

**STANDARDIZATION
IN
EMERGING BIODIVERSE INDUSTRIES**

**Canadian Agri-value Interests
in the Canadian Standards Strategy**

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1.0 Introduction

The aim of this research is to have industry identify strategic goals, assume responsibility, and to begin the process to develop, adapt or adopt standards for their respective markets that will enable them to grow and add increased value in agri-value and other emerging biodiverse industries in Canada.

Consumers are losing their base for understanding the products they consume and regulators no longer have the information they need to keep pace with rapid technical change. Among other consequences, agri-value firms that are producing advanced technology products are losing the trust of consumers and are losing potential market share within Canada and throughout the world. Private firms or collective groups of firms who possess information about new products must take the initiative to create either brands or standards in order to recapture their markets.

Given this context for Canadian firms, the objectives of this paper are:

1. For government to take notice of current domestic and international biodiverse market conditions and to assist Canadian industries in standardization efforts.
2. For biodiverse industries to begin working collectively to identify strategic goals and begin working together to achieve these goals.
3. Suggest approaches for achieving these objectives.

This study examines the opportunities and challenges of using standards to create and maintain markets, of standards maintenance, and of offering a policy framework for standards development. The opportunities and challenges will be detailed, in part, through the experiences of several industries. The study will focus on industries dominated by small and medium enterprises (SMEs) because of the greater difficulties that SMEs have working collectively towards standardization. Industry standardization involves issues of development, conformity assessment and standards maintenance, however the study will focus primarily on standards development as the first step that agri-value industries must take towards standardization.

1.1 Emerging Biodiverse Industries

The potential impacts that standardization may have on market development are evident in the behaviour of consumers in these emerging industries. Among other investigations, a general consumer survey demonstrates that consumer preferences are significantly influenced by their trust or confidence in the quality and safety of a particular product or of the industry as a whole. There are circumstances, for example, where the quality assurance associated with a brand is preferred over the regulatory assurance.

In cases where regulations or standards are not established in a market, consumers will seek out assurance from trusted sources. The natural health products market provides a case in point of an industry where neither specific regulations nor standards exist and consumers obtain quality assurance information primarily from pharmacies. These results appear across surveys of consumers and industry. In general, consumers depend on product labelling and newspapers or other media about natural health product information, and do not go to government for assistance. For natural health products in particular, an industry survey clearly demonstrates consumer confidence in pharmacist opinions about these products. The regulatory and industry standards for quality and safety provide the basis of consumer trust in pharmacist opinions.

Pharmacists have become knowledgeable about the products because consumers demand to know, and an industry that is developing primarily because of consumer demand is an underdeveloped industry. Industries exist because of consumer demand, but growth due to demand that is not fed by marketing campaigns indicates that many more consumers will enter the market once they have sufficient information. Only consumers who are motivated to seek out a product are currently represented in this market. Industries provide goods and services in as easy a manner as possible in order to capture the full demand for the products, so the actions of consumers of natural health products indicates that the industry is under-development. Survey information, reported above, indicates that the constraints inhibiting development of the market includes a lack of information about natural health product effects and quality.

Specific brands – pharmacy brands that are labelled “standardised and certified”, although these are only labels – are attempting to use the existing confidence in pharmacists in order to capture the markets. A particular company will not be able to fully develop consumer demand for the whole industry unless that company has a majority market share, which any one pharmacy does not. The implication is that industry standards, through collective action of several firms, will develop consumer demand by providing information that consumers need to make appropriate choices among natural health products and between these and other health products or services.

The natural health products market provides an example of the potential benefits of standards-based development. This industry provides a context for understanding the effects that industry standards may have on market development. The study, overall, examines the theory and practice of standards in the natural health products sector as well as the theory and practice of standards in organic foods, fibre sector products, and non-traditional meats.

1.2 Private and Public Action for Capturing the Benefits

Standards development and maintenance are time-consuming and costly processes for industry. The benefit of standards development is market development and the benefit of standards maintenance is market maintenance. These benefits cannot easily be linked to specific standards development or maintenance activities, and as a consequence many industry participants do not fully appreciate the benefits and some participants do not respect standards at all. Larger firms are able to link internal quality standards to firm market development where small and medium sized firms require widely accepted standards in order to achieve the same benefits from creating images of quality control and assurance. Small and medium-sized enterprises (SME's) must act collectively in order to develop and maintain these standards.

In addition to the market development benefits of standardization, the Standards Council of Canada has noted the public role that standards serve for product assurance:

- *For Canadian consumers* – Standards allow trust to dominate the supply chain for products and the information that flows along the supply chain will become a competitive advantage for firms maintaining standards.
- *For securing international markets* – Rapid technology change will be the way of the future and in order for firms in the agri-value industry to remain at or near the top of the industry in terms of offering new innovative technologies it is crucial that standards become part of technology development and dissemination.
- *For “reducing administrative costs and eliminating ... burden”* – Industry-led standards offer flexible and less costly alternatives that may lead to innovative approaches for protecting the public and meeting market needs (*Canadian Standards Strategy, p.1*).

The public policy role that industry-led standards serve should also be facilitated and supported by government oversight. Government participation in standards – whether through the Standards Council, Industry Canada, or other federal and provincial agencies – will serve to ease the time and cost incurred by industry’s collective activity – in short, by *taking care of industry volunteers*.

Government participation in standards development, by taking care of the small and medium enterprise volunteers and consumer volunteers, is a necessary component for realizing the full potential of standards. Taking care of industry volunteers, in addition, depends on industry participation and industry leadership of the process. Industry must come to terms with the reality in international markets that failing to participate in standardization is ultimately more costly than volunteering time, energy, and resources to the development and maintenance of standards, and to conformity assessment. This study will provide the basis for developing strategic goals for industries to participate in standardization and begin to establish the appropriate standards for continued economic development in Canada.

2.0 Economics and Strategy of Standards-Based Development

This section of the study establishes the theoretical and practical importance of standards to knowledge-based economic growth. There is clear evidence that standardization provides a competitive advantage for countries in world markets, and, therefore, is a tool for national economic development. Standards are used as a means to expand or maintain markets, and are now a means to control markets for commercial gain (e.g. software and food standards). The focus of this section is to identify the theoretical aspects that provide direction for the development of standards in agriculture industries that could deliver competitive advantages for Canada in world markets.

2.1 Product Standardization for Efficient Market Exchange

2.1.1 Trust as a Criteria for Exchange

Standards involve a set of informally or formally acknowledged product and process attributes that help determine the quality, safety and value of a product or service to consumers. Quality is a multifaceted aspect for any product, although basic economic theory provides little direction regarding the public role in the marketplace. Simply, basic theory suggests that minimal or no regulation should exist so that information about consumer preferences is most easily accessible from firms operating in a competitive market to satisfy consumers. These conditions ensure that consumers receive the precise quantity and quality of good that they demand.

Increasingly, however, the literature is pointing to conditions of trust and confidence in the development and maintenance of markets (Fukuyama 1995 and Stiglitz 1999), and that these conditions are not best managed in the unfettered realm of the free market. Markets for many products are not able to create, by themselves, the conditions of trust that generate the socially optimal qualities and quantities of goods and services produced and consumed. Hence, there is more potential for public and private regulation in markets than basic theory suggests. This is especially true for new agri-food products, where perceived risks and public uncertainties inhibit the creation of trust between consumers and companies.

Tirole (1988) has explicitly identified a basis for integrating trust into consumer theory by classifying products into three categories:

1. *search goods*: where consumers can visually identify attributes before consumption;
2. *experience goods*: where consumers identify attributes after consumption; and
3. *credence goods*: where the unaided consumer cannot know the full attributes of consuming a good for at least for some period after consumption.

In practice, a single product could embody attributes that fit all three types of goods. For example, if one is looking for a tomato, one could ‘search’ through the bins and find one that looks ripe, smells good and is apparently free of insects or disease. Once a consumer takes it home and eats it, they experience the quality of the fruit, judging it based on a variety of subjective factors, such as flavour and texture. Ultimately, satisfaction from consuming the tomato includes any longer-term benefits or costs that become known some time after consumption.

Long term benefits include some benefits such as anti-oxidants, or some costs, such as food borne pathogens (e.g. e-coli or salmonella) which would become known within a few days, or toxic elements (e.g. carcinogenic elements) that may have only a long-term cumulative effect on a person’s health. At the time of purchase in the marketplace a consumer “trusts” that the experience and credence attributes exist in the tomato.

Markets for search goods function using simple transactions: barter exchange and street markets effectively deliver search goods with little or no government intervention. Markets for experience or credence goods do not function without some external trust element. Experience goods require a greater element of trust. Product markets where there are repeated transactions, such as for haircuts or for non-durable products, often can operate with only limited regulation, either ruled by the public or private sector. Markets for experience goods with infrequent transactions (as for consumer durables such as automobiles or houses) often require some additional structures to effect the exchange (e.g. brands, warranties, inspections). Credence goods pose a much greater problem for markets. Although transactions may be possible in unregulated markets for credence goods, the absence of consumer knowledge severely limits the potential for an economically efficient outcome. These markets require some public or private regulatory structure to address the absence of consumer trust.

2.1.2 Private and Public Market Intervention (Brands through to Regulations)

The search, experience and credence attributes of most foods are assured through a combination of public and private regulatory systems (table 1). In the production system, the public sector has tended to establish the general environment for private actors to effect transactions. The Food and Drugs Act set rules for human consumption, the Feeds Act sets rules for animal usage, the Canada Seeds Act specifies the performance standards for new germplasm, and the Canadian Grains Commissions sets and monitors the standards for the seed trade. At the retail level, consumer-labelling laws have operated to establish consistency of product labelling. Meanwhile, the private sector has established common-property or other private mechanisms to manage exchange for different product attributes (search, experience, or credence). Companies employ trademarks, brands, warranties, and other means of identifying firm products (identity preserved production and marketing – IPPM) to assure customers of the value of their product. Experience has shown, however, that the costs of developing private standards are high. For industries dominated by small and medium sized enterprises, such as for many agri-value products, the efficiencies that can be gained only through collective action (e.g. Canola Council of Canada story, see Gray, Malla and Phillips, 1999).

Companies employ trademarks, brands and warranties to assure customers of the value of their product.

Table 1: Product Attributes and Public and Private Responses			
	Search Attributes	Experience Attributes	Credence Attributes
Public Mechanisms for Regulation	- Consumer labelling laws to prevent fraud.	- Seeds Act regulations ensuring consistent quality.	- Health, safety and environmental regulations; - Product liability and tort laws.
Private Mechanisms for Regulation	- Voluntary labelling	- Trademarks backed up by IPPM.	- Private warranties and brands backed up by IPPM.

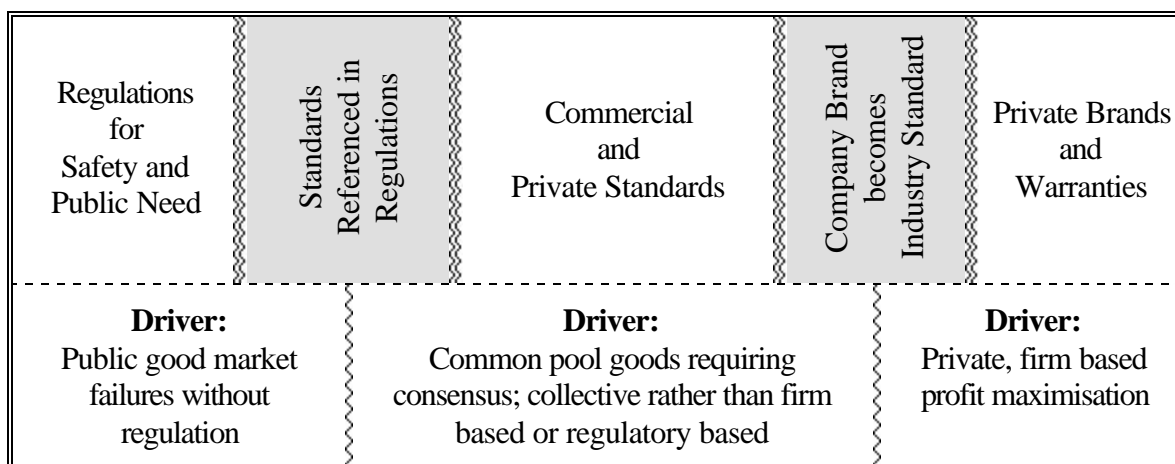
The most effective means of regulating a market depends, in large measure, on the degree of trust necessary between buyers and sellers in order to effect the transaction. In general, the greater difficulty that consumers have in assessing product attributes or the greater the consequences for making mistakes about attributes requires greater trust on the part of consumers and means that a regulatory responses is more likely to be a public response rather than a private response.

The importance of trust does not imply that regulatory response is determined solely by the degree of trust, since this minimizes the importance of recognizing search, experience and credence attributes. Rather, by noting the role of trust in market transactions, private and public actions are no longer considered to be opposites, but considered to be examples in a continuum of regulatory responses that improve transaction efficiency. Private brands represents one extreme and government fiat represents the other extreme of market regulation. Each of these extremes facilitates transactions using standards of product quality. The range of mechanisms, institutions, and industry participants that maintain these standards complete the continuum between private brands and public regulations.

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In essence, commercial product standards can only really be understood in the context of all mechanisms used to manage markets (Figure 1). At one extreme, governments or agents for governments set regulations to achieve public goals, such as health and safety or environmental objectives. At the other extreme, private companies develop brands and provide private warranties to assure consumers of the quality of their products. Warranties, brands and other mechanisms used by a firm, by firms in an industry, or by firms across a nation depend on standardization within and across firms to capture or maintain market access. The continuum between brands and regulations is key to understanding and developing emerging agri-value industries, because the consistent achievement of a high quality standard over a long period breeds a perception of quality that is critical in the competition of knowledge-based innovative products (based on integrity and trust).

Figure 1: Relationships between Regulations, Standards and Private Brands



Brand loyalty to a firm or to an industry becomes a source of several long-term competitive advantages, which guarantee sufficient future demand. In particular, brand loyalty:

- is the basis for extending product lines by capitalising on the perceived quality of the original product to facilitate market acceptance (Murphy 1990, Aaker, 1991, Lane and Jacobson 1995);
- increases the amount a customer will pay for a product in comparison to other comparable products, allowing for greater sales revenue through premium pricing (Keller 1993); and
- contributes to marketing responsiveness – that is marketing efforts for products with strong, favourable brand attitudes reach consumers more effectively (Keller 1993).

In some cases the brands and warranties become generalised and are the *de facto* industry standard for a commodity or product group. In this case the commercial benefits of the standard accrue to the industry as a whole. Consumers clearly benefit as well by having access to a choice of quality products. The higher that a standard is set or the more serious the consequences of consuming a substandard product and the more stringently that a standard is enforced in an industry, then consumer benefits are greater than industry benefits. The extreme case occurs where product characteristics are determined and enforced by government – *i.e.*, regulatory control.

Consumers clearly benefit by having access to a choice of quality products.

The continuum also includes cases where firms, consumers, and government are all participating in standardization in one means or another. For example, many if not most commercial standards evolve from collective action among producers with support by government. In addition, commercial standards may be established by industry and referenced in legislation in order to be enforced by government. Health Canada requires medical device manufacturers to implement ISO 9001 (ISO – International Standards Office) to ensure consistent quality of their products and requires manufacturers to undergo third-party registration for the standards using SCC accredited registrars. Human tissue regulations are presently undergoing modification so the Canadian industry developed standard will be referenced in federal and provincial legislation.

The grey areas between brands, standards and regulations are compounded by the notion that a standard in one region may be a regulation or a brand in another region. The industry standards within one country may be sufficiently high that products from this region exact a higher price in world markets than products from other regions. Wines from the Bordeaux region possess this type of brand identity and have a distinct competitive advantage over other wines made from the same grape variety. Alternatively, standards (*e.g.*, many ISO standards) established in one region (the European Community) must be adopted in other regions in order for firms to sell into the original region (*i.e.*, a trade barrier). Such a standard also affords the originating region with a competitive advantage over competing regions.

The examples provided are intended to demonstrate the range of interventions that are possible, rather than to suggest that any one particular approach should be adopted. The particular approach that will be most efficient for managing market transactions or for creating a national competitive advantage will be driven by product attributes and the existing level of trust in an industry. The motivation to employ strict regulatory control is public safety, for example, and the motivation for private branding is profit. The area between regulations and firm brands, standards are often motivated by industry development or expansion, and require persuasion and consensus among firms to develop. The drivers of regulations, standards and brands are implied by various product attributes, but the concept of drivers is separate and ultimately more useful in understanding the institutions that are most efficient in governing market transactions for different products.

2.1.3 Market Institutions

In a competitive marketplace made up of many informed buyers and sellers, market exchange is an institution that effectively governs the production and consumption of goods and services. The prices generated in a market create Adam Smith's 'invisible hand' to match the marginal cost of providing a good to the marginal value of that good to society. In a great many instances in the market place, a simple exchange of goods and services at an agreed upon price is a low-cost transaction that provides the correct incentives for the buyer and sellers. The proliferation of private brands and warranties illustrates that in some areas, the market can function. When the marketplace operates in a manner such that the marginal social benefit is not equal to the marginal social cost of the transaction, then a market failure is said to exist.

Those market failures from standard economic theory most relevant to standardization are associated with public goods and technical externalities. Markets fail to provide adequate public goods because no one can be excluded from their consumption and, hence, there are no feasible means for a firm to charge the users for the provision of the goods. Both positive and negative technical externalities, such as knowledge or pollution, also represent market failures because they are not priced in the market. The key factor in each of the market failures is the lack of marginal cost pricing, often due to the inability of producers to exclude others from using their good without paying the price.

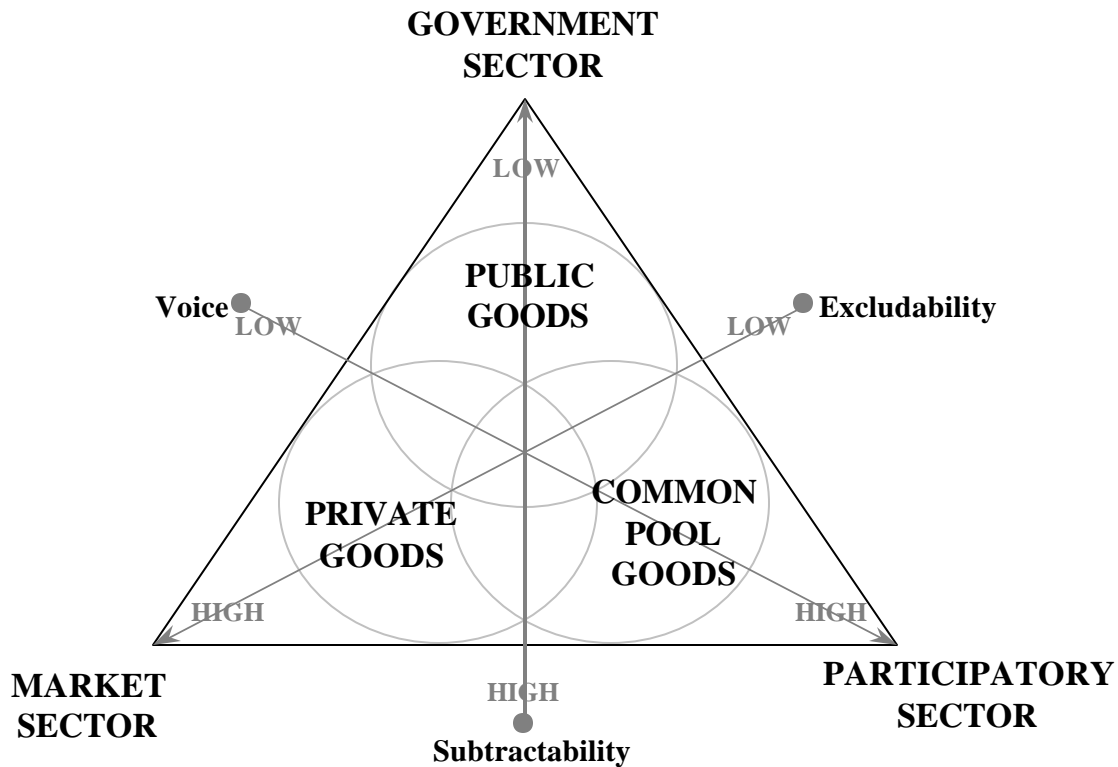
Institutions are essential to solving market failures. They encompass a set of rules, both formal (e.g., statutes) and informal (e.g., norms), which constrain the behavioural relationship among individuals or groups. Institutions can be established, enforced and policed either by an external authority or by voluntarily acceptance. The key feature of institutions is that they are predictable, stable, and applicable in repeated situations. Ultimately, institutions guide public and private decisions and responses to market incentives.

Particular institutions tend to be best suited to govern particular types of transactions. Picciotto (1995) classifies institutions into three general types:

1. *Government sector*: the government represents all citizens of a country and pursues policies in the best interest of society, or at least groups in society);
2. *Private sector*: the private sector owns property and seeks to maximise their profits or other self-interest; and,
3. *Participatory sector*: the participatory sector involves those who voluntarily join to obtain the benefits of collective action (Olson, 1965).

Participants in collective ventures either seek to put forward their views and ideas or to pursue more material goals that cannot be realistically obtained through individual action. In the context of standardization, this need for persuasion or ‘voice’ involves co-ordination among multiple actors to establish the quality attributes for products or services.

Figure 2: The Nature of Goods and Services



Source: Picciotto, 1995.

Each sector represents different individuals and incentives and is effective in producing goods or attributes with specific characteristics. The government sector produces public goods (e.g., public health and safety), usually characterised by low “excludability”,¹ low “rivalry”,² and low “voice”,³ that are involuntarily consumed by all citizens equally. On the other hand, the private sector provides market goods (e.g., brands and product specific warranties), that exhibit high excludability, high rivalry and low voice, and are consumed voluntarily by individuals. In contrast, the participation sector specialises in common pool goods (e.g., standards that go beyond regulations but involve more than one firm), with low excludability, from low to high rivalry and high voice (e.g., co-ordination).

Table 2: Taxonomy of attributes for goods produced by different institutions			
	Excludability	Rivalry	Voice
Government provided Public goods	Low	Low	Low
Privately produced Market goods	High	High	Low
Association produced Collective goods	Low	Low to High	High

In short, there are significant lessons for standards development that can come from institutional economics (North 1991 and Nabli and Nugent 1989). Standardisation, which involve investments in specific assets (the rules) with uncertain paybacks, depend critically on predictable, effective institutions to mobilise resources, to develop objectives and to produce benefits. The most effective institution must be in place to provide specific goods (public, private, or collective) most efficiently.

2.2 The Economics and Commercial Strategy for Trading Knowledge

Product distribution and supply chains are shifting their focus from products being the most important aspect to a new focus of managing knowledge or information. With the rising use of the Internet, product distribution as currently practiced will become less and less relevant. Firms will use the Internet to meet the demand that is created by niche markets around the world. Already there are seafood companies on the eastern seaboard that guarantee delivery of live lobster within 24 hours of placing an Internet order. To varying degrees, depending on the product, the power in supply chains has shifted from the wholesaler/retailer to consumers, who now demand specific products to meet their needs. Consumer choice is no longer bound by a food distribution system built around the limited technology of ground transportation. The consumer has become the driver of change in the new economy. Consumers create niche markets and are responsible for exponential niche market growth.

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¹ Excludability describes the circumstance where individual consumers can be excluded without incurring substantial cost.

² Non rival, or low subtractable, goods are ones where the consumption by one person does not diminish the ability of other persons to benefit from the good.

³ Voice is the ability of members in a sector to have their opinion heard by those who make decisions.

Nuala Beck in her book “The Next Century: Why Canada Wins” argues that Canada’s most strategic asset is knowledge.

“Unlike the wealth derived from oceans, minerals, forests, and farmlands, today’s knowledge economy doesn’t depend on luck, fate or natural endowments. Knowledge—our society’s ability to develop new know-how and create new products, new processes and new markets through applying that knowledge—is based solely on our own ability, drive and determination as individuals and as a country.”

The key purpose of a commercial enterprise in an economy is the capture of some excess value for producing a product or service. This effort requires different measures in a knowledge-based economy than in a commodity-based economy. Commodity products are produced and sold by a specific firm that captures the value of the product. The value of knowledge products is more difficult to capture, because knowledge products are non-rival and often non-excludable.

All products exhibit some degree of these two characteristics: rivalry and excludability. Rivalry refers to the extent that only one person may use a good, service or innovation at one time. Only one person can use commodities and personal services at any given moment. A knowledge product, for little or no expense, may be disseminated to and used by competing producers and no one producer’s use is limited by any other producer’s use. Excludability refers to whether a good, service or innovation is protected from widespread use by legal means (e.g., patent) or by some other constraint such as industrial organization or climate. If a product is excludable, then a commercial enterprise is more likely able to appropriate all the benefits (i.e., value) from the production, investment or innovation.

Commodity-based economic development – developing new products or machine based process – involved both rival and excludable products, which made it easier to capture some or all of the value of the new innovations through traditional patent protection and production systems. Knowledge-based economic development – developing new knowledge-intensive products that are easily replicated (i.e. the marginal cost of replicating is often zero) and often have low or no rivalry – makes it extremely difficult to capture returns. High quality, standards-based agri-value industries are knowledge-based industries and should be developed with the understanding that innovations are non-rival and non-excludable. Once the product is invented, standards established and the markets developed, anyone can replicate the example and compete head-to-head with the entrepreneur or group that made the investment to develop the product.

The commercial challenge, then, is not simply to develop a product and market, but to develop it in such a way that others are excluded from benefiting from your efforts. There are a number of examples from the agri-food sector that illustrate the power of such as strategy. At the firm level, this has historically involved positioning marketing, brand development, aggressive pricing, and marketing channels to lock in both buyers and suppliers, to exclude other firms by making competition more difficult and costly. Almost all major agri-food companies – e.g., Coca Cola, Kraft – have in one way or another positioned their products to meet or beat the competition in their core product areas.

The commercial challenge, then, is not simply to develop a product and market, but to develop it in such a way that others are excluded from benefiting from your efforts.

Similarly, some geographic regions have captured the value of their innovations by inextricably tying their product quality to the geographic region. For example, Bordeaux and Champagne wines, both produced in a wide range of wine growing regions around the world, are eponymous with the regions they started in. Producers in these areas capture premiums and, therefore, a higher return for their produce. Also, commodity groups have at times successfully developed standards or brands that have captured some of the returns on innovation to producers and the industry. The Canadian rapeseed industry, between 1968 and 1985, collectively invested in transforming rapeseed into edible oil, developed markets, and assisted farmers to adopt the new product. The key to their success was the decision to trademark the new product by the name “canola” and successively tighten the quality standards to reduce competition in the higher value end of the edible oils market (Gray, Malla and Phillips 1999).

The key to their success was the decision to trademark the new product by the name “canola” and successively tighten the quality standards to reduce competition in the higher value end of the edible oils market

The ultimate success comes if the innovators, through standardization, can encourage further innovation that becomes tied to the location of the standard. Grossman and Helpman (1990) argue that if that can be achieved, then the technological spill-over that is limited to a specific location create the possibility that “comparative advantage is endogenously generated” – that is, the technical and commercial advantage of a region is a result of regional industrial strength and supporting government policy. In the extreme, if trade partners are similar in size and their economic base is otherwise the same, then a country that inherits even a small technological lead will come to dominate world markets for high-technology products. A productivity differential in knowledge-based industries is self-perpetuating. In more general circumstances, a large domestic market, an abundance of human capital and a sizeable knowledge base contribute to a country’s comparative advantage in research. In short, standards are one way that companies, industries and governments can generate comparative advantage.

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2.3 The Public Role in Nurturing Standards-Based Growth

2.3.1 Public Role

Standardization can be a government policy instrument that creates product attributes to increase trust and thereby facilitates market efficiency. The precise structure of a standard and of conformity to the standard varies according to the existing product attributes and according to the existing industrial organization. Health products, for example, must have strict conformity measures to ensure public safety where incorrect use or poor manufacturing practices may harm consumers. Also, industries dominated by small enterprises require standardized products and services in order to create broad-based consumer confidence in the industry. In many cases, such as in knowledge-based industries, standardization is a prerequisite for industrial development. As an industrial development policy, standardization is needed to improve or at least maintain Canada’s competitive advantages in world markets for knowledge-based products.

Standardization is needed to effectively manage markets for advanced technology health care products, including medical devices as noted above. In particular, medical device manufacturers are governed by standards that are referenced in regulation by the Therapeutics Product Program of Health Canada. The following standards govern medical devices:

required, by legislation, to conform to and to regulate the industry according to:

- ISO 14971 – Application of Risk Management to Medical Devices
- ISO 13485/13488 (with reference to ISO 9001)
- ISO 10011 – Audit
- ISO Guide 62 – Certification Body
- ISO Guide 61 – Accrediting Body

Medical device manufacturers are regulated using standardization. This approach to regulation has the important added benefits of:

- direct industry and medical involvement and commitment to managing quality in medical devices;
- international contributions to standardization in the ISO forums; and,
- flexibility – as technologies advance, the standards system is able to evolve because of direct industry and medical community input.

Standardization referenced in legislation is the most effective means of regulating this market in order to maintain a high level of quality for public safety.

Alternatively, standardization provides the means for an industry to work collectively to establish credence attributes in that industry's products and, thereby, create the trust necessary for less costly transactions. Automotive firms collectively, and independently of government involvement, developed the QS 9000 (Quality Systems standard). The collective action involved the sellers and buyers of automotive parts as a means, among other things, to improve the overall quality of vehicles sold to final consumers. Industry stakeholders recognized the benefit of standardization and a relatively small number of firms were able to work towards the common good. The two characteristics of the industry – identifiable benefits of standardization and the relatively small number of firms – lead to private regulation for efficient market transaction.

Private actions are not always sufficient, however, for developing efficient markets in many industries. Agri-value industries are dominated by small and medium enterprises and have greater difficulty in managing collective activity such as that needed for effective standardization. Agricultural market operation and market policies are often guided or determined by government in Canada and by governments around the world. This market structure is partially a result of the great number of small producers in the industry. The costs of collective action for industry development are very high relative to the size of each firm. The benefits of standardization, therefore, can be lost without the participation of a public body that facilitates or otherwise co-ordinates collective action among agricultural firms.

Agri-value industries that depend on consumer confidence as well as access to information about consumer want and needs (*i.e.*, knowledge-based agri-value industries) require standardization to manage product attributes, but depends on the collective action of a large number of small firms to achieve this standardization. These industry conditions provide the motivation for public participation and, perhaps, management of agri-value standardization. This motivation for public participation leads to two actions that government may take:

1. Government will improve market conditions by ***facilitating the collective action of small and medium agri-value industries*** to create, maintain and enforce standardization.
 - Improved market conditions include higher product quality and consistency that leads to greater consumer trust.
 - Consumers have access to greater choice and better products.
 - Canada's international market share will rise as standardization in Canada leads standardization in other jurisdictions.
 - Economic development occurs throughout Canada with agri-value sector growth.
2. Government will be able to better ***manage food, functional food, and nutraceutical product quality and safety by enforcing of industry developed standardization***.
 - Legislative enforcement of standards leads to very high minimum product quality and safety as well as maintaining the flexibility to incorporate new technologies into an existing regulatory framework.
 - Government, industry, and consumer participation are key for stakeholders to communicate needs to others in the effective management of market transaction.

Public participation in standardization is a prerequisite for the development of knowledge-based agri-value industries. Agri-value industry expansion for the benefit of Canadian consumers and for greater global competitiveness depends on managing trust through product quality attributes. The credibility (*i.e.*, credence attribute) of Canadian knowledge-based agri-value products can only be developed through collective action by industry. Collective action is difficult due to the dominance of small and medium enterprises in agri-value sectors. Therefore, development of agri-value industries depends on government facilitation to develop, maintain, and enforce standardization. Through standardization, government will be able to successfully expand Canada's international competitive position.

Public participation in standardization is a prerequisite for the development of knowledge-based agri-value industries.

2.3.2 Standardization as a National Industrial Policy

There are two possible futures with any knowledge intensive industry. Once investments begin to yield commercializable products, the production and/or returns on those products could be captured locally or flow to other regions around the world. Multinational agri-value research companies and ventures pursue private brands and warranties that are often not tied to Canadian production. Hence, the significant public investments in agri-value R&D could have little or no return unless industry clusters are developed to build on and, therefore, capture the benefits of innovation. These clusters can be created by the collective action of firms and industries using the National Standards System.

The significant public investments in agri-value R&D could have little or no return unless collective, regionally and nationally linked standards are developed.

Porter (1993) recognizes the economic potential of strong industrial clusters:

“The central question ... is why do firms based in particular nations achieve international success...? The search is for the decisive characteristics of a nation that allows its firms to create and sustain competitive advantage in particular field... As earlier examples have suggested, the leaders in particular industries and segments of industries tend to be concentrated in a few nations and sustain competitive advantage for many decades.”

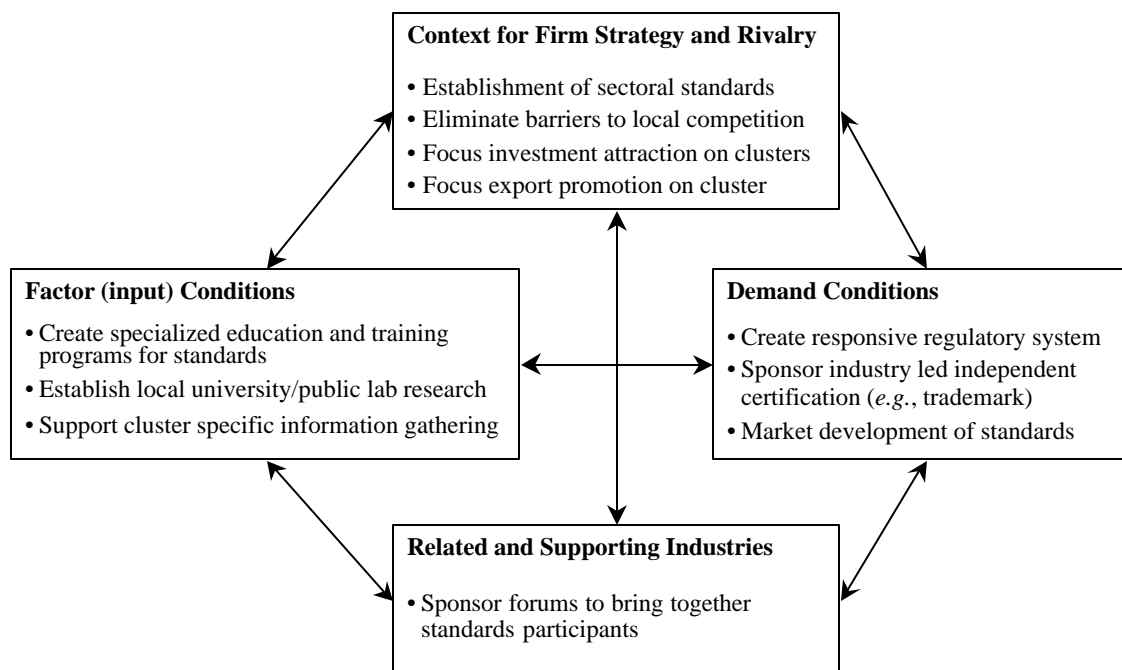
Porter developed a taxonomy to explain and predict the economic performance of a nation's industries in a global economy. The taxonomy may also be used as a tool to improve the competitive advantage of a nation. He identifies six factors that influence competitiveness:

1. Factor conditions,
2. Demand conditions,
3. Related and Supporting Industries,
4. Firm Strategy, Structure and Rivalry,
5. Chance, and
6. Government Policy

The first four factors are the ‘diamond’ factors that describe industrial clusters (see Figure 3). These factors may be managed to take advantage of chance (the fifth factor). The final factor – government policy – involves the public management of industrial policy to develop clusters and position the nation to take advantage of chance, among other issues. Porter's model can be used to examine the strategic roles for standardization in nurturing growth and development. Figure 3 illustrates the linkages for developing standards in an effort to nurture clusters of growth.

Figure 3: The Strategic Role for Standards in Agri-value Development

Source: Modified from Porter (1993).



The competitive advantage that can be gained through standardization to improve information flows between producers and consumers will be realized as a cluster of industrial activity develops around standards. The standards allow trust to dominate the supply chain for knowledge-based products and the resulting information that flows along the supply chain begins to offer direction for innovation in the sector. This information flow can allow innovative firms to continually supply the market with new products that are in demand. Successful management of this information allows firms to continually stay on the cutting edge of technological advancements.

Standardization will be a basis for industry clusters if standards are sufficiently flexible so that information that flows to firms may be incorporated in a timely manner. Timely information flows are critical for high value and rapidly evolving niche markets – for example, in emerging agri-value sectors. Niche market activity will continue to increase in the new economy and the firms that successfully service these markets will be the firms that rapidly adapt to shifting market requests. Firms benefit by capturing premium prices on consistently high product quality. Consumers benefit as demands and concerns are rapidly addressed. These benefits may be captured in Canada as a cluster of industrial activity develops around the effective management of information flows.

Niche markets will continue to increase and firms that will successfully service these markets will be firms that can rapidly adapt to shifting market requests.

The effective use of standards can allow the Canadian agri-value industry to become a world leader in providing products to rising niche markets. Success lies in developing innovative standards that manage product attributes to improve information flows in addition to managing physical product attributes. For the firms in the agri-value industry to remain at or near the top of the industry in terms of offering new innovative technologies it is crucial that standards become part of technology development.

Rapid technology change will be the way of the future and for the firms in the agri-value industry to remain at or near the top of the industry in terms of offering new innovative technologies it is crucial that standards become part of technology development.

3.0 Emerging Biodiverse Sectors

Canadian agriculture is going through a transition. Until recently, the vast majority of the agricultural produce was sold in commodity markets based on regulated grading systems – this is particularly true for western Canada. Increasingly each commodity market is becoming segmented into multiple product markets. At the same time, producers are seeking out and producing a wide range of new crops and animals for the food and fibre markets. This study looked at four specific emerging industries:

- Organic foods;
- Specialized livestock;
- Plant fibre products; and
- Natural health products.

This section outlines for each product, existing production, new areas of opportunity, existing regulations, brands and standards, the identified needs for standards, and collective processes completed or underway. In addition, this study undertook a preliminary examination of the challenges of maintaining and conforming to standards.

3.1 Organic foods

A concerted effort to develop organic standards in Canada began in 1989. Through the efforts of individual organic producers and several government agencies a national standard for organic agriculture was established in 1999. The motivation for developing the industry standard was to protect the meaning of the label “organic”. The pressures to protect the meaning of “organic” were rising due to expanding demand. Producers were entering the organic market because of the premium that consumers were willing to pay for these products. However, in the absence of standards, regulations, or a nationally recognized certification body, there are insufficient consumer protections in place and exports are limited.

During the period that the organic standard was developed, the number of producers expanded rapidly. The number of organic producers increased 300% between 1989 and 1995. The organic market accounted for 1% of the Canadian market in 1995, but annual growth was estimated to be between 15% and 25%. The rapid growth in the market led to the development of over 40 locally established organic standards of production. Consumers not only want organic products, they also demand assurance that the products are produced and handled using organic methods and recognized certification schemes.

International markets exhibit many of the same characteristics as in Canadian markets. There is growing consumer demand and need for organic certification. The market for organic products in the European Union and Japan was estimated to be US\$1.5 billion in 1994 and the world market was estimated to be US\$11 billion in 1998 with an expected 20% growth rate per year. The major factor limiting growth of world organic markets is an under-supply of organic products. Canadian export of organic products into these world markets is limited, because Canada does not have a nationally recognized organic standard or the accompanying certification processes. Canada now has a standard, but the next step of establishing a certification process has stalled.

Canada now has a standard, but next step of establishing a certification process has stalled.

3.1.1 Organizing Stakeholders

Canadian Organic producers are responding to the need to conform to recognized standards by seeking certification from European and US organizations. In addition, many regional certification bodies were formed throughout Canada to certify organic producers. However, regional certification bodies were not recognized in international markets and often competed with other regional bodies. Most regional bodies may cease to exist in the near future or become local chapters of US or EU organizations – e.g., the US-based Organic Crop Improvement Association (OCIA) that has eight chapters in Saskatchewan alone. Other organic producers have paid the full cost of inspectors coming from Europe to conduct audits for the International Federation of Organic Agriculture Movement (IFOAM) in order to access European markets.

A few producers initially approached Agriculture and Agri-Food Canada (AAFC) in 1990 to work out a solution to the problems associated with:

- the proliferation of competing regional standards;
- recognition by (European) importers; and,
- integrity of the word “organic”.

Various stakeholders came together as a result of this effort and developed the Canadian Organic Unity Project. In 1992 the Canadian Organic Advisory Board (COAB) was established. COAB would be the accreditation body under a regulatory approach referenced in the Canadian Agriculture Producers (CAP) Act. This was before the establishment of CFIA, and COAB was to be set up as an extension of AAFC under CAP.

In 1995, AAFC developed a draft proposal on how the organic industry would be regulated. After circulating this draft and reviewing it, the organic industry felt that this proposal had too much government involvement, not enough of the standards came from COAB and there was a general dislike of the actual standards. The organic industry decided to not endorse the standards as developed by AAFC. Organic stakeholders strongly objected to a government approach to organic standards development, the regulations were halted and the consensus was for COAB to seek other alternatives.

The alternative approach was to facilitate the industry in creating a self-regulated process. With this goal in mind, COAB proposed a project to develop a voluntary standard and accreditation scheme, reporting to the Standing Committee on Agriculture in 1996. AAFC organized a meeting with the appropriate players in the National Standards System (NSS) – managed by the Standards Council of Canada (SCC). COAB was now working with the Canadian Food Inspection Agency (CFIA) and contracted the Canadian General Standards Board (CGSB) to develop a national standard for organic agriculture under the auspices of the NSS (CGSB is accredited by the SCC as a standards development organization). The CGSB is part of Public Works Government Services Canada, which is the procurement arm of the federal government.

From these efforts and proposed involvement of the CGSB, COAB submitted a proposal to the Standards Initiative Program (SIP) administered by Industry Canada. A budget of around \$300,000 was prepared and the money came from Industry Canada to fund the contract with the CGSB, to hire an executive director for COAB, and to offset some of the travel costs for Ottawa-based meetings. The provincial government, except B.C. and Quebec, agreed to this approach. B.C. and Quebec have provincial standards and certification schemes (mandated through regulation in Quebec) and the respective governments feel these are equivalent, if not superior, standards and certification processes.

A budget of around \$300,000 was prepared and the money came from Industry Canada to fund the contract with the CGSB, to hire an executive director for COAB, and to offset some of the travel costs for Ottawa-based meetings.

The objectives that were adopted by the Canadian Organic Advisory Board (COAB) are three-fold:

- i) to develop industry standards that ensure the delivery of organic products to the end buyer;
- ii) to develop a certification mechanism that allows for a control process that ensures compliance to organic standards; and,
- iii) to reference the whole process in regulation, at the discretion of the organic industry and AAFC.

The development of a Canadian organic standard had to keep pace with standardization in other nations and to ensure that elements of the agreement were consistent with the various international standards. The fact that Canada had no domestic standards for organic production meant that these products had difficulty in gaining recognition in international markets and in ensuring that products complied with the standards if recognized. The development of standards and a recognized conformity assessment scheme would allow the organic industry to compete at the international level as equal partners.

3.1.2 Developing the Standard

The Canadian General Standards Board (CGSB) developed the organic standard under contract. The CGSB brings industry participants together using a generic platform that is modified to meet the requirements of specific industries. The CGSB facilitates the development of standards through a consensus approach, written by a cross-section of industry representatives. In the case of organic agriculture, the CGSB invited many groups and organizations to participate in the development of the standard. They contacted existing certification bodies and asked them to participate and, through this process, key stakeholders in the standards development process contacted others that they believed should be involved and offered invitations.

Roughly 150 industry representatives participated, not all of whom had voting power, but all had the opportunity to provide input into the process. These participants were largely those who saw value in developing standards and had a desire to ensure that standards were developed. The standards that were developed by COAB were not written solely from the viewpoint of organic producers. Because standards were the essential key in providing consumer accountability, consumer advocates participated in the process as well. The standards development process had to include all stakeholders, as opposed to including only organic producers and processors.

The value of contracting the CGSB was that the facilitation removed many political items from the process and personal agendas were less likely to interfere in the process. Practical issues were then able to dominate the agenda. Issues such as the existing regulations that applied to the industry and had to be included to satisfy legislation are mundane in a philosophical debate, but came to dominate the agenda. For example, the treatment of warbles in livestock requires that the animals be treated with a pesticide. This was viewed by some as not being organic but for health and safety reasons the law would have to be followed. Any standard had to be consistent with the Feed Act, the Labelling Act that is under the jurisdiction of the CFIA, and any other applicable legislation.

The process of developing standards was accomplished in a few years once the CGSB became involved. The period of time is relatively short, but several stages had to be repeated during the process. The development process is effectively an iterative process, where drafts of the organic standard are circulated to stakeholders for comment. Also, a “final draft” was rejected by stakeholder vote, and a new “final draft” had to be completed before the standard was accepted.

The second “final draft” was accepted, although not unanimously by all industry participants. A number of organizations continue to oppose the standard for various reasons such as:

- the standards were not sufficiently strict,
- an existing certification body may lose its market for conformity assessment,
- an existing certification body may come under the scrutiny of an industry governing body, or
- the goal of the organic standard was too market oriented.

Objections to any standard development will be found. The crucial decision with respect to developing a national standard is whether any given draft has obtained the greatest consensus possible. If not, a new draft would be developed to account for additional views or new information.

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Finally, the standards that have been developed are working standards. The CGSB maintains these as an “open document” for five years, during which the organic industry can make changes to account for new information or refine the standards to be more effective and efficient. For example, there is no reference to the width of buffer strips between organic and other crop fields because there is no proven way to document how wide this buffer should actually be. The industry needs to use the standards for a time to begin to appreciate how they are structured and then document what needs to be changed.

The national standard will continue to be a “working document” to the extent that standards will evolve. Under NSS rules the standard must be reviewed every five years and revised at that time if necessary under the direction of a nationally recognized standards development organization. Issues involving new production information or unanticipated consumer reaction will affect standards maintenance. The maintenance of standards to accommodate these requirements will require similar industry and consumer involvement and will require future facilitation by third party standards development organizations. The time and cost commitment to maintain standards at the national and international levels will be less than those to initially develop standards, but will be viewed as a burden by most industry volunteers. However, commitment by the industry must be sustained in order to build on the time and effort by industry and government of the previous ten years.

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3.1.3 Organic Certification Industry

An organic conformity assessment/certification industry has yet to emerge following the development of the national organic standard. There are a number of simple and practical reasons for the delay, but solving these problems is straight-forward relative to the difficulties associated with the absence of trust in the industry among existing organic certifying organizations. Several industry participants perceive the emergence of a nationally accredited certification body will force the closure of all existing OCIA, IFOAM or other local standards-certifying firms. The national organic standard, however, has the potential to cause significant expansion of the industry and create the need for organic consulting firms to support new organic producers that enter the industry.

To date no organization has received accreditation to certify conformity to the Canadian Standard, although two organizations have initiated the process. Given the potential size and the existing diversity of organic agriculture, at least three different nationally accredited certification organizations are needed to service standards conformity. There are more than 40 small certification organizations (as of July, 2000) that certify producers and processors according to OCIA standards, IFOAM standards or to a local proprietary standard. In addition, certification to the provincial standard is mandatory in Quebec, and certification is provided by a government organization.

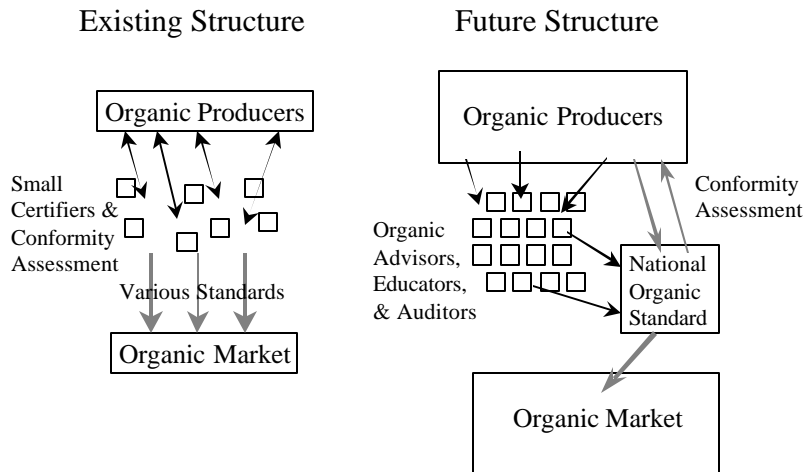
There are small obstacles that must be overcome before any existing organization is able to apply for accreditation under the National Standards System. For an existing small certifying company to become a nationally accredited body, the firm must expand by many times over or join with one or two other firms and expand as well. Most small certifying firms have one or two employees and cannot presently meet the needs of organic producers and processors across the country. For the Quebec certifying organization to become a nationally accredited certifying body, the organization must a cost-recovery operation in order to avoid claims by Europe or the US that Quebec producers are indirectly subsidized.

The organizations that have taken steps to become a nationally accredited certifying body are COAB and a joint venture between Pro-Cert (Saskatchewan) and Organic Crop Producers and Processors (Ontario). COAB is not presently a certifying body, so must expand its mandate and operations to manage certification. Existing small certification bodies are opposed to the expansion of COAB although these organizations have not taken steps to become nationally accredited themselves. There is likely a concern among the existing certification bodies that COAB accreditation will force small organizations out of the business of conformity assessment.

The concern among small certifying companies is understandable, but is not necessary. Organic producers presently contract directly with the small certifying firms in order to meet current market requirements and producers will contract with someone else – whether this is COAB or a different accredited body – to meet new market requirements. However, the expansion of organic agriculture will necessitate an expansion of the consulting services that are provided by small certifying firms. In order for a producer, processor or other organization to become certified as organic, a planning, learning and development process will be completed. The organic standard lists conditions, prohibitions and other types of criteria, but does not provide direction to producers or interpretations where necessary. Assistance is needed for producers to develop their operations or convert from traditional operations. This process will be completed most often with the help of organic experts – *i.e.*, organic consultants. Such consulting firms will have between one and five employees, and the rapid expansion of organic agriculture implies that at least 60 such organizations will exist across Canada.

The existence of a nationally accredited certifying body will likely lead to the expansion of operations for the small firms that presently certify producers to other standards. The current and future industry structures are depicted in the following figure.

Figure 4: Organic Certifying Industry



Despite this relatively simple evolution from one industry structure to another, there is vocal resistance among existing small certifying companies to the emergence of a larger nationally accredited certifying body. The small obstacles in this development are indeed small. The primary barrier is the result of defensive positioning as opposed to the strategic positioning of business investments for future organic development. In order for small certifying firms to support or at least complement the development of consulting and certifying services in the industry, existing stakeholders in the industry must be willing to accept and support the development initiatives of other stakeholders. That is, the industry stakeholders must *trust* that the initiatives of other industry participants are positive developments for the industry rather than anti-competitive actions that will force firms out of this growing industry.

3.2 Specialized Livestock

Specialized Livestock is a category that encompasses several species and markets. They are grouped together in large part because they deal with animals that are relatively new to captive/domestic farming. Several of these species are grouped together under provincial regulations such as the Saskatchewan Domestic Game Farm Animals Regulations. These species include mule deer, fallow deer, white tail deer, elk, wild boar, bison, and caribou. However, included in speciality livestock operations are wild boar and organically grown beef. The major commercial species in Western Canada are Bison, Elk, wild boar, fallow deer, and white-tail deer. Canada is not a large consumer of game meats but it is expanding its speciality livestock production. Statistics Canada reports that the domestic market for Bison in 1997 was 1,766 animals slaughtered, 327 tonnes exported and 6 tonnes imported.

In 1996 figures for the inventory of Bison in Canada according to Statistics Canada was 45,437 head, for Elk 28,217 head and for Deer - white-tail, red and Fallow 49,268 head. In 1999 however, Saskatchewan had 20,000 head of Bison up from 11,000 in 1997, 21,000 head of Elk, up from 13,500 head in 1997, 20,000 head of Wild Boar, up from 18,000 head in 1996 and over 7,500 head of white-tail, mule and fallow deer, up from just under 6,000 head in 1997. In Alberta, the rates of growth in herd inventory has been steady also. Bison numbers rose from 29,000 in 1997 to 47,000 in 1999 Elk rose from 15,000 to over 23,000 over the same period.

Table 3: Inventory of Specialized Livestock Species in Saskatchewan							
Year	Bison	Elk	White-tail Deer	Mule Deer	Reindeer	Fallow Deer	Wild Boar
1987		400					
1990			200				
1991	1,000	3,200				900	
1992	2,000	4,100	400			1,200	
1993	2,800	5,500	300	200		2,300	
1994	4,000	6,875	350	270		3,000	
1995	5,300	8,594	500	350		3,900	12,781
1996	7,749	10,000	800			4,500	18,686
1997	11,000	13,500	900		25	5,000	
1998	14,000	17,000	1,968	200	50	3,000	
1999	20,000	21,000	2,500	200	154	4,800	
2000							20,000

Source: Saskatchewan Agriculture and Food Sustainable Production Branch

3.2.1 New Opportunities for Specialized Livestock

The Elk industry is emerging from the stage where the industry was focused almost exclusively on the development of its breeding stock. Through the development of the industry however, there has been a keen focus on the sale of antler velvet. The emergence of hunt farms and trophy ranches, has brought the industry the opportunity to generate revenue from the slaughter of animals. This new development has seen several sectors of the industry working together to maximise this opportunity. The white-tail and mule deer producers together with the wild boar, have organized and are co-ordinating their activities with elk producers in this regard. Hunt Farms are a lucrative activity and efforts in the sector are being concentrated in this area. Estimates are that the Saskatchewan market has seen the growth in this industry from \$1million in 1998 to \$3-4 million in 1999. These figures only indicate the services of Hunt farms based on the prices charged by animals. They do not include spin-off for accommodation and related services, nor do they include the revenue from wild boar hunts.

Wild boar producers have also identified opportunities to export products to Asia (primarily to the Japanese market) and to Europe. They are positioned to benefit from the increasing rise in ethnic cuisine in Canada and the diverse cuisine emerging around the world. At the same time, the Bison producers are poised for a strong growth in the consumption of their products, meat, leather and other products in Canada, across North America and around the world.

The perceived opportunity for game production is evidenced by the growth in the number of Game farm licenses issued in Saskatchewan and Alberta over the last 12 years.

Table 4: Game Farm Licenses Issued Across Canada						
Year	Alta	BC	Man	Ont	Que	Sask
1987	0	0	0	0	0	20
1988	0	0	0	0	0	30
1989	0	0	0	0	0	56
1990	117	0	0	0	0	71
1991	136	0	0	0	0	92
1992	154	0	0	0	0	104
1993	170	0	0	0	0	111
1994	196	0	0	0	0	175
1995	250	0	0	0	0	232
1996	305	0	0	0	0	268
1997	0	0	0	0	0	360
1998	400	0	0	0	0	450
1999	490	0	0	0	0	520
2000	0	0	0	0	0	0

Source: Saskatchewan Department of Agriculture and Food Sustainable production Branch

3.2.2 Existing Specialized Livestock Standards and Regulations

Game farming and Specialized Livestock production is regulated provincially (e.g., Animal Products Act of Saskatchewan). The Act provides the force for regulations that govern the licensing of domestic game farm operators, the species that are farmed, and the products that are produced from these animals, as well as the organizations that represent the interests of game farm operators and producers. The industry also is subject to import licensing provisions of The Wildlife Act, 1997.

The implication of this type of regulatory structure is that regulations serve game hunting in the wild rather than serving market development needs for hunt farms, for game farms, or for other specialized livestock product markets. The existing regulatory structure does not serve specialized livestock product development, so regulations, standards or some type of branding of regional products will emerge in order to serve consumer needs for consistency, quality, or other particular product attributes.

Existing regulations serve game hunting in the wild rather than serving market development needs for hunt farms, for game farms, or for other specialized livestock product markets.

3.2.3 The Emerging Need for Standards for the Specialized Livestock Industry

The existing regulatory structure does not serve the emergence of specialized livestock product markets. The activities of various industry participants to manage or regulate product markets demonstrate the perceived need to raise the minimal level of product quality and consistency. These industry participants appear to understand that expectations of consumers have to be addressed in order for the specialized livestock markets to continue to grow.

Industry participants understand that expectations of consumers have to be addressed in order for the specialized livestock markets to continue to grow.

The increased interest in Hunt Farms and the increased economic potential has led to many operators and sectors seeking ways to enter the industry and to gain an advantage. At the same time, the “laissez faire” approach has begun to concern persons in the industry. As a result, there is a growing interest for the development of standards for the Hunt Farm industry. At the same time, there is increasing concern to expand the development of standards to some specific sectors including Bison and Wild Boar.

The Canadian Classic Wild Boar association, as a second example, has expressed interest in creating a code of practice for the production of wild boar. Other specialized livestock associations have developed codes of husbandry practice and incorporated these in by-laws. However there are competing wild boar associations – just as these are competing associations in other specialized livestock markets – so agreement on codes of practice across producer associations is not inevitable despite the advantage of creating regional, national and international brand loyalty.

As a final example, the markets for elk velvet have been small, fragmented, and somewhat inconsistent. The trend in velvet prices from 1970 to 1999 has been generally downwards with significant peaks in 1976, 1991 and 1996. The industry is experiencing a tremendous surge in interest and in increased markets in 2000. This increased interest in the velvet antler products industry and its market is leading to a growing recognition of the needs for standards and product consistency in order to create stability in the market. This interest is being translated into the Hazard Analysis Critical Control Point (HACCP) standards in elk operations.

HACCP standards are becoming a default standard for food products in the absence of other regulations. The Canadian Food Inspection Agency (CFIA) maintains regulations for slaughter that apply to specialized livestock as well as for other meats, and other regulations are enforced for food handling and processing. Despite the importance of these regulations, the regulations are not sufficient for maintaining brand recognition and loyalty of consumers. Industry maintained beef grading standards provide a case in point of enforced regulations ensuring health attributes and standards providing other product marketing attributes. The specialized livestock associations are refining their focus on the niche markets that they anticipate will be most advantageous for them. As a part of this process and similar to the beef industry, the development of standards are critical to successful marketing strategies (e.g., wild boar standards in Europe).

3.2.4 Collective Processes Completed and Underway

There are a number of small collective efforts underway by specialized livestock producers to address industry-wide marketing and standardization issues. These efforts are the important first efforts needed in order to increase producer awareness of industry issues and to increase willingness among industry participants to work together for the industry as a whole. As evident in the following examples, creating a high enough level of trust among a broad group of industry stakeholders is time consuming and requires a type of iteration in discussions to determine the key issues that affect the broadest number of industry players.

The Diversified Livestock Alliance encompasses wild boar, bison and organic beef. This organization has received funding from the Canadian Adaptation and Rural Development (CARD) fund to explore market opportunities. Their interest is in addressing production issues and accessing meat markets. These species have placed a priority on the meat markets as the markets holding the greatest potential growth. Consumer unfamiliarity with products and inconsistency of supply and of meat characteristics inhibits market growth. Specialized livestock producers, therefore, are interested in product standards to increase market penetration.

On the other hand, the elk producers have placed a low priority on the meat industry and are not willing to participating in the alliance. Elk producers are keen on the hunt farm market and are putting their resources into developing that industry. They are joined by the white-tail deer and the mule deer producers, as well as the wild boar producers, to develop standards and protocols.

In both of these cases, and in other cases, common market constraints motivate different specialized livestock groups to work together. Several specialized livestock associations considered working together to support a federally inspected multi-species abattoir in Manitoba. Such a facility would certainly benefit marketing operations for each association, and the experience of working together could lead to other collective opportunities such as standardization. However, each association could not secure sufficient resources from members to develop the abattoir. The small size and hence large number of specialized livestock operations is a serious constraint for successful collective action that benefits the industry as a whole.

The attempts to of producers to organize are positive indications of industry growth, because these efforts are fundamental to the emergence of trust that is necessary for effective product standardization. The small efforts demonstrate a partial ability to work collectively towards industry standardization. Specialized livestock industry participants are typically small enterprises that do not have resources to sufficiently develop industry organizations to create specialized livestock standards. Nonetheless, the efforts of industry participants to work collectively indicate a motivation to improve markets through standardization. The collective actions of small specialized livestock groups have created a foundation for the successful development of standards for the entire industry.

Efforts by a few or a small group of stakeholders to co-operate are the necessary first actions that are fundamental to the emergence of trust that is necessary for effective product standardization.

3.3 Plant fibre

There are a great number of uses for agricultural fibre products – ranging from insulation and other building materials to textiles and other high value consumer products. The range of uses for fibre products grown and produced in Canada represents a significant opportunity for expansion of industrial agricultural crops. Most of the markets discussed in this section do not have standards for quality, consistency, or other product characteristics. A few partial standards have been used as reference for producers, but these are inconsistent or cannot be applied easily to the fibre market. Missing or absent fibre standards have been identified by many industry participants as a barrier to export market penetration by Canadian fibre producers and processors. This section describes some of these market conditions and describes current efforts underway to address these problems.

Missing or absent fibre standards have been identified by many industry participants as a barrier to export market penetration by Canadian fibre producers and processors.

3.3.1 New Opportunities for Processed Agricultural Fibre

Agricultural fibre is used in the production of plastic composites, used in insulation materials, and used as a substitute for traditional wood products and synthetic fibres. The leading bast fibre crops are Flax, Hemp, Kenaf Ramie and Jute. In Saskatchewan, the primary fibre crop is flax, and is grown for the oilseed with the residual straw and shives processed for fibre.⁴ Wheat and hemp are also grown as substitutes for wood or synthetic fibres.

Straw and Chaff – About 15 million acres of 6 primary classes of wheat are seeded in Saskatchewan (June 1999 seeded acres). Most of the wheat straw and chaff is chopped and spread back on the fields. There are 1.5 million acres of flax seeded in Saskatchewan for both industrial and food oil. However, there is only a small amount of flax grown for fibre markets. Because the flax straw is difficult to chop, spread and seed into, a significant amount of flax straw is burned each year. If this straw can be bundled and collected, it would represent a large resource available for the processing industry.

Hemp – With the changed Health Canada Regulations in 1998, licenses were issued to 30 Saskatchewan producers to grow low THC hemp (THC – TetraHydroCannabinol). Approximately 3,000-4,000 acres of hemp is expected to be grown in Saskatchewan this year. Market uses for hemp fibre products include robe, industrial fibre, some clothing, among other uses. These markets are not well developed to date. Hemp has had more press coverage than other fibre products partially because high THC hemp is an illicit drug and partially because of financial difficulties experienced by a Manitoba hemp processor. Nonetheless, hemp market uses are expected to grow rapidly in the near future as markets become better developed.

⁴ Data and industry specifics that are drawn from Saskatchewan are representative of international industry dynamics faced by producers and processors from other provinces.

Bast Fibre – Approximately 1 million hectares of Linseed Bast stalk was grown in North America in 1999. Saskatchewan produced the lion's share or over 1 million acres of linseed and 450,000 metric tonnes of stalk. Of the amount of linseed bast fibre produced, only 17 percent were used.

The global market for Glass fibre reinforcements is estimated at some \$4.3 billion a year with an annual growth rate for buildings of 2%, vehicle 3.2%, electronics 8-9%, and telecommunications 14-15%. The leading markets for Bast fibre is in fibre-reinforcements for composites including:

- Thermoplastics - estimated at 1.4 million metric tonnes
- Insulation - estimated at 1 million metric tonnes
- Pallets - estimated at 800,000 metric tonnes
- Automotive non-woven:
 - wet-laid and dry, estimated at 200,000 metric tonnes
- Cement fibre products - roofing shingles and siding products,
- Speciality paper products: estimated at 80,000 metric tonnes
 - currency papers,
 - fine papers, filter papers and
- Selected building materials.

Opportunities – The new areas of opportunity include plastics estimated in US\$ at \$1.4 billion, insulation \$900 million, pallets \$800 million, automotive non-woven \$150 million, and Composites \$120 million. There is a significant gap between the potential bast fibre market and the available bast fibre. In fact, there is currently only 10% of the bast fibre available for the potential bast fibre market in North America. Further, the risk-adjusted potential for bast fibre markets versus all Saskatchewan linseed fibre, is 88.8% to 11.2%.

3.3.2 Existing Agricultural Fibre Standards and Regulations

The fibre industry faces a distinct set of challenges in the area of standards. To begin, most of the producers of the agricultural products such as flax are accustomed to dealing with a complex and sophisticated well-developed set of standards for the primary product, oilseed. However the fibre which has been treated as basically a waste product does not have any of the sophistication. Further, because the fibres are used for a variety of purposes, including textiles, particleboard and fibre substitution, there are differing requirements and expectations in each market with different grades and specifications for each fibre. As a result, there has tended to be adoption by the industry of existing standards and regulations of the products that the industry is competing with or intending to replace (*e.g.*, cotton standards for linen textile and wood for particleboard).

3.3.3 Identified need for Fibre Standards

The need for standards has been clearly identified by many of the participants in the industry. This need arises from the variety of conflicting measures that are currently applied and the inadequacy of current scientific information and measures to support existing practices. It also arises from the desire to deliver products into markets that have clear standards but the industry having no way of relating its products to the market opportunity. One example is the existence of European standards for insulation which include characteristics such as moisture content, fire and rodent resistance and the absence of odour. The issue of odour is a challenging one and a major concern for the industry in Western Canada. Additionally, the odour issue may have both agronomic and micro-biological influences that the industry has been unable to determine.

Colour for textile markets also presents a similar concern for the industry. The consistency of the end-product in which the fibre is used affects the price obtained by the fibre processor. However, both the colour and the amount of fibre in the straw are determined by visual identification. This can result in estimates ranging from 8 - 30% of fibre in the straw and measures of visual preference that can be influenced by the amount of shives in the fibre. The absence of a standard for colour is used by textile traders to lower prices of imported products.

These market customs inhibit development of other fibre markets. Textile markets seem to encourage inconsistency, but most industrial uses require input consistency – *i.e.*, input tolerances. Further, producers and processors of these fibres are moving from an agricultural realm where they are comfortable and familiar to a manufacturing realm where consistency of product is imperative to meet consumer expectations. At present, the flax straw processing industry considers weed count, thickness of stems, height and colour of straw, but without reference to a measurable or identifiable standard. Canadian exporters have difficulty developing a strong market presence due to the absence of standards.

Producers and processors of these fibres are moving from an agricultural realm where they are comfortable and familiar to a manufacturing realm where consistency of product is imperative to meet consumer expectations.

3.3.4 The Agricultural Fibre Industry Collective Efforts

The fibre industry has developed a strategic focus on the development of standards. This effort is spear-headed by the Flax Commission and thus far has included many of the participants in the industry. In fact, the sector has been reaching out across the world to identify the standards that do exist and to develop relationships with the agencies that are engaged in developing standards as well as with other more mature industries that have already developed their standards. In this exercise, the industry has been working with the American Society for the Testing of Materials (ASTM) to enhance their ability to identify and develop standards from the ground floor. ASTM is a leading volunteer organization recognized as the authority for standards in North America in the areas of Textiles, Wool and Felt, fabrics and Cotton among many others.

In attempting to develop standards, the industry in Saskatchewan and Western Canada, led by the Flax Commission, are using the cotton and the textile industries as guides. They have also approached the Agricultural Development Fund (ADF) for funding to assist the industry in the development of standards. This type of initiative will help lead to standardization in fibre industries. Standardization initiatives address specific crops or markets, and do not yet address standardization needs for all fibre sectors. All fibre industry stakeholders, therefore, may not be participating in standardization initiatives.

3.4 Natural Health Products

World natural health products markets reached US\$71 billion in 1998. The US, Europe and Japan account for 75% of the market. Natural health products include a wide range of products that are categorized as:

- Vitamins and minerals,
- Herbs and botanicals,
- Nutrition supplements (sport, meals, and speciality product),
- Natural foods, and
- Natural personal care.

There are no binding characteristics that precisely define natural health products. The Standing Committee Study on Health produced a report on Natural Health Products for the Hon. Allan Rock, Minister of Health Canada, on November 13, 1997. In this report, the Committee noted several definitions for natural health products, all originating from Health Canada. In an effort to reduce or eliminate confusion, the Advisory Panel on Natural Health Products “described” ***natural health products*** as:

“...substances or combinations of substances consisting of molecules and elements found in nature, and homeopathic preparations, sold in dosage form for the purpose of maintaining or improving health and treating or preventing diseases/conditions.”

Additionally, a Health Canada document defines:

- A ***functional food*** is similar in appearance to or may be a conventional food, is consumed as part of a usual diet, and is demonstrated to have physiological benefits and/or reduce the risk of chronic disease beyond basic nutritional functions.
- A ***nutraceutical*** is a product isolated or purified from foods and generally sold in medicinal forms not usually associated with food and demonstrated to have a physiological benefit or provide protection against chronic disease.

The complicated array of concepts and definitions is a result of the expanding and changing character of the natural health products industry. The industry has been characterized as a niche market serving homeopathic, traditional medicinal, Chinese herbal and other needs for knowledgeable consumers. The market can no longer be described as a niche market due to expansion of natural health products to a broader consumer base. The expansion is the result of demonstrated success and of the products becoming more easily available.

Consumers' knowledge about the products that they are using has *diminished* as rapidly as the market has expanded. Growth in demand has been met, to some extent, by a growing number of suppliers. The change in consumer demographics, however, has been met with a rise in the number of products and firms concerned more with exploiting consumer demand rather than serving consumer health. Growing demand has led to entrance by firms aware of the potential to capture new consumers. The medicinal benefits of products and the quality of ingredients are becoming more difficult for natural health product consumers to assess.

Consumers' knowledge about the products that they are using has diminished as rapidly as the market has expanded.

Consumers in the past were able to assess suppliers, but the growing number of suppliers and the growing number of purported medicinal products makes this task impossible for consumers. Certain industry participants have called on government to regulate the industry more closely. The need for some type of public involvement in the industry is evident in the request by the Minister of Health for a report by the Standing Committee on Health regarding natural health products.

3.4.1 Regulatory Structure for Growing Consumer Market

The Food and Drug Act is written in order to regulate medicinal products of all sorts. Products that are not claimed to have health effects are regulated as food. Specifically, the Act defines *food* as:

"...any article manufactured, sold or represented for use as food or drink by man, chewing gum, and any ingredient that, may be mixed with food for any purpose whatever."

A *drug* includes:

"...any substance or mixture of substances, sold or represented for use in:

- the diagnosis, treatment, mitigation or prevention of a disease, disorder, abnormal physical state, or the symptoms thereof, in man or animal;
- restoring, correcting or modifying organic functions in man or animal; or,
- disinfection in premises in which food is manufactured, prepared or kept."

Food and drugs are defined in the Act in such a manner that a substance may be considered to be *both* a food and a drug. There is no grey area in the Act. There is no motive for Health Canada to change the Act if the issues for public safety are sufficiently addressed. Because of the existing structure of the Act and because of the standpoint by various health professionals that natural health products are “untested alternative products”, the Act is unlikely to change. Even if there are changes to the Act, the changes will be very minor.

Regulation of natural health products is such that it inhibits market growth. Market growth is not the concern of Health Canada. In addition, if there are perceived concerns regarding public protection of a natural health product, Health Canada will investigate it and regulate the product accordingly. This type of involvement by Health Canada will be expensive for particular firms and for the industry as a whole. The regulatory structure for drugs is very expensive to manage from a company’s point of view, so only large companies tend to participate in drug regulation.

The sale of most drugs is heavily regulated, so that only certified pharmacists sell drugs by the prescription of a physician. Non-prescription drugs, such as cold remedies and headache medications, tend to be sold at pharmacies because the existing regulations that govern prescription drugs create a high degree of trust in products sold at pharmacies. The confidence in pharmacists provides a natural basis for pharmacies to expand into selling natural health products as well. Pharmacists do not necessarily understand natural health products and have found information from publications such as *Facts and Figures* – a company specializing in the dissemination of drug information to pharmacies – but the association with trusted services provided by pharmacies extends to natural health products sold at pharmacies.

In order to enter this market, given the existing regulatory structure, natural health product companies must be able to register products with Health Canada. Registering nutraceuticals as drugs, obtaining patents, and otherwise complying with regulations is an extremely expensive proposition. If a nutraceutical company is able to demonstrate the health benefits of a product to a broad market, then a pharmaceutical company will be tempted to use its financial strength to patent the product and register it as a drug under Health Canada regulations. The nutraceutical company will then become excluded from producing the product that it brought to market.

Registering nutraceuticals as drugs, obtaining patents, and otherwise complying with regulations is an extremely expensive proposition.

Health regulations inhibit growth of natural health products. This does not imply that regulations should change. Rather, the natural health product industry may use the practices of pharmacies in order to create a broader market. That is, by using consumer confidence to draw consumers to natural health suppliers. Consumer confidence may be established by regulation as it is for pharmaceuticals, or by the collective action of industry to develop recognized standards. In the absence of industry standards, pharmaceutical companies and pharmacies will dominate health products and the natural health products industry will continue to serve a niche market.

3.4.2 Standards as A Competitive Advantage

The natural health product industry is small and firms in the industry tend to be small as well. Collective action on the part of the firms in the industry, therefore, is required in order to develop the market for consumers. Health Canada regulation is prohibitively expensive for the smaller natural health product firms; even for firms that participated in developing regulations. Regulations and industry standards, for this matter, cannot be used as defensive structures to prevent other companies (*i.e.*, pharmaceutical companies) from entering the natural health product industry. Standards may be used, instead, to create consumer confidence in order to attract potential consumers to natural health products.

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Pharmacies are presently using such a strategy to capture market share. For example, a national pharmacy chain sells natural health products using the store's brand name and, as part of the labelling, the products are described as "Standardized and Certified". Nowhere on the label is there an explanation of how the products are certified as belonging to a standard. There are no legal restrictions on the use of these terms except where a recognized national standard governs the products. Nonetheless, standards presently exist in the natural health products industry as a store brand.

The labelling by the pharmaceutical chain demonstrates the value that standards will have for the natural health product market development. The pharmacy is using existing consumer confidence to draw potential consumers to the natural health product market. Overall, market development depends on potential consumers rather than on the knowledgeable consumers who are already part of the market.

At present pharmacies are providing some of the information that consumers are requesting, and pharmacies will continue to provide this service. Natural health product companies have developed these products, but in order to benefit from these efforts, the companies must provide an alternative to pharmacies for consumers. The alternative must provide the same sense of security and confidence that pharmacies provide consumers with respect to registered drugs.

Firms in the natural health products industry are small relative to pharmacies, so collective action is required to develop the market on behalf of consumers. Only in the case where natural health product companies work to develop the meaning of terms such as "nutraceutical" or to develop the acceptable content and sources of Echinacea will the market begin to flourish. In this case, natural health product companies that become certified producers or processors will create a competitive advantage for the products. Presently, the competitive advantage in the industry rests with pharmacy branded products and regulatory change will not alter this reality. Industry developed standards will create consumer confidence and growing market share of a growing market for products produced by natural health products companies.

Natural health product companies that become certified producers or processors will create a competitive advantage for the products.

3.5 Conformity Assessment and Maintaining Standards

Identifying and creating new standards are real and immediate challenges, but standards development is just the beginning. Developing a standard is similar to investing in a capital asset in that the asset has a large initial cost and requires ongoing maintenance. Also, the asset is only valuable if it is in use – that is, firms must be able to demonstrate that they conform to a standard (*i.e.*, conformity assessment) in order for firms to benefit from the standard. The development of a standard requires conformity to the standard and requires maintenance of standard relevance in order for an industry to maintain the benefits of standardization.

The efforts needed for maintenance and conformity assessment are compounded by the fluid nature of markets. If successful standards are reflections of the demands of consumers, and consumer demand for most products change over time, then standards must change over time as well in order to maintain relevance. As a result, sectors beginning to engage in standardization must consider how to maintain and sustain the standards that they are creating. Many firms in this study reported that there is internal support for participation in developing and conforming to standards, there did not appear to be sufficient awareness of the need for maintaining standards.

The time and effort necessary for development, conformity and maintenance of standards are significant for small firms, but the benefits to the industry are potentially much greater. Some firms estimate that efforts to establish, maintain and conform to standards account for up to 15% of the total labour costs of their operations. This percentage will fall as firms become larger and will rise as firms become smaller. In agri-value industries dominated by small and medium enterprises the importance for collective action and the potential for government involvement, therefore, is relatively great. The benefits of standardization will be compromised if, following, and standards development effort, conformity assessment and standards maintenance cannot be preserved.

Preserving the relevance of standardization faces several challenges beyond the cost of maintenance and conformity assessment. Without proper attention to the maintenance a standard the industry that is intended to benefit from standardization may begin to face creeping standards, competing standards or lost recognition of the standard. Each of these issues may be a result of poor maintenance, poor conformity, or both. The problems with these three problems are detailed below.

Creeping Standards: Standards creep upwards almost inexorably as products evolve and markets mature. This is both inevitable and necessary. Firms expressed some concern, however, that regulatory agencies, at times, either gain or seek new authority to set rules in industries. This is particularly a problem in the confederation system where jurisdiction for food safety is divided between federal and provincial governments and where local governments often are authorized to exercise judgement in terms of the how they implement and enforce laws and regulations from the higher orders of government.

As food safety concerns rise in the public consciousness, every order of government seeks to respond and demonstrate that it is protecting the public. As a result, some agencies have shown interest in extending their efforts to regulate the local impacts of the agri-value system. In some cases the responsible agency has not demonstrated any competence in the field or understanding of the pre-existing quality assurance systems and standards that secure food safety. It is both possible and likely that the standards set by local agencies could be costly and counter-productive.

Competing Standards: In new or evolving markets there often is not a single, recognized standard. Rather, different markets often adopt different standards, with the result that exporting agri-value companies need to conform to more than one standard. This was observed in discussions with the Saskatchewan organic industry, where there are several agencies vying to be the industry leader in providing standards and certification. The OCIA is currently the standard setting and auditing agency for US destined organic shipments while IFOAM is the agency for EU destined shipments.

Lack of Mutual Recognition of Standards: Many firms in the agri-value industry that currently conform to standards to access markets express very real concern that different markets establish different standards that have somewhat different criteria and conformity regimes. For example, those firms supplying inputs to the baking and milling industry have to conform to a variety of regulations and standards. For instance:

- the (Canadian Food Inspection Agency (CFIA) regulates sanitary and phytosanitary standards;
- the Canadian Grains Commission administers the Seeds Act;
- most bakeries demand product that meets one or other of the levels set by the American Institute of Baking;
- speciality markets such as the Kosher trade set their own rules and if concessionary food aid through (Canadian International Development Agency (CIDA) is sought; and,
- Public Works and Government Supply Canada requires an ISO 9003E standard.

Other markets set other standards. Even though an estimated 50% of the criteria out of each of these standards are essentially the same (e.g. management structures, quality control structures, contract review processes, document and data control, product identification and traceability, corrective action, records keeping, and training), conformity each of these separate standards are assessed by separate conformity auditors. The company being assessed pays the (at times inflated) costs of these overlapping and duplicating audits. This is particularly a problem for smaller agri-value companies, as they often have to supply small amounts of product to a large number of markets in order to develop the market for their emerging products. There currently are no provisions for mutual recognition of conformity or for bundling of audits. There is no technical impediment to impede more efficiency in the system, simply a lack of incentive for the audit systems to streamline.

Most of the issues involving standards development are applicable to conformity assessment and standards maintenance. In particular, standardization at all levels involves collective action by firms in an industry to realize the benefits of standards. An activity that becomes increasingly difficult as the size of firms in the industry are generally smaller. A summary of benefits, costs, lessons and other issues are detailed in the following section.

3.6 Summary of Lessons

The theory and evidence presents a number of possible directions for Western Canadian agri-value development. These directions may be categorized into sets of related lessons and ideas regarding standardization.

1. *Standards exist in the realm between regulatory control and brand recognition.*

- A standard provides quality and safety through the collective actions of firms, consumers, and governing bodies.
- A brand creates images of quality assurance through the efforts of individual firms or groups.
- A regulation is created by a government or industry governing body to ensure safety.
- A standard for a region will act as a brand for that region in export markets.
- A standard has the force of regulation when provisions of the standard are enforced through sanctions or legislation.

2. *Standardization improves market exchange by raising consistency, quality, and safety.*

- Standardization is most useful or most important when product characteristics are difficult to assess at the time of purchase or are has a technology that is easily taken or duplicated by competing firms.
- Firms in markets with a few larger companies are able to use branding as a means to capture the returns of technical innovation. Firms in markets with many small companies (agri-value industries) are unable to earn a reasonable return by individually raising quality – firms have to act collectively.
- Collective actions by exporting firms that are able to create a regional brand for quality and consistency are then able to gain a price premium for their products. The standard of the region becomes recognized as an international brand.
- Standardization ensures safety of consumers with the same or greater effectiveness than regulatory control when the standards are referenced in legislation. Standardization will also provide greater flexibility in maintaining high safety standards in industries with rapidly changing technology – *e.g.*, biotechnology.

3. ***Standardization should be focussed on industries and consumers where there are missing or incomplete market structures and institutions.***

- Firms and consumers in new and unregulated markets potentially benefit more from standardization than existing or mature markets.
- Market institutions in rapidly changing markets must be flexible, and standards are more flexible and more effective than regulatory control in these markets.
- Standardization requires significant time and resources to be effective, so standardization should occur in industries where the benefits dominate the costs.
- Regulations are costly for firms, and standardization may reduce the burden or costs to firms if the same or improved levels of quality and safety can be achieved.

4. ***The public benefit of standardization cannot be achieved in certain industries without intervention by consumers and government.***

- Small and medium enterprises have limited resources for industry development issues such as standardization. Where an industry has national and international standards bodies, smaller firms are often not able to fully represent Canadian interests without public support – there must be provisions for volunteers.
- Small and medium enterprises are able to participate in regional, national and international levels through collective actions pursuing collective goals. Individual firms do not have the resources to effectively influence industry development through standardization. Collective actions of small firms create advantages from shared resources and, more importantly, provide a broader perspective for establishing industry standards.
- Because of the impact on a broad number of firms and consumers, there must be means for establishing trust and other collaborative foundations on which industries, consumers and other stakeholders are able to establish strategic goals for higher quality, greater consistency and safer products. Facilitation, communication and education are the means necessary to create the conditions of trust for collective action.

4.0 A Policy Framework for Standards in Canadian Agri-value Sectors

The public policy role that standards may serve and the flexibility that standards offer in market management are becoming more apparent for knowledge-based products. A high degree of trust is required by consumers to purchase knowledge-based products, because product qualities of new products are not always easy to assess for consumers. These products cannot be managed using regulatory control, because the specific characteristics of knowledge-based product change rapidly. Standardization offers quality, safety and consistency control, offers flexibility, and offers broad participation of firms, consumers and other stakeholders.

All markets require intervention for expansion and development, and this intervention will be in the form of firm brands, government regulation, or industry standardization. Brands and regulations are understood more easily than standards, but each of the three concepts is a market intervention tool. Standards exist in the realm between branding and regulatory control. Standards theory demonstrates how and when standardization as a public policy may take forms that serve market development whether this is through some form of regional brand recognition or through near regulatory control for the purpose of quality and safety.

During the four months of this study a wide variety of companies in four emerging biodiverse industries—organic foods, non-traditional meats, plant fibre and natural health products—were consulted and worked with. That experience demonstrated the important role of facilitating the education and mobilization of groups of firms to identify and pursue standards opportunities. Firm participation in standardization produces a variety of public benefits from market expansion to higher product safety. These benefits become more broadly based when industries such as agri-value industries are dominated by small and medium enterprises and when consumers participate in standardization together with firms in the industry.

The broad benefit and the extent of the benefits that standardization offers for firms, consumers and other stakeholders mean that there is an important public policy role to expand the role of standardization in managing and developing Canadian agri-value industries.

4.1 General Policy Framework

The lessons from the theory and evidence imply that a general policy framework is needed to expand the understanding of standards. Standards will serve the public interest as standardization is better understood relative to regulations, as an alternative to regulations, or used in conjunction with regulations. There is a presumption among consumers and public officials in particular that markets are best managed through regulatory control. The general policy framework must raise the awareness of standards as a flexible public policy instrument and thereby raise the degree of standardization in Canada.

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Expanding the understanding and use of standards requires commitment from industries, consumers and other stakeholders to become involved in standardization processes. As a first step in developing the understanding of standardization, firms must become convinced that they have the power to create standards – that standardization is not solely a government responsibility. In order for firms to create and manage standards, there must be an underlying level of trust for firms to work together. The trust may be achieved through consensus, facilitation, or strategic planning exercises. If firms have the basic level of trust, the willingness to pursue standardization and the resources to pursue standardization, then industries will lead market development and initiate standardization efforts without prompting from government or other public interests.

As a first step in developing the understanding of standardization firms must become convinced that they have the power to create standards.

The second step in expanding the understanding of standards is to draw consumers into standardization efforts. This will most often be a consumer group or other interested party, since consumers want products that meet their needs rather than want to be involved in the management of the product or of the product market. Consumers will only become involved if they understand the role that standards serve in markets.

The second step is to draw consumers into standardization efforts.

In pursuit of these goals, The Standards Council of Canada has developed the ***Canadian Standards Strategy and Implementation Proposals*** to increase awareness and understanding of the National Standards System for managing and developing markets. The Standards Strategy is publicly available and is distributed by the Standards Council of Canada. As a review, the *Key Elements of the Strategy* are:

1. Participate in the development of international standards, and use standards adopted or adapted from internationally accepted standards to the greatest extent possible.
2. Prioritize standardization efforts and resources within three key areas:
 - those in which Canadians have a major interest in health, safety, the environment or other social issues;
 - trade sectors in which there are existing or potential benefits to Canadians; and,
 - harmonization of standards where appropriate, and especially within North American markets.
3. Monitor and evaluate innovations in conformity assessment practices, and actively pursue new international arrangements of anticipated benefit to Canada.
4. Actively communicate the role of standards, and the benefits and challenges associated with standardization processes and products, among public- and private-sector decision makers at all levels of Canadian society.
5. Position standardization processes as a necessary complement to regulatory processes, and encourage the use of standards in the development of Canadian public policy.
6. Develop mechanisms to guide standardization activities in current and emerging social and economic issues.
7. Improve system responsiveness and enhance participation in all standardization activities.
8. Forge partnerships and strategic alliances among current and potential participants in standardization activities.

Implementation of the key elements requires concrete action that will achieve aspects of the goals noted above. The Standards Strategy identifies 23 *Implementation Proposals* for this purpose, and these are:

1. Create and maintain a framework for developing national positions.
2. Establish a broader mandate for technical committees under Canadian National Committee of the International Standards Office (CNC/ISO) and the Canadian National Committee of the International Electrotechnical Commission (CNC/IEC).
3. Take leadership in developing international standards for electronic commerce.
4. Engage developing countries in international standardization.
5. Develop, implement and maintain processes for setting priorities for standardization activities in the areas of health, safety, the environment and other social issues.
6. Develop and maintain the capacity for standards-related policy development, analysis and dissemination.
7. Ensure that standards development processes support social policy objectives.
8. Move toward a global accreditation regime.
9. Identify and make available to stakeholders the objectives and strategies underlying trade-related Mutual Recognition Agreements (MRAs).
10. Examine the use of alternative conformity assessment practices.
11. Strengthen Canada's metrological infrastructure.
12. Promote the use of the National Standards System.
13. Connect emerging industries to standardization activity.
14. Examine and evaluate management system standards.
15. Develop a web portal for the National Standards System.
16. Provide support for the Agreement on Internal Trade.
17. Make standards and conformity assessment a full part of the public policy debate.
18. Utilize quality management systems and environmental management systems to achieve public policy objectives.
19. Communicate the value of environmental management standards.
20. Employ innovative funding mechanisms.
21. Implement a volunteer program.
22. Generate strategic sectoral participation.
23. Facilitate consumer input to the North America Free Trade Agreement (NAFTA).

Some of the concrete implementation proposals are specific to certain sectors while others are expected to have relevant impacts on all sectors. The specific proposals include reference to agri-value sectors. Proposals #22 (Generate strategic sectoral participation) is targeted to three sectors:

- agriculture (including “nutraceuticals”, dry food, fibre, organic, specialized livestock and biotechnology);
- information technology (including software, communications and internet usage); and,
- forestry.

These sectors are identified as priority sectors because the development of standards in these sectors will produce the greatest return to the sectors and to the economy in general, and will produce the greatest benefits for consumers compared to other sectors.

As a final consideration for a general policy framework, government should use several criteria when assessing priority sectors. Several such criteria are:

- Will standardization support the commercialization of new high-value products?
- Will the standardization process be managed or influenced by and for Canadian firms?
- Will standardization lock-in production and profits in Canada?

As work progresses towards extending the use of standards to more sectors, these criteria should be kept in mind and continually evaluated.

4.2 Policy Response in Agri-value Sectors

Standards policy development is critical for agri-value sector development because Canadian agriculture is currently facing a major transformation. Weak commodity prices and emerging demand for higher value goods is shifting producer and processing interest from the traditional commodity trade towards new high-value product markets. Even commodity markets are undergoing a change, with buyers demanding new and different quality traits that are not easily supplied through the traditional commodity stream. Canadian firms are able to take advantage of the comparative advantage in agriculture and control or significant influence standardization in Canada and internationally in order to advance Canada's competitive advantage in agri-value and other biodiverse sectors.

4.2.1 Support Collective Action in Agri-value Sectors

A policy framework for standardization in high-value agricultural sectors must account for the reality that the sectors are dominated by small and medium sized enterprises. Small and medium sized enterprises do not, in general, have the internal resources needed for participating in standards development or maintenance. Therefore, the policy framework must be established that supports the collective action of firms in the sectors to pursue standardization. The support of collective action does not imply funding of industry organizations; rather support for collective action implies that the policy framework includes provisions to create the conditions for industry-led organization and action.

The two most important conditions leading to industry action are resources and trust. Firms must have sufficient internal resources in order to redirect time and money to general industry activities that have indirect benefits. The indirect benefits are difficult to measure and assess, so firms may only participate if the firm has ample internal resources. This likelihood of firms in an industry meeting this condition falls as the size of firms fall.

Firms must also trust that other firms in the industry are working towards the same goal for standardization. A lack of trust will cause individual firms to withhold information for the broader benefit of the industry, thus making standardization more difficult to achieve. More importantly, the greater the degree of trust, then the easier for firms to work together to overcome difficulties in the processes leading to effective standardization in the industry. The greater the number of firms in an industry, then the more difficult the task of having all firms working together towards one goal.

The policy framework must be designed to account for these two conditions of resources and trust. These two conditions may be assumed in industries with a relatively few number of larger firms. In the agri-value sectors characterized by small and medium sized enterprises resources are not easily diverted from direct product uses towards the possible indirect benefits for the industry. There are a large number of firms in the agri-value sectors, so firms cannot be easily organized for the benefit of the industry as a whole.

4.2.2 Agri-value Policy Framework

An agri-value policy framework must begin with facilitation of firms towards the goal of appropriate standardization. This is the first of five elements that comprise a comprehensive approach for a policy framework for agri-value standardization. Details of these five elements are described as follows.

1. Facilitate Strategic Planning by Industry for Industry

Industries that may potentially benefit from standardization must work together in order to establish industry goals and objectives. Strategic planning by an industry most often occurs within the structure of an existing industry association. Such associations are most often the appropriate forum for strategic planning and work effectively if the association does not serve too broad a mandate. Indeed, the more the broadly based an industry association, then the fewer issues or objectives that the association membership will agreed on. Standardization and other strategic issues take a lower position on associations' agendas relative to more obvious benefits such as tax breaks, specific policy changes, and other government concessions.

For agri-value industries with a large number of small and medium enterprises, industry associations are in general not able to provide strategic direction for the industry as a whole. Agri-value firms are not able to identify whether standardization will benefit specific sectors, let alone work towards standardization, without effective associations that embody the vision of an agri-value sector. The existence of an association or of a common process by itself is not sufficient to ensure development and maintenance of standards.

Facilitation of standards development in the organic industry provides a case in point. The organic standard was developed through a broad-based collaborative effort facilitated by the CGSB. This facilitation was successful. The absence of a common vision prior to the standards development process has led to the current state of affairs where a conformity assessment industry has difficulty emerging to support organic producers and processors.

The public policy implication is for the facilitation of industry strategic planning rather than the creation of industry associations. Facilitation will accomplish several feats:

- Industry participants are more likely to commit to an industry vision rather than near term firm benefits (*e.g.*, tax breaks).
- Firms in the industry will devote more resources (time and money) to developing industry associations and to standardization specifically.
- The industry will continue to evolve and take advantages of opportunities as these occur – as opposed to creating barriers in the same manner that the organic industry has created barriers in the conformity to and accreditation of the organic standard.

2. *Implement Volunteer Program*

At present there are some resources available for volunteers to attend various international standards meetings. These resources are limited, are accessible in a limited number of situations, or are available through the discretionary spending of various federal and provincial government departments. The Canadian Standards Strategy notes that “the current volunteer cadre is aging, and interest in standards work is declining in some quarters” (*Strategy*, p.31).

The time and money costs are key constraints for industries to participate in standardization, so an accessible and well-designed volunteer support program will increase participation in standards development and maintenance. A well-designed program may include:

- provisions for travel, accommodations and meals;
- extremely rapid payment on eligible receipts, initial payments, or travel services;
- research services;
- other support services prior to and during standardization meetings and events.

Relatively few of the firms that were consulted in this study indicated a need for significant contributions from a volunteer program. Industries are willing to contribute resources to standards development, but the constant demands of time, and cost of travel and accommodations wears down commitment to standardization. The volunteer program must provide enough resources to industry, particularly small and medium size companies, in order to maintain commitment for the development and maintenance of standards.

3. *Increase Consumer and Industry Awareness of Standardization*

The success of general standardization policies and of agri-value standardization policies depends in large measure on the understanding and acceptance of standards for regulating markets. There is a general perception that products are either regulated by government or are allowed to find levels of quality and safety according to the free market. This perception leads to consumers and producers allowing control of markets to become “someone else’s” responsibility either as central control (*i.e.*, regulation) or as an individual decision (*i.e.*, consumer choice of a brand). The role of standards is lost if there is not a general understanding of standards that exist between the role of regulations and the role of firm brands.

The low awareness of standards in managing markets is leading to greater regulatory control of agri-value sectors. Consumers have lost the basis on which they have traditionally understood agricultural production – comfort with images of a family farm. Without an understanding of standards, consumers and governments are attempting to regain confidence in agri-value products by using regulatory control. Regulatory control is an inappropriate policy response for emerging knowledge-based agri-value industries. Regulatory does not have the flexibility that is necessary to respond and manage new technologies or consumer demands that are influencing the marketplace.

Given these reactions by consumers and regulating government agencies, the appropriate policy response by standards bodies (*i.e.*, Standards Council of Canada and Industry Canada) is raise the awareness of consumers and regulating government agencies of the potential advantages of standardization for market management. Of course, standards bodies should also seek to raise the industry awareness of standards. As industry comes to understand when and where standardization is needed to manage markets, the industry will be better able to involve consumers, government and other stakeholders in developing standards as needed.

4. *Build Research Capacity*

Awareness of standardization must increase among policy researchers as well as among firms, consumers, and governments. There is ample discussion among researchers regarding the role of the public sector versus the private sector and vice versa, but there are limited discussions among policy researchers about the role of collective action by the participatory sector. Collective actions by industry are a prerequisite for standards development and maintenance. Collective action is more difficult for agri-value sectors and other industries with a large number of small and medium sized firms. Part of the policy framework for agri-value standardization, therefore, is to build policy research capacity that will raise understanding of collective action and standardization among consumers, industries, and governments.

Several approaches are needed to build research capacity. Research takes several forms including basic research, applied research, and specific policy research and analysis. The first two forms may only be influenced using indirect means, but will have long lasting impacts. Specific policy research may be directed through conferences and seminars, through the funding of research chairs or through a centre of excellence, and will have a more immediate impact. This paper is an example of improving research capacity since it is supported in part by government funding and is being used to increase the awareness and understanding of standardization in agri-value market development.

The building of research capacity must be part of the policy framework. Research provides solutions to specific problems, but it also raises the general awareness of standards among all interested parties. Research is used to educate people, so if standards issues become part of research programs, then standardization is more likely to be considered as a policy option by industry for market development, by government for market management, and by consumers for ensuring product quality and safety.

5. *Conformity Assessment*

A comprehensive policy framework for agri-value standards must include a discussion of conformity assessment. Conformity assessment has not been addressed in any significant measure in this paper although it is fundamental to successful standardization in any industry because the topic deserves detailed attention that could not be completed as part of this project. Conformity assessment in agri-value industries should be a topic of policy research in the very near future.

Such research will address the many forms conformity assessment may take. The form and the institutions required for conformity assessment will vary depending on the particular standard, on the industry that developed the standard, and on the degree of control necessary. Companies and individuals that were interviewed as part of the current research identified a number of issues related to the form and institutions of conformity assessment. The following four issues in order of priority were discussed by agri-value industry representatives.

- *Duplicate and Competing Standards* – The one major concern for industries presently involved in standardization is the number of different standards that a firm must conform to in order to access one or a combination of markets. Agri-value industries, like other knowledge-based industries, produce a number of products and services that are classified in more than one commodity group. For example, a small but successful Saskatoon agri-value company faces an average of one standards audit each month. The company is able to access high value markets as a consequence, but many of the criteria in each standard are duplicates of criteria in other standards. Serving more than one market will lead to multiple standards, but duplicate criteria within these standards are a burden for industries.

In addition to duplication, many firms face competing standards. Duplication of criteria is partially a consequence of competing standards, but there are also contradictions among standards as well. There are at least four organic standards that Canadian organic producers and processors could use. These are IFOAM, USDA, OCIA (standards vary by local chapter), and the new Canadian Organic Standard.

- *Mutual Recognition of Standards* – Mutual recognition of duplicate and competing standards by standards bodies is an ongoing issue that requires continued participation by firms, consumers and other stakeholders to identify and develop solutions where conformity assessment burdens are needlessly rising (*i.e.*, standards maintenance). Nationally recognized standards will alleviate some of the concern in organic industries, but firms producing products in multiple markets are only able to seek redress through participation in multiple standardization processes.
- *Conformity and Auditor Industry Structures* – Conformity assessment appears to be a new burden for firms in industries that develop standards for the first time. The entrance of conformity assessment auditors, certifiers or other firms necessarily means that a new industry structure will develop. There is an understandable reaction by existing firms in an industry to be concerned about market survival as new firms enter the industry. This concern is most often overstated because future market structures only evolve out of current market structures. Alternatively, firms in an industry are most often in the best position to develop the skills needed in future market structures.

The number of different market structures for conformity and auditor industries may be detailed for the benefit of industries, consumers and government. Such a report will provide stakeholders with a view of the future as well as ideas about how to manage change, as standards become the norm in knowledge-based and agri-value industries.

- *Self-Declaration* – One possible industry structure for conformity assessment is the self-declaration by firms of their practices. Clearly the nature of a product is a determining factor in whether consumers will accept self-declared standards conformity. However, the size of an industry, potential price premiums, safety factors, and international competition are also determining factors in whether conformity assessment must be flawless, must meet a minimum level, or must provide sufficient assurance for consumers. That is, self-declaration is a much less expensive means of assessing conformity to a standard and is appropriate wherever product characteristics, size of firm, and other factors imply that separate and independent auditors become an unnecessary burden on small firms and small markets.

These are only brief descriptions of a few conformity assessment issues. A complete discussion will provide more information and direction for conformity institutions and a potential policy framework for conformity assessment.

References

- Aaker, David A. and Kevin Lane Keller (1990), "Consumer Evaluations of Brand Extensions," *Journal of Marketing*, 54 (Jan.), 27-41.
- Beck, Nuala. (1998), *The Next Century: Why Canada Wins*. Toronto: HarperCollins.
- Fukuyama, F. (1995), *Trust: The social virtues and the creation of prosperity*. London: Penguin.
- Gray, R., S. Malla and P.W.B. Phillips. (1999), *The Effectiveness of the Research Funding in the Canola Industry*. Saskatchewan Agriculture and Food.
- Grossman, G. & E. Helpman, *Innovation and Growth in the Global Economy* (London: The MIT Press, 1991), pp. 1 and 6-7.
- Industry Canada, *Standards Systems: A Guide for Canadian Regulars*, Regulatory Affairs and Standards Policy Directorate, Industry and Science Policy Sector, Industry Canada, 1998.
- Keller, Kevin Lane (1993), "Conceptualizing, Measuring, and Managing Customer-Based Brand Equity," *Journal of Marketing*, 57 (Jan.), 1-22.
- Lane, Vicki and Robert Jacobson (1995), "Stock Market Reactions to Brand Extension Announcements: The Effects of Brand Attitude and Familiarity," *Journal of Marketing*, 59 (Jan.) 63-77.
- Murphy, John M. (1990), "Assessing the Value of Brands," *Long Range Planning*, 23 (3), 23-29.
- Nabli, M and J. Nugent, "The New Institutional Economics and its Applicability to Development." *World Development*. 17 (1989): 1333-1347.
- North, D. "Institutions." *Journal of Economic Perspectives*. 5 (1991): 97-112.
- Olson, M. (1965), *The Logic of Collective Action: Public Goods and the Theory of Groups*. London: Harvard University Press.
- Picciotto, R. "Putting Institutional Economics to Work: From Participation to Governance." *World Bank Discussion Paper 304* (1995).
- Porter, M. (1990), *The Comparative Advantage of Nations*. New York: Free Press.
- Shapiro, C. and H. Varian (1999), *Information Rules: A strategic guide to the network economy*. Boston: Harvard University Press.
- Sprigg, J. and G. Isaac. Forthcoming.
- Standards Council of Canada, *Canadian Standards Strategy and Implementation Proposals*, Standards Council of Canada, March 2000.
- Stiglitz, J. (1999), *Wither Reform? Ten Years of the Transition*. World Bank Annual Bank Conference on Development Economics, April 28-30.
- Tirol, J., *The Theory of Industrial Organization*. MIT Press, Cambridge, Mass, 1988.

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