

# *Sustainable Development: Innovation and the Quality of Life*

Sherri Torjman

Vice-President, Caledon Institute

David Minns

Special Advisor to NRC

Sustainable Development Technology

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The Caledon Institute of Social Policy and the National Research Council are working together to develop a conceptual framework that identifies the role of innovation in improving the quality of life.

## ***Purpose of this Framework***

This framework was designed for presentation at a meeting of the federal Interdepartmental Network on Sustainable Development Strategies. The framework focusses specifically upon the links between sustainable development and work currently and potentially under way with respect to *innovation*. The framework does not incorporate all the possible components of the social dimension of sustainable development; these are discussed in more depth in a Caledon report entitled *The Social Dimension of Sustainable Development* [Torjman 2000].

The framework illustrates the intrinsic links among the environmental, economic and social spheres of activity in the area of innovation. It demonstrates in a concrete way the need for integrated decision-making.

The framework also is intended to explain how the social dimension of sustainable development can play an active role in shaping the innovation agenda. The social dimension generally is considered as a residual of the environmental and economic domains. Discussions typically focus upon how to measure the impact of economic and environmental change upon human well-being.

This conceptualization shows how the social dimension is important not just as a residual (e.g., poor health, poverty) of the two other spheres. It illustrates that active investment in education and skills development (referred to here by the OECD term 'human capital') actually can *drive* the innovation agenda. First, education and skills development with respect to appropriate environmental behaviour seeks to encourage green behaviour and purchasing. Second, education and skills development related to the creation and application of technology can promote clean production.

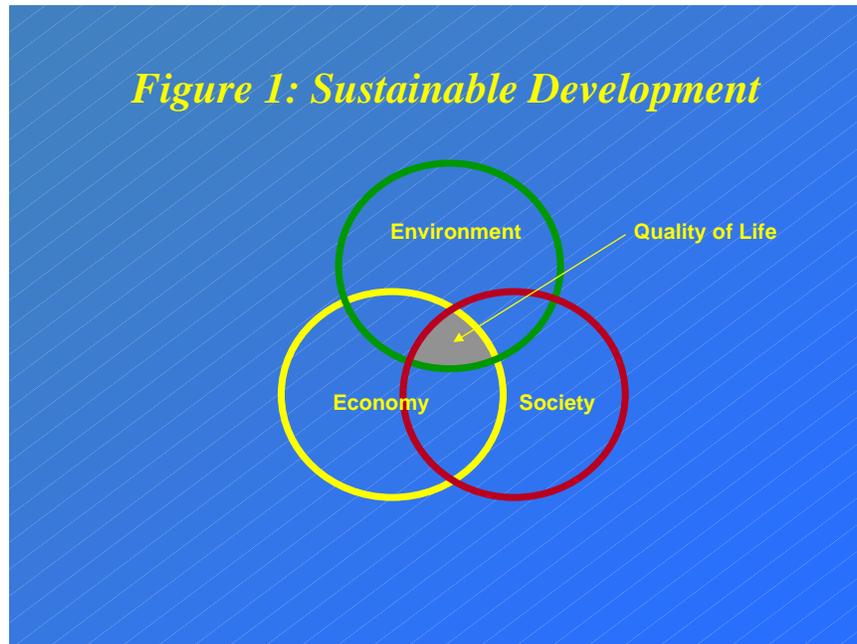
The framework makes clear that direct investment in human capital is essential to an innovation agenda. But the framework also argues that the presence of social capital is a prerequisite to the development of human capital. The harnessing of social capital is referred to here as a 'catalyst' for innovation. However, within a broader sustainable agenda, social capital can be considered a basic building block for human capital development, in particular, and for caring communities and human development more generally [Torjman 2000].

In short, the social dimension of sustainable development involves investment in people (human capital) as well as support for their relationships and social environments (social capital) that comprise the foundation of human well-being.

## ***Quality of Life***

The ultimate goal of sustainable development is to protect and improve the quality of life – which lies at the heart of the interaction among the environment, the economy

and society (Figure 1). The unique contribution of the concept of sustainable development is that it moves beyond economic indicators as the sole barometer of the health of a nation to include measures of environmental and social well-being.



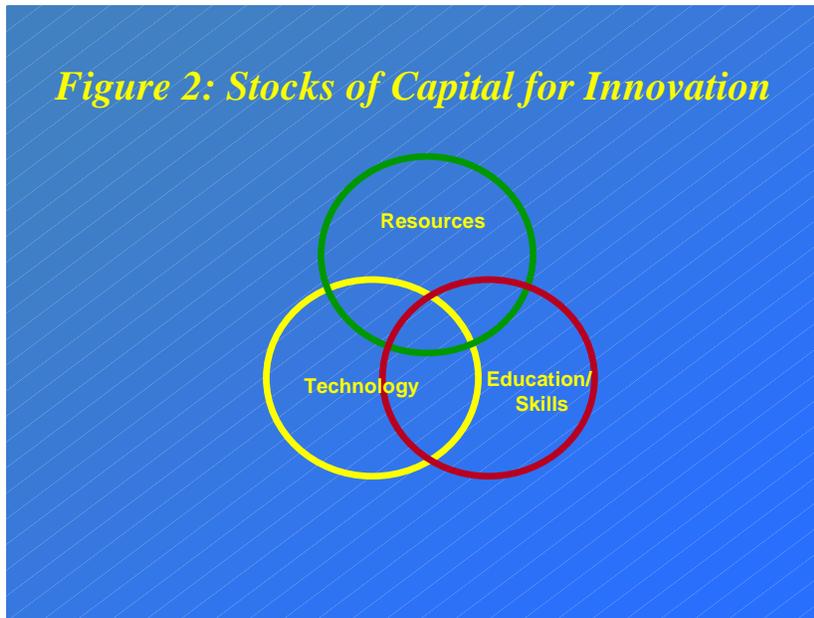
### ***Stocks of Capital for Innovation***

Within the context of innovation, the environment, the economy and society are composed of ‘stocks of capital’ or assets that can be harnessed to improve the quality of life (Figure 2). Renewable and nonrenewable resources as well as ecosystems comprise the pool of natural capital – referred to here as ‘resources.’ In the economic sphere, technology is the primary capital stock for improving the quality of life through innovation. The principal capital stock in the social sphere consists of human capital in the form of education and skills. (Clearly, the environmental and social spheres embody value in and of themselves – they are not simply resources to be captured for production. But within the context of innovation, in particular, it is helpful to view these spheres as pools of capital.)

Together, these stocks of capital comprise the major building blocks for improving the quality of life. These stocks represent the ‘inputs’ required to achieve desired outcomes and impacts. *It is the unique combinations of these inputs that create innovation in support of sustainable development.*

While these stocks of capital are necessary ingredients for innovation, they are not sufficient in themselves. Other factors – including science and knowledge, economic incentives and social/cultural capital – play key roles by acting as the catalysts for innovation. This catalytic role is discussed below.

*Figure 2: Stocks of Capital for Innovation*

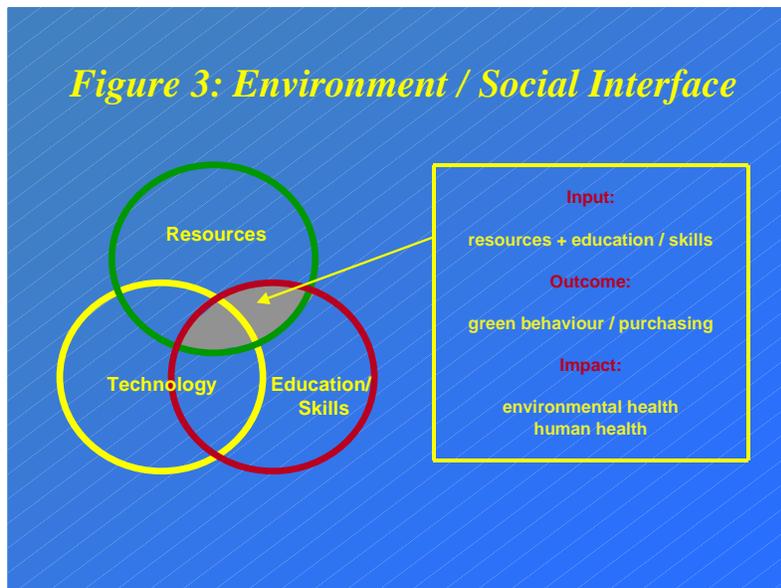


### *Environment /Social Interface*

The environment and social spheres interact in significant ways. *Environmental inputs in the form of resources combined with social inputs in the form of education/skills regarding the impact of human behaviour on the environment produce the desired outcome of 'green' behaviour and purchasing* (Figure 3). This desired outcome applies not only to individuals and households but also to organizations that effectively can act as green consumers through their procurement and purchase practices. Organizations can have an impact well beyond their own boundaries by greening their respective supply chains that provide required goods and services.

*The desired outcome of green behaviour and purchasing would have a positive impact upon environmental health and human health.*

*Figure 3: Environment / Social Interface*

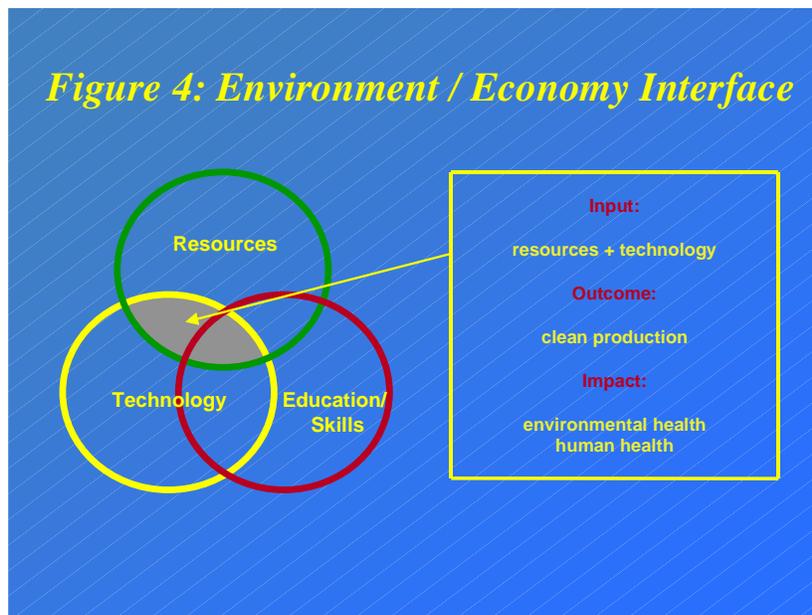


## ***Environment/Economy Interface***

The economy and the environment also interact in significant ways (Figure 4). *Environmental inputs in the form of resources combined with economic inputs in the form of technology produce the desired outcome of clean production.* The goal is to move beyond eco-efficiency toward production that meets sustainability targets.

While sustainability performance targets for technology have yet to be developed, they would be based on the assumption that cleaner production alone may not be ‘clean enough’ to maintain or reduce an organization’s or industrial sector’s environmental footprint over the long term. Clean production targets would help determine whether it is necessary to amplify or accelerate eco-efficiency actions or whether fundamentally different production processes are required.

*The desired outcome of clean production would have a positive impact upon environmental health and human health.*



## ***Economy/Social Interface***

Finally, the economy and the social dimension of sustainable development are intrinsically linked (Figure 5). *Economic inputs in the form of technology combined with social inputs in the form of education/skills produce the desired outcome of job and wealth creation.*

*The desired outcome of job and wealth creation would have a positive impact upon income distribution and poverty. Through its impact upon income distribution, job and wealth creation also would have a positive impact upon human health.*

It should be noted that while human health is considered here as a function of all three outcomes, the OECD has noted that health often is viewed as an integral component of human capital because it is essential to human well-being. There is no question that the impacts resulting from the outcomes feed back into the system in the form of inputs. Improved environmental health, for example, produces more and better natural capital. Reduced poverty helps facilitate further education and skills development. In short, this framework represents a system with feedback loops in which all essential components interact.

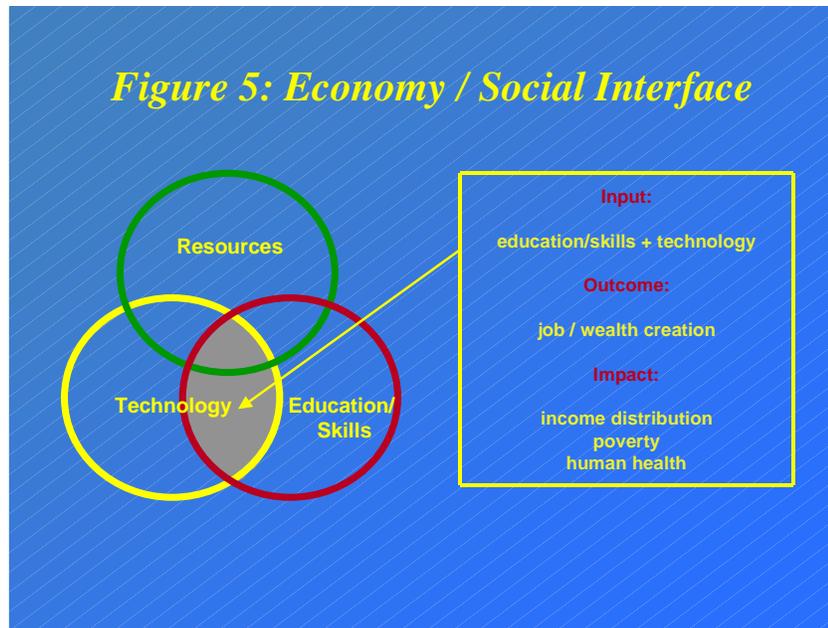
The economy/social interface implies that technology has no intrinsic value of its own. It is of value only to the extent that it is used and applied.

Technology is the product of human education and skills. But technology interacts with the social sphere in other important ways: It requires that those who use the technology – those responsible for its application – need ongoing education and skills development to keep pace with technological change. Innovation is possible only if there is continual and ongoing interaction between technological development and education/skills development. These two inputs are so inextricably connected that one cannot proceed without the other.

It is also important to recognize the links between technology and education/skills development beyond innovation and clean production. Technology can play an important role in reducing marginalization and promoting social inclusion.

Substantial activity is under way throughout the country to ‘wire’ rural and northern regions in order to ensure universal access to computer and Internet technology. This activity is important not only for its economic value in terms of skill development and its potential for e-commerce. National ‘wiring’ also promotes social contact among members within communities and helps link isolated regions with other communities throughout the country and the world. Technological aids and equipment play a central role as well in facilitating the integration of persons with disabilities within the mainstream of society.

At the same time as certain technologies help promote inclusion, they also can lead to exclusion when technological advances outpace the ability of citizens to understand or use the technology. This ‘digital divide’ can narrow the employment options available to a substantial portion of the population and thereby contribute to lower income and increased poverty. Moreover, the digital divide can affect individuals’ ability to participate as full citizens if they must use technology beyond their capacity. For example, welfare recipients with low literacy skills frequently are referred to sophisticated electronic job search websites that require language and reading competence. These are of no assistance to the people for whom they are intended.



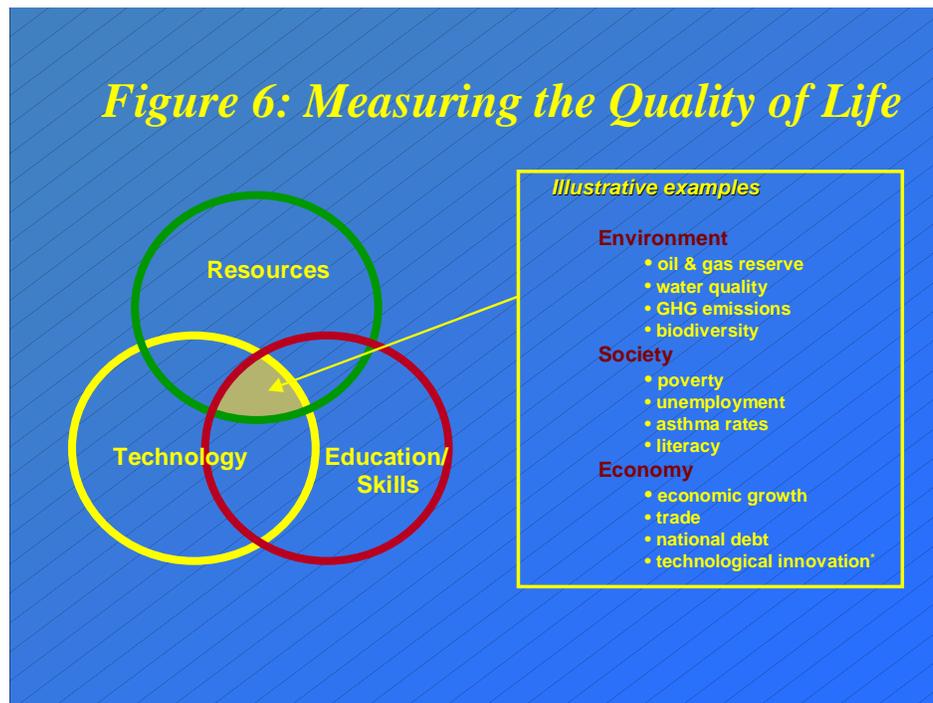
### *Measuring the Quality of Life*

Ideally, the key outcomes at the core of sustainable development – green behaviour and purchasing, clean production, and job and wealth creation – lead to three desired impacts that promote the quality of life: improved environmental health, enhanced human health and reduced poverty. These impacts can be measured to determine whether the environmental, economic and social spheres are moving together in the right direction and are resulting in objective and verifiable advances in the quality of life (Figure 6).

But it is possible, and indeed desirable, not only to quantify these impacts. The inputs and outcomes also should be measured because they comprise the essential ingredients to achieve the desired impacts. For example, a reduction in the stock of natural capital – an essential component of green behaviour and of clean production – is a warning sign that intervention is required to protect the environment. Similarly, a reduction in overall literacy skills in the population is a clear signal that educational investments must be bolstered in various ways.

In short, measuring progress toward improving the quality of life requires measures from the environmental, economic and social spheres at the level of inputs, outcomes and impacts. Such measures include indicators of the quantity and health of natural stock as well as the health of ecosystems. Economic indicators include traditional measures of economic performance such as Gross Domestic Product and trade. But they also should incorporate indicators related to technology performance – a component that appears missing from much of the current work on sustainable development indicators.

Indicators from the social sphere would include levels of education and skills, poverty and human health.



## ***Catalysts for Innovation***

Innovation involves the *development and application* of unique combinations of resources, technology and education/skills. But these unique combinations do not simply come together on their own. Like a chemical reaction, they need to be activated by the appropriate catalysts (Figure 7).

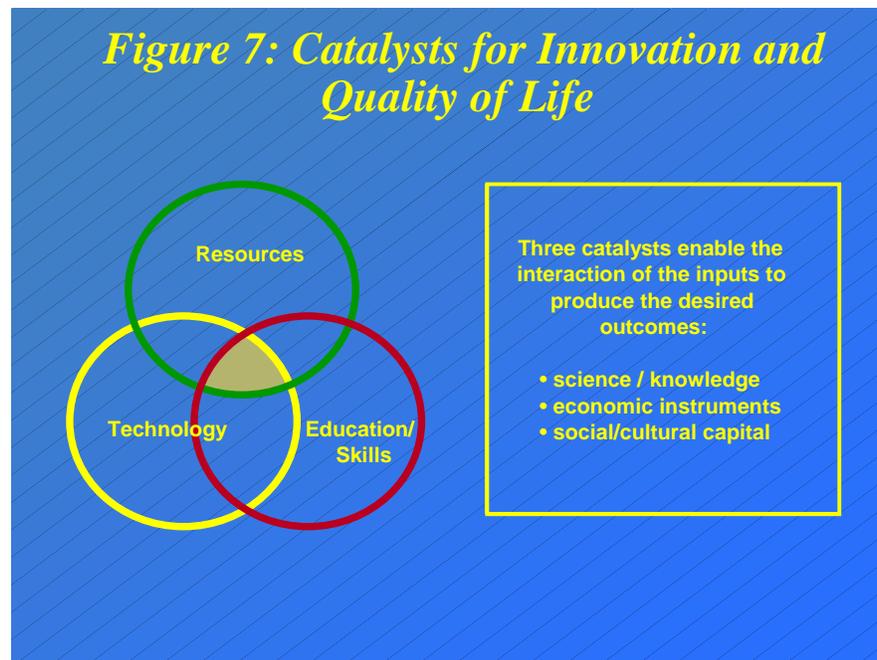
There are three key factors that catalyze the inputs to create the desired outcomes: science/information, economic instruments and social/cultural capital. These factors affect all three capital pools as well as the interactions among them.

Science and information refer to the basic knowledge that comprises the foundation of any activity taken in respect of sustainable development. Environmental protection, green behaviour and clean production must be built upon a solid body of knowledge formulated on the basis of reliable and verified research.

Economic instruments refer to measures that act as incentives or as disincentives for certain investments or behaviour. Economic incentives can take the form of grants, subsidies, tax deductions, tax credits, capital cost allowances and tradeable permits. Disincentives include taxes, user fees, fines and other penalties on the investment or behaviour being discouraged.

Social capital refers to the relationships, networks and norms that facilitate collective action. Social capital comprises the foundation upon which societies are built. The OECD has found that social capital and the networks it embodies create the foundation for learning. It therefore comprises a cornerstone of human capital development. Moreover, the trust embedded in networks and associations has been found to provide an essential underpinning for economic transactions. Social capital also forms the basis for green behaviour, in particular, in which citizens may be required to act in concert to make decisions or change their practices and purchases as well as those of local governments.

Cultural capital is a dimension of social capital. The OECD notes that cultural capital is the resource that resides in families whereby individuals attain a particular social status. However, cultural capital also can be understood as a set of common values which are expressed in a wide variety of ways: through art, music, song, dance, poetry, ritual or other form of cultural expression. These common values, in turn, are the building blocks of social capital.



### ***Innovation and Sustainable Development Framework***

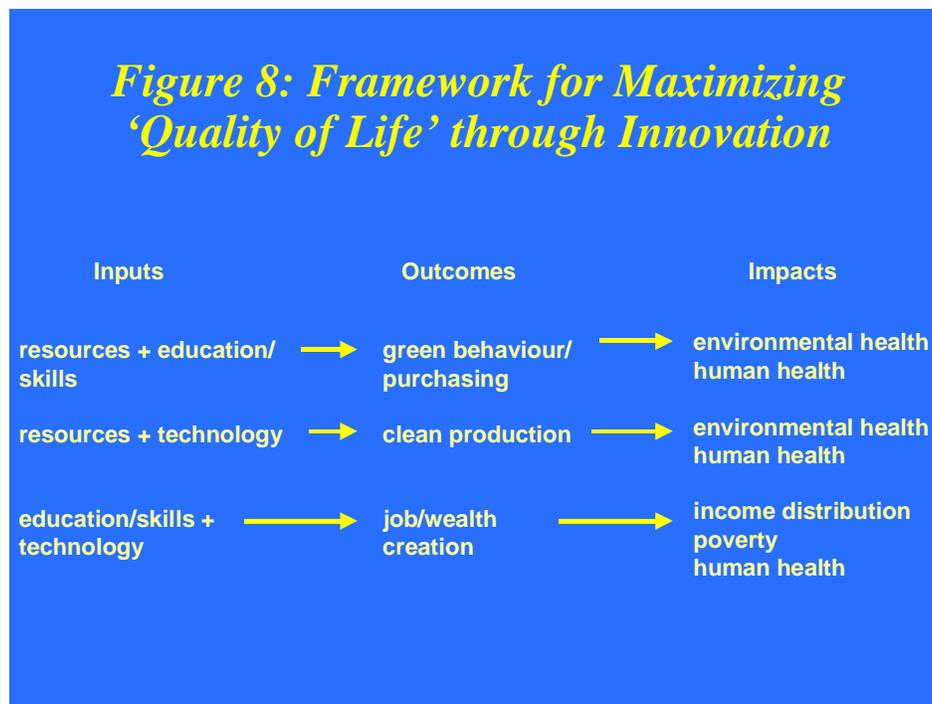
The ultimate goal of sustainable development – improving the quality of life – can be achieved through protecting environmental health, advancing human health and reducing poverty. These desired impacts can be attained through three key outcomes: green behaviour and purchasing, clean production, and job and wealth creation. These key outcomes, in turn, are the result of the unique combinations of inputs from the three capital pools: resources and education/skills, resources and technology, and technology

and education/skills, respectively. The unique combinations of inputs create innovation in support of the ultimate goal of sustainable development (Figure 8).

The inputs are catalyzed by three major factors – science and knowledge, economic instruments, and social/cultural capital – that act on the capital pools in varying degrees and combinations to create the desired outcomes

The value of this framework is that it sets out clearly a fundamental goal of sustainable development: to improve the quality of life. It identifies how the interaction of the environment, the economy and society can create innovation for sustainable development. It highlights the intrinsic linkages among these three spheres and the components of the system that should be measured to determine progress toward improving the quality of life.

But this framework is important not only as a conceptual tool to identify unique linkages. It also can help determine the areas around which action is required. It can help develop the proposed actions that should be taken with respect to the inputs and catalysts in order to achieve the desired outcomes and impacts. Future work will focus on the role of social capital, in particular, as both foundation and catalyst for sustainable development.



This framework also can be used to explore the policy instruments to achieve the desired results. It will identify the key stakeholders that should take responsibility, both individually and together, for these actions. These stakeholders include the federal government, provincial/territorial governments, municipalities, the private sector, the voluntary sector and individual citizens.

Finally, a *caveat* is in order. This conceptual framework for innovation in sustainable development sets out directions for improving the quality of life over the long term. It will take many years to generate widespread green behaviour and purchase, introduce clean production in all sectors of the economy and create sufficient jobs and wealth to substantially reduce poverty. It also will take many years to put in place the appropriate indicators to measure improvements in the quality of life. Finally, substantial effort will be required to ensure that the suitable catalysts are in place – the science and knowledge, economic instruments and social/cultural capital – to generate the appropriate interface interactions.

In the meantime, there are several pressing concerns that must be addressed immediately. The well-being of the environment – both the stock of resources and the health of its ecosystems – must be protected through various measures, including legislative action. In contrast to the technology and education/skills pools of capital, much of natural capital assumes the form of finite resources. Moreover, ecosystems may not be able to be repaired, easily or ever. Natural capital should therefore be viewed as a fragile and limited pool that requires special and immediate attention.

The widespread prevalence of poverty in Canada and throughout the world is another serious problem. The United Nations has identified poverty as the greatest threat to political stability, social cohesion and the environmental health of the planet. In the long run, the best approach to reduce poverty is through investment in human capital through education and skills development. The creation of social capital is a prerequisite to this investment.

However, there is an immediate imperative to ensure that all humans can meet their basic needs. Redistributive mechanisms in the form of income security programs play a central role in tackling this problem. In fact, even with the most sophisticated education and skills development, there always will be a need for income security programs both to ensure that basic needs are met and to reduce the disparities that invariably will arise with ongoing technological advances resulting from innovation.

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