worldwide, globalization is one of the core characteristics of the Knowledge Era. While globalization has its own economic and political roots, it works in concert with other forces, including trade liberalization, deregulation, and advances in ICTs to accelerate the emergence and growth of the knowledge economy. The financial sector has moved the fastest and furthest, to the point where there is now a global capital market. Manufacturing followed, with the dispersal of production and assembly operations to lower-wage economies and regions. Now, the service

sector is becoming global, with an increasing number of ICT-based service functions being carried out anywhere in the world.

- At the national level, governments have experienced significant diminution of their capacity to control and direct the economy, in large part due to the above noted forces of globalization. Trade liberalization and global competition have reduced the scope for economic intervention, regional development, and fiscal and monetary policy. While the capacity remains to regulate environmental and safety matters, and to provide social safety nets, these too are under pressure from the forces of globalization.
- At the sector level, economies worldwide have seen a shift to a service economy. As well, the knowledge component makes up an increasing proportion of the value of manufactured goods; as such, services are playing a growing role even within the manufacturing sector. Sectors with a high and/or rapidly growing intensity of ICT use are experiencing growth and accounting for an increasing share of the economy, while sectors with low and/or decreasing intensity of ICT use are declining in size and importance.

- At the firm level, the linked forces of the Knowledge Era have resulted in a number of trends, including downsizing to a focus on core competencies and a concomitant outsourcing of non-core activities; substitution of ICTs for labour; a flattening of hierarchies leading to a shake-out of middle management; and the emergence of new and more collaborative networked forms of relationships with suppliers, customers, and even competitors.

These various developments, in combination, are having a profound effect on their societies. Most prominent of all, perhaps, is the impact on the labour market.

>>>top

Labour Market

The emerging literature on the Knowledge Era places great emphasis on its impacts on employment and the labour market understandably so, since these impacts appear to be significant. Substantial evidence exists that the knowledge economy is bringing about significant shifts in the occupational composition and skill levels and requirements of the labour market. Numerous studies have identified such shifts, which include:

- a broad, long-term shift throughout this century from blue-collar to white collar occupations;
- within this trend, more recently, an increase in the number and proportion of managerial, professional, and skilled technical jobs and a decrease in clerical jobs; and
- an increase in the skill requirements of occupations across the spectrum.

The effects of these trends have been to create intense demand for skilled workers, leading to shortages in some categories, and increasing the pressures on such workers to work overtime. At the same time, lower-skilled workers in most industries have experienced severe job losses, leading to a significant jump in the long-term reliance of such unemployed workers on social safety net programs. Generally, the labour market of the knowledge economy puts those with limited or obsolete training or experience at a severe disadvantage. Groups particularly affected include youth, older workers, and less educated workers. These impacts have been captured in catch phrases such as "Good Jobs, Bad Jobs."

The nature of employment is also changing. The paradigm of secure lifetime employment with one employer, which held sway during the middle decades of this century, is rapidly becoming obsolete. So-called "non-standard" employment i.e., everything but full-time, full-year employment is increasing rapidly, driven by the downsizing and outsourcing trends noted in the previous section. Fewer jobs are secure. Even secure jobs have become less stable, with shifts in working hours and conditions, requirements to upgrade skills, and changing duties. In short, THE JOB as we have known it is becoming a thing of the past for a growing proportion of the labour force. Yet our policy frameworks, social programs, and institutions are still premised on the concept of THE JOB -- secure, full-time, full-year, dependent employment.

The net effect of the knowledge economy on employment levels is still a subject of debate. No one disputes the facts that base levels of unemployment have increased in most industrialized countries, and that the duration of joblessness has increased for many unemployed during the past two decades. Views differ, however, on the causes of these trends, with varying degrees of impact assigned to the emergence of the knowledge economy versus trade liberalization, labour market imperfections, disincentives to job creation such as payroll taxes, and other factors. Views also differ on the likely future; some, such as the Conference Board of Canada, see net growth in jobs in the medium to longer term, while others are less optimistic, viewing this as an unlikely outcome or one achievable only in a best-case scenario.

Most commentators agree, however, that jurisdictions have no choice but to adapt by seeking to build the knowledge-based aspects of their economy as rapidly as possible. In keeping with the distinction noted earlier, some favor a strong focus on ICT-related industries, while others emphasize the application and commercialization of knowledge in traditional sectors. Whichever approach is taken, it appears likely that the optimistic future will only be achieved if significant investments are made in education, and major changes are made in labour market institutions, policy frameworks, and social programs.

>>>top

Learning

The essence of the knowledge society is the creation, diffusion, internalization, and application of knowledge. These are learning activities, and their critical importance has led many to stress that in order to succeed in the Knowledge Era, countries, organizations, and individuals all must move into a mode of continuous learning. Advances in technology create new opportunities for diversity, individualization, and access in this sphere as in others. However, several barriers stand in the way of becoming a learning society:

- Demographics are against us. The baby boom in industrialized countries is passing through middle age, and following cohorts are smaller. Meanwhile, the world's stock of knowledge is doubling every ten, or five, or three years, depending on the commentator. In short, "society is aging, while the technology is getting younger."
- The existing stock of knowledge is rapidly becoming obsolete, meaning that people must continuously renew and refresh their knowledge, not just add to it.
- Particularly in Canada, the private sector has long under-invested in training. Now, the labour market changes described above, notably the higher turnover and shorter duration of jobs, are further serving to discourage employer investment in training.
- Government restraint in most industrialized societies has resulted in constrained resources to both adult training and to the formal education system, especially post-secondary education.
- Canada's labour market institutions have long been recognized as having some deficiencies in terms of matching labour market demand and supply. In particular, linkages between employers and the educational system are very weak, leaving many young people to stumble through a trial-and-error process of learning and short-term work for years. This results in significant skill shortages and mismatches, and a less than optimal allocation of learning resources.

- The formal education systems of our societies, which to date have played the dominant role in learning, have by and large exhibited considerable resistance to changes that would diminish this dominance. These changes include the reallocation of funding to adult learning and training; the use of technologies and lay persons in lieu of teachers; the acknowledgment of home, workplace, and community as learning settings and the development of systems to recognize and accredit these forms of education; and the increased power of education "consumers" to assess and promote the quality of service they are receiving.

If the benefits of the knowledge society are to be fully realized, ways must be found to overcome these barriers.

>>>top

Society

The social impacts of the Knowledge Era are less well mapped and understood than its economic and labour market impacts, reflecting the relatively recent emergence of this dimension of the debate. A later section of this paper addresses impacts on groups, communities, and regions in our society; here the paper touches on some broader and more pervasive implications of the Knowledge Era for people and human relationships.

- The complex array of economic, labour market, and governance changes of the Knowledge Era outlined elsewhere in this paper, in combination, are placing increasing onus on individuals to ensure their own success in the Knowledge Era, based on native ability, continuous self-development, and personal and family resources. Many would argue that this is contributing to increasing social polarization in many societies, as well as stress for individuals.
- The labour market impacts and social polarization noted above also have effects on the capacity of individuals to maximize benefits from the new and more sophisticated, personalized, knowledge-based goods and services available to them as consumers. Consumption of many of these requires both time and money, whereas it has been said of the knowledge society, "Those with money have no time, and those with time have no money."
- Advances in ICTs open new possibilities for human development in spheres of learning, health, culture, and citizenship, some of which are touched on at greater length elsewhere in this paper. Like any major development, they also raise risks in these spheres should they be used inappropriately or below their potential.
- The emergence of the information highway and particularly the Internet has led to new forms of human contact and relationships, and a growing emphasis on networked, collaborative forms of relationships. While this has many positive aspects, it also raises concerns that such "virtual" relationships and communities may replace or weaken the fabric of "real" relationships and communities. The challenge is to promote social integration and cohesion, rather than the isolation of the "chair and screen society."
- The pace of change has accelerated enormously, especially in consumer products and services related to ICTs. It is hard to believe, for example, that the Internet was barely heard of only five years ago. People also face growing pressures to update their knowledge and skills on an ongoing basis, not only as workers but also as consumers and as citizens. This instability and continuous pressure to upgrade and compete is stressful for many.

>>>top

Culture

The area of culture points up, perhaps more clearly than any other, the threats and the opportunities of the Knowledge Era. On the one hand, pessimists fear that the increasingly oligopolistic nature of the cultural marketplace, combined with the

pervasiveness of ICTs, and the forces of trade liberalization and deregulation, are rapidly drowning out diversity and bringing about the "Disneyfication" of the world. It is clear that the competitive pressures of the Knowledge Era, particularly the convergence of infrastructure technologies and the increasing importance of content, are driving firms in the ICT sector to pursue both vertical and horizontal integration strategies on a multinational scale. This trend has implications for both cultural distinctiveness and for democracy that are disquieting to many observers.

On the other hand, advances in ICTs allow customization, specialization, and access in this sector as elsewhere. The optimistic believe that this will allow previously unheard voices to be heard and previously neglected audiences to be served. While this is demonstrably taking place, it too raises some implications. Reflecting the continuing dominance of an economic perspective, some of the literature tends to value cultural diversity and distinctiveness as a source of commercial content and competitive advantage, rather than focusing on its intrinsic human and social value.

Moreover, both this trend and the Disneyfication trend noted above have the effect of blurring national boundaries, the former cross cutting them with ethnic, social, and regional cultures and the latter drowning them in a sea of sameness. The cultural sector is one where government has long played a major role, and many see a continuing need for collective action to deal with the trends and implications noted above.

>>>top

Governance

In this sphere as in others, the Knowledge Era has brought some major opportunities. Most notably, perhaps, the "leakiness" of information has empowered people and increased their capacity to hold governments accountable and to participate in decision-making and public policy formulation. It has also been argued that the public's greater access to information, particularly in visual form, has made it more difficult for nations to engage in prolonged warfare, particularly where such warfare results in substantial casualties. The Knowledge Era, then, is contributing to world peace and to democracy, to the particular benefit of those formerly under authoritarian or despotic rule.

Within countries, advances in ICTs enable governments, in theory, to provide better leadership and a higher quality of public service across the range of their activities. In Canada, initiatives are under way across the country to improve the timeliness, quality, responsiveness, efficiency, accessibility, convenience and individualization of services and programs.

Government also *has the potential* to play a critical role in encouraging and supporting the emergence of the knowledge economy. Governance and public services are, in essence, knowledge activities. Government is the central node of society, a repository of much of its knowledge, which in itself represents a resource of enormous value.

Government can be a model user, a source of demand for new products and services, and can provide a critical mass for the development of new technologies and approaches. These capacities can be of particular importance in smaller jurisdictions and those lacking a strong diversified private sector.

>>>top

However, many question whether government is able to attain these potential benefits. Some would argue that the emergence of the Knowledge Era is precipitating a crisis in governance. This perception is based on several factors:

- The **reach** of governments, particularly national governments, is diminishing as they leak power upwards, outwards, and downwards:
- upwards, as globalization increases the number of issues that can only be addressed in supranational fora and institutions;
- outwards, as trade liberalization and deregulation increase the role and power of the private sector, and knowledge diffusion and accumulation of expertise increase the role of other vested interests in society; and
- downwards, as subnational and local governments play an increasing role.
- The **resources** of government are scarce and under enormous pressure, squeezed on both the supply side and the demand side:
- On the demand side, the efforts of governments to cope with the past three decades of adjustment to the Knowledge Era, particularly with regard to the marginalization of unskilled workers, have left many with significant debt and deficits. While most governments are overcoming their deficit problems, they must carry or pay down their debt, while continuing to meet the needs of the disadvantaged and reshaping the institutions and capacities of their societies.
- On the supply side, the Knowledge Era is undercutting government revenues on several fronts:
- globalization has reduced revenues from taxation of capital;
- labour market shifts, particularly substitution of technology for labour, have reduced revenues from income taxes and payroll taxes; and
- teleshopping and consumption of intangible goods have affected revenues from consumption taxes.

Governments have not yet devised new forms of taxation to reflect the Knowledge Era, although some options such as a "bit tax" are under discussion. These new forms of taxation may well require international revenue-sharing systems.

- The **capacity** of governments to operate effectively is challenged by the forces of the Knowledge Era. Older ways of organizing and governing, premised on the ability to limit and channel the flow of information and to control the process, are breaking down. Today, governments must seek to build consensus among social interests through participative processes. Governments must also find new ways of organizing to address the increasing number of issues that transcend departmental and governmental boundaries and extend beyond typical

government time-frames. They must find ways to reconcile these approaches with the hierarchical traditions and norms of accountability developed through centuries, or, perhaps, to transform these norms into new forms of accountability and governance, using advances in ICTs to increase the role of citizens in decision-making and accountability. If the latter approach is taken, it raises significant questions for democratic government as we have known it.

- The **role** of government is being challenged. Some, operating from a pragmatic base, would point to the limitations of reach, resources, and capacity noted above and argue that governments **cannot** play a significant role in the Knowledge Era. Others, proceeding from a philosophical base, would argue that, regardless of capacity, governments **should not** play a significant role that the benefits of the Knowledge Era can be most fully and best realized through unfettered competition and the operation of market forces. This increasing political conservatism and shift away from collective action in many societies is linked partly to the demographics of an aging society, and partly to the many interrelated impacts of the Knowledge Era.

These issues raise major questions for societies, for as the following section will argue, the benefits of the knowledge society can only be maximized and its costs minimized through collective social action, expressed and implemented through government.

>>>top

Impacts on Individuals, Groups, Communities, and Regions

The foregoing analysis has touched on both the opportunities and the risks of the Knowledge Era. On the one hand, the forces of the Knowledge Era create considerable opportunity for many previously disadvantaged and marginalized sectors of society, particularly those whose disadvantages consist of physical constraints. For example, persons with physical disabilities are enabled by new ICTs to participate in every sphere of life more fully than before. New opportunities exist to bring learning, health services, culture, recreation, and consumer products and services to previously underserved groups. Advances in ICTs offer small and remote communities new opportunities for knowledge-based economic development, high-quality social services and programs, and cultural expression. Remote communities and regions become part of the global community. Regions lacking the raw materials or heavy industry on which yesterday's wealth was built can hope for an economic future based on their human resources and on access to the learning and knowledge-creation activities of other regions and countries. Internationally, the forces of trade liberalization, transparency, and information diffusion are fueling rapid growth in many developing countries, spreading the affluence formerly enjoyed by only a few nations.

This is the potential of the knowledge society to enable a leveling up of previously disadvantaged individuals, groups, communities, and regions. Is this the future that will be realized? Or will our future rather be one of leveling down -- of nations competing in a race to the bottom with their social and environmental programs in response to the forces of growing

competition? -- and of polarization: "To those who have, shall be given; to those who have not, shall be taken away even the little that they have." Evidence exists to support this perspective as well:

- Individuals who lack the capacity or the resources to become part of the knowledge society may be worse off than before, as social programs are slashed and increased onus is placed on the individual to secure his or her own well-being.
- Particular groups have characteristics which place them at a disadvantage in the knowledge society. Older workers may have obsolete knowledge and both society and employers are reluctant to invest in its renewal. Women continue to experience time out of the labour force for family reasons, and run a greater risk of involuntary non-standard employment, and skill obsolescence. Youth are often excluded from the labour market, suffering both from their lack of experience (inadequate tacit knowledge) and the mismatch between their education and the demands of the labour market (inappropriate codified knowledge). Those with limited education face challenges in ever catching up to the rapidly moving and growing demands of the labour market. Cutting across these groups, the poor lack the resources to seize the opportunities and realize the benefits of the Knowledge Era.
- Communities face challenges to their cohesion from the lure of the virtual world, and the risks of social isolation and polarization posed by the Knowledge Era.
- Regions whose disadvantages involve the quality of their labour force are likely to suffer similar disadvantages to those noted above for groups: the difficulty of catching up from behind; the lack of the business networks and relationships so important in the Knowledge Era; and the high cost of being a player. Remote and sparsely settled regions may face cost barriers in establishing information and communications infrastructure. Canadian evidence to date suggests that knowledge-based economic development is taking place in large central urban centres to an even greater extent than did industrial development.

In short, the risk appears very real that the past and present disadvantages suffered by many people, groups, communities, and regions will continue to persist, perhaps to intensify, and will impede their capacity to take up and benefit from the many opportunities offered by the Knowledge *Era if their future is left purely to market forces*. There is, therefore, a clear role for collective social action to ensure that the Knowledge Era offers the chance of a better future for all.

Conclusion

The Knowledge Era holds great promise for some, great threat for others. On the one hand, it is creating opportunities that have never existed before, and is demonstrably bringing about a betterment of the human condition in many ways. On the other hand, the challenges of the past and some new challenges specific to the knowledge economy may make it difficult to realize those opportunities; for some it may be impossible. Concerted action and social consensus are

needed to ensure that Prince Edward Island attains the benefits and contains the costs of the Knowledge Era.

Earlier, this paper touched on the particular challenges facing government, and argued that government does have a role, perhaps more so than ever before. It is society's main instrument of collective action in the public interest, through which social awareness and consensus on the Knowledge Era are attained, and action is taken to ensure inclusiveness and equity.

New approaches to this role are required in this interconnected, diverse, turbulent, and rapidly changing society. These new ways of governing, it has been suggested, must focus on societal learning and consensus building, by leading processes that engage the many interests in our society, including the public interest. Government's role is to develop shared frameworks, ensure full and equitable representation in processes, set the context for engagement, and promote agreement on the definitions and information on which the process is based. This paper has sought to provide an introduction to the issues as the essential starting point for the road that lies ahead.

>>>top

References

Association of Universities and Colleges of Canada et al. "Putting Knowledge to Work: Sustaining Canada as an Innovative Society" (Brief to the Government of Canada, October 1996)

Betcherman, Gordon, and Lowe, Graham S. *The Future of Work in Canada: A Synthesis Report* (Ottawa, Canadian Policy Research Networks, Renouf Publishing Co. Ltd., 1997)

Chodos, Robert, et al. *Lost in Cyberspace: Canada and the Information Revolution* (Toronto, James Lorimer and Co., 1997)

Coffey, William. *Employment Growth and Change in the Canadian Urban System, 1971 - 1994* (Ottawa, Canadian Policy Research Networks Working Paper No. W-02, Renouf Publishing Co. Ltd., 1996)

Courchene, Thomas J., ed. *Policy Frameworks for a Knowledge Economy* (Kingston, Ontario. Bell Canada Paper No. 4 on Economic and Public Policy: Proceedings of a Conference held at Queen's University November 16 -17, 1995, John Deutsch Institute, 1996)

Courchene, Thomas J., ed. *Stabilization, Growth, and Distribution: Linkages in the Knowledge Era* (Kingston, Ontario. Bell Canada Paper No. 2 on Economic and Public Policy: Proceedings of a Conference held at Queen's University October 15-16, 1993, John Deutsch Institute, 1994)

Courchene, Thomas J., ed *Technology, Information, and Public Policy* (Kingston, Ontario. Bell Canada Paper No. 3 on Economic and Public Policy: Proceedings of a conference held at Queen's University November 17-18, 1994, John Deutsch Institute, 1995)

European Commission High Level Expert Group. *Final Report: Building the European Information Society for Us All* (European Commission, Directorate for Employment, Industrial Relations, and Social Affairs, April 1997)

Johnston, David, et al. *Getting Canada Online: Understanding the Information Highway* (Toronto, Stoddart, 1995)

KBE/S Working Group. *Pilot Project Thematic Outline: Factors Leading to the Successful Adjustment to a Knowledge-Based Economy and Society* (Ottawa, unpublished paper, n.d.)

Information Highway Advisory Council. *Final Report: Preparing Canada for a Digital World*

(Ottawa, Industry Canada, September 1997)

Lafleur, Brenda, and Lok, Peter. *Jobs in the Knowledge-Based Economy: Information Technology and the Impact on Employment* (Canada, Conference Board of Canada, 1997)

Marquardt, Richard. *Youth and Work in Troubled Times: A Report on Canada in the 1990s* (Ottawa, Canadian Policy Research Networks Working Paper No. W-01, Renouf Publishing Co. Ltd., 1996)

McMullen, Kathryn.*Skill and Employment Effects of Computer-Based Technology: The Results of Working With Technology Survey III* (Ottawa, Canadian Policy Research Networks Study No. W-01, Renouf Publishing Co. Ltd., 1996)

National Research Council, Office of International Affairs. *Prospectus for National Knowledge Assessment* (Washington, D.C., National Academy Press, 1996)

OECD. *Employment and Growth in the Knowledge-Based Economy* (Paris, Proceedings of an OECD Conference on Employment and Growth in the Knowledge-Based Economy held November 1994, pub. 1996)

Project on Governing in an Information Society. "Canada in a World of Rapid Change: Future Choices and Consequences" (Ottawa, Government of Canada, 1995)

Rischard, Jean-Francois. "Forces Reshaping the World Economy" (California, Remarks at the Symposium on Marshalling Technology for Development, 1994.)

Rosell, Stephen, ed. *Governing in an Information Society* (Toronto, Institute for Research on Public Policy, 1992)

Various authors. *Lifelong Learning Issue, OECD Observer* (No. 199, April-May 1996)

>>>top