



GEORGE MORRIS CENTRE

**Competitiveness: Demystifying Concepts,
with Application to the Agri-food Sector**

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1. Introduction

For the second year in a row Canada's competitiveness ranking has slipped in the World Economic Forum's 2011/12 Global Competitiveness Report. In 2011 Canada ranks 12th amongst 142 countries and has slipped three places since 2009. Interestingly, Canada's absolute performance actually improved in 2011, but our competitors have improved even more.

Is this a big deal? Why should the Canadian agri-food sector care about competitiveness?

Canada is a major agri-food producing country, and among the largest exporting countries for a number of commodities and processed products. As such, Canada has a significant capacity and economic stake in agri-food production and processing. The opportunities in Canadian agri-food are great – there are growing developing economies that are changing their diets and demanding more food, while the domestic market and our traditional trading partners are looking more and more for food with certain attributes – such as health, convenience, certain production practices and environmental sustainability. Canada is currently negotiating a major trade deal with the EU and there is the prospect of others. At the same time, Canada is an open economy in which domestic market share is contested. Growth in the Canadian agri-food sector is dependent on the sector's ability to compete with other sectors in the economy for inputs and its ability to compete in output and specialized input markets with rival agri-food sectors in other countries.

Competitiveness is thus important in Canadian agri-food. But what does competitiveness mean and how is it actually measured in order to be meaningful to those economies or sectors that are looking to improve? Understanding the sources of competitiveness, and the gaps in competitiveness, is fundamental in developing a continuous improvement process, and in planning industry development. Competitiveness, however, is a complex and elusive concept, involving everything from relative production costs to product mix, to how firms in an industry compete. It is also a concept that has evolved over time.

The purpose of this paper is to provide greater clarity on the meaning and significance of competitiveness by developing an overview of the evolution of thought on the concept, and to trace this through ideas around measurement. The paper concludes with an application to the agri-food sector.

2. Defining Competitiveness

Generically, the term competitiveness means “*the ability of a company, country, or a product to compete with others*” (Logman Dictionary of Contemporary English). Therefore, depending on the type of competing entity, competitiveness can be distinguished with respect to products, industries, or nations as a whole. And depending on the space where the entities operate, competitiveness can be considered on a regional, national, or international scale.

Canada's Agri-Food Competitiveness Task Force developed the following definition of competitiveness in 1990:

Competitiveness is the sustained ability to profitably gain or maintain market share.

We like this definition for a number of reasons, including:

- There are three measurable aspects - profits, market share and time. So, competitiveness is attained if one is profitable with steady or increasing market share over time.
- The word “profitably” is meant to imply only that profitability is attained from the market place, not from unfair competition, public policy that confers unfair advantage, or subsidies.
- The fact that profitability is used instead of cost explicitly recognizes that there are alternative competitive strategies and recognizes that various stages in the supply chain must be profitable.
- Underlying the definition is the expectation that, as a result of its actions in the market, a company, industry, sector, or national economy that has maximum competitiveness will be able to attract resources of production – i.e. labour, capital and new ideas.
- The term focuses on results (profitability, market share), not on behaviour. So, the distinction between one who is competitive and one who has a high degree of competitiveness is that the first displays competitive behaviour, while the second shows results. The two are not necessarily the same. The second person’s competitiveness may have resulted from her or his ability to cooperate. The last distinction is important in that it implies that an analysis of competitiveness begins with the end – i.e. the industry has shown a high degree of profitability and an ability to gain market share.

This is consistent with other definitions. For example, the World Economic Forum’s definition is “*the set of institutions, policies and factors that determine the level of productivity of a country*”. This conveys the idea that continual productivity improvement must occur to remain competitive.

The OECD defines competitiveness as “*the degree to which a country can, under free and fair market conditions, produce goods and services which meet the test of international markets, while simultaneously maintaining and expanding the real incomes of its people over the long term*”. Again the definition is very similar to the Task Force’s definition. The only way real incomes of a populace can expand over time is if their employers are profitable over time.

3. Evolution of Competitiveness in International Trade Theory

The evolution of thought on competitiveness comes from international trade theory. This stretches from *mercantilism, absolute advantage, comparative advantage, resource endowment, the product life-cycle, “new” trade theory, to national competitive advantage theory*.

This section examines the definitions of competitiveness and related measures as they have evolved. Appendix A summarizes the discussion below.

3.1 Mercantilism

Mercantilism was the dominant school of thought explaining trade in Europe throughout the 15th to 18th centuries. The basic notion was that the economic system was a zero-sum game where the net exporter was considered the winner and the net importer a loser. Accordingly,

competitiveness was considered as *the ability to accumulate wealth* through such factors as supporting exports and suppressing imports (LaHaye).

Under this framework, *trade balance (net export)* was considered as a measure of success and the net exporting country was competitive.

Under *mercantilism*, competitiveness is driven off self-sufficiency and surplus. The more a country produces domestically (or obtains from its colonies) relative to its needs, the less it must import and the more it can export; therefore the more competitive it is irrespective of the efficiency of production. The latter was considered a fundamental flaw of the theory that was criticized by Adam Smith and representatives of classical and neo-classical economic schools.

3.2 *Absolute Advantage*

Mercantilism as a theory of restricted trade was superseded by the theory of free trade, and *trade surplus* as a criterion of competitiveness was succeeded by the concepts of Adam Smith's *absolute advantage* theory. Under this approach, trade is not a zero-sum game. Countries differ in their ability to produce goods efficiently and, as a result, free trade leads to specialization which is beneficial for all trading parties. More specifically, a country has an *absolute advantage* (is more competitive) in producing a given product if it produces more than its competitors using the same amount of resources. Because resource use and product outputs are related through technology, the latter was considered as the main factor driving *absolute advantage* and competitiveness. *Absolute advantage* is measured by the productivity of resources - labour, land, capital, etc...

The measure of *absolute advantage* was criticized for its lack of generality. For example, what advantages are there to trade if one country has an *absolute advantage* in all products? This was addressed by David Ricardo through reformulating Adam Smith's measure of *absolute advantage* into *comparative advantage*.

3.3 *Comparative Advantage*

Under the *comparative advantage* approach (the *Ricardian model*), the competitiveness of two products is determined not by their absolute productiveness, but by opportunity cost. For example, a country is more competitive (has a *comparative advantage*) in producing corn if its opportunity cost is lower compared to that of its competitor. Initially, the opportunity cost of producing one good in terms of another was defined as the ratio of their labour requirements. This was later extended in several ways – moving from two to multi-product systems, extending the number of factors of production (Dornbusch et al. 1977), and incorporating equilibrium relative prices instead of pre-trade ones. Implementing the equilibrium relative prices (and so the consumer preferences) into the framework allows, in addition to technical efficiency, the country to achieve efficiency of product-mix. The latter implication is important because it extends the concept of *comparative advantage* and its measurement. In particular, a country has a *comparative advantage* in producing a product if (i) its opportunity cost is lower and (ii) its product-mix also reflects the demand in that product.

Measures of competitiveness under this framework result from empirical trade models for the countries of interest trading a given product. The most competitive country in the production of a product is the one with the lowest opportunity cost in producing the product, given its productivity and the opportunity cost of alternatives.

Under the *comparative advantage* framework, as with *absolute advantage*, the differences in efficiency stem from differences in productivity (technology). The endowment of natural resources (land, water) is not considered. Attempts to incorporate the resource factor into the comparative advantage framework resulted in the development of the *factor endowments* approach (*Heckscher-Ohlin model*).

3.4 Factor Endowments

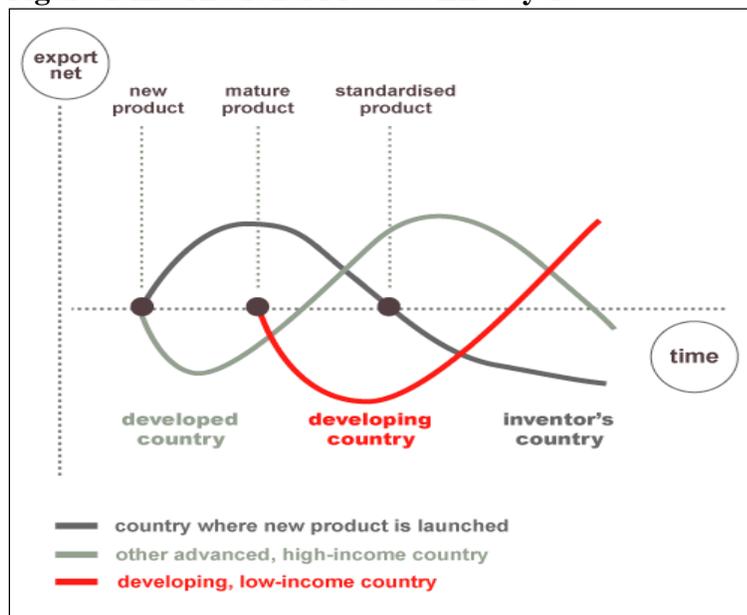
Eli Heckscher and Bertil Ohlin extended the comparative advantage framework by predicting patterns of commerce and production based on the resource endowments of a trading region. Their framework essentially says that countries will export products that utilize their abundant and cheap factors of production and import products that utilize the countries' scarce factors. Thus, natural resource endowments complement technology in driving competitiveness.

It is important to note that although the *factor endowment* theory extended the *Ricardian model*, the theory could not explain a range of practical issues such as a trade among countries with similar resource endowments. In particular, Leontief, in 1953 postulated that since the US was relatively abundant in capital compared to other nations, according to the theory the US would be an exporter of capital intensive goods and an importer of labour-intensive goods. However he found that US imports were more capital intensive than US exports. This observation is known as the Leontief Paradox (Koenig).

3.5 The Product Life Cycle Theory (Dynamic Comparative Advantage)

The *product life cycle theory* (Vernon, 1961) introduced an important new dimension to understanding competitiveness - time. The product life cycle according to Vernon consists of three phases – new, mature, and standardized product. Vernon argued that as a product matures both the location of sales and the optimal production will change affecting the flow and direction of trade (Blom & Karlsson, 2001). According to the theory, the initial driving force is the demand for goods. Demand starts to grow in the most advanced country (the US, for example), and demand in other less advanced countries is limited to only high-income groups. Then, over time the demand in the advanced country becomes saturated while demand in the less developed country continues to grow. The advanced country then starts to expand production of its good internationally. Because the demand in the less advanced country is growing, its domestic producers start to increase production displacing imports from the developed country.

Figure 1: International Product Life Cycle



An important implication of Vernon's understanding of the measure of competitiveness is extending the notion of comparative advantage – from a static to a dynamic framework (dynamic comparative advantage). According to Vernon, comparative advantage changes in time. Another important factor is that product development does not occur by chance; countries need to have the demand, industrial capabilities and skilled human resources to bring forth a new product. While this provided additional insights into the nature of competitiveness and its driving forces, this framework still left many unresolved questions – speed of the diffusion process of a new technology, originating similar products in several world regions simultaneously, and why similar regions trade the same products among themselves.

3.6 *New Trade Theory*

Paul Krugman argued that comparative advantage occurs mainly because of economies of scale that create barriers to entry for other firms (Krugman, 2009). In addition, he considered increasing returns to specialization as an important motive for countries to expand internationally. These ideas became known as *new trade theory*. According to the *new trade theory*, trade induces a country to specialize, and government should support the industries where the first mover advantages and economies of scale can be important for economic development. A country's competitiveness can be considered *an ability to build and support large scale industries*. The level of concentration and specialization can be measured as competitiveness.

3.7 *National Competitive Advantage (Porter's Diamond)*

The *national competitive advantage theory* was developed by Michael Porter (Harvard Business School). Porter defines competitiveness as the *productivity with which a nation utilizes its human, capital and natural resources* (Porter, 2003). Accordingly, productivity, as measured by *GDP per capita*, is a major measure of competitiveness. A distinctive feature of Porter's theory

is its comprehensive formulation of factors of competitiveness. In his own words, “... *almost everything* matters for competitiveness” (Porter, 2003). On an aggregate level the factors of competitiveness (determinants of productivity) are grouped into (i) sophistication of company operations and strategy, and (ii) the quality of the microeconomic business environment. He extends further the time dimension of competitiveness and distinguishes company sophistication in relation to low, middle, and high income countries. Then he maps the groups above into specific stages of competitive development – factor, investment, and innovation-driven economies (Figure 2).

Figure 2: Stages of Competitive Development



Source: Porter, 2003

Going from general to specific, Porter broke down the two determinants of productivity into five factors known as *Porter's Diamond*. In particular, those factors are: rivalry among existing competitors, threat of new entrants, bargaining power of suppliers, bargaining power of buyers, threat of substitute products or services.

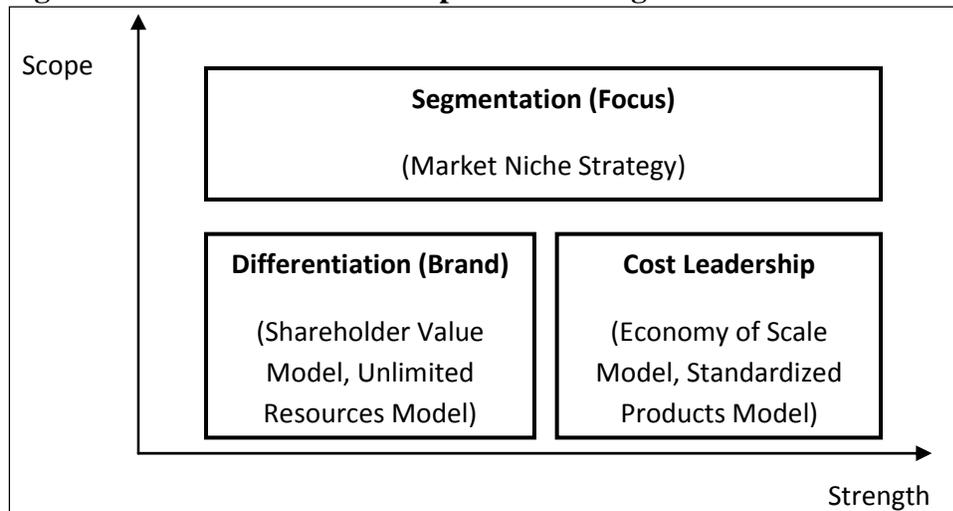
Going further, Porter also considers certain competitive strategies as specific forms of realization of the five factors. In particular, he formulated three types of generic strategies – cost leadership, differentiation, and segmentation - which are defined along two dimensions: strategic scope and strategic strength (Figure 3).

According to Porter, the *Cost Leadership Strategy* takes advantage of low cost products (usually through economies of scale or access to cheap input resources). Usually these strategies are accompanied by targeting a high level of market segmentation – e.g. large market share. Examples of such strategies are the retailer Wal-Mart or the IT firm Dell.

The *Differentiation Strategy* is based on taking advantage of a unique brand. Normally it uses a higher pricing schedule than the Cost Leadership Strategy. Examples of such strategies are the computer manufacturer Apple and car manufacturer Mercedes-Benz.

Segmentation Strategy focuses on specific market segments such as people with specific income levels, social preferences or ethnic backgrounds. Examples of such strategies are food retailer No-Frills which targets low-medium income groups.

Figure 3: Porter's Generic Competitive Strategies



3.8 Measuring Competitiveness

The ideas shaping competitiveness described above lead naturally to measures which are used as indicators of competitiveness. There are many candidate measures of competitiveness that have been devised; the sub-sections below highlight the more mainstream measures.

3.8.1 Relative Production Cost

Perhaps the most basic measure of competitiveness is production cost in one region versus another. Understood properly, it has its origins with the mercantilist view; the country with the lowest cost of production in a product can successfully compete with imports and price competitively in export markets, thereby maximizing national trade surplus in that product.

3.8.2 Relative Profitability

An alternative measure of competitiveness is the profitability in production in one region versus another. This stems from the notion of absolute advantage and gains from trade; it allows for profit to guide specialization in production, and trade to allocate product across markets.

3.8.3 Relative Productivity

Another set of measures compares the productivity in producing a given product in one region versus another. Productivity measures are many, but the most common are taken relative to fixed inputs such as labour or capital. These measures follow from absolute advantage, with the intuition being that the regions more productive in producing a product can specialize in its production, with markets served through trade.

3.8.4 Revealed Comparative Advantage

The notion behind revealed comparative advantage is that a region that has demonstrated a greater ability to specialize in given a product has low relative opportunity costs in doing so versus competitors. This is done by comparing the share of exports in a given product in a region with that of a competitor, or of the world.

This measure clearly derives from the notion of comparative advantage in trade; its insight is that the more specialized a region is in a product than its peers, the more competitive it must be. The key weakness with this measure, and the factors that explain its lack of mainstream use, is that it can make regions appear competitive simply because their broader economy is small or non-diversified, and differences in data format can give sharply different results (see for example Mussell *et al*, 2008).

3.8.5 Relative Resource Endowment

Natural resource endowments frame competitiveness, as identified by Hecksher-Ohlin. Thus, one means of measuring competitiveness (or at least informing it) is to compare resource endowments. For example, measures such as arable land per capita are used to inform comparisons of agricultural competitiveness, the notion being that regions with a higher endowment of arable land relative to population should have greater capacity and be lower in cost compared with other regions.

3.9 Summary

The robustness behind concepts and empirical measures of competitiveness (of which there are many) derives from international trade theory. The evolution of international trade theory has been based on an increasingly refined understanding of resource scarcity and opportunity costs- across countries, within a country, over time, and across market structures.

While a range of competitiveness measures derived from trade concepts have been developed (only a small subset of which are described here), they remain only a partial analysis for which additional context is inherently required. Any single measure, while informative, helps focus but only leads to more questions- for example, if relatively profitable or productive, why? This is inherent with a concept that draws together everything from technology to marketing, human resources, and distribution- Porter says that “everything matters”.

Thus further analysis is required to determine why the industry has the degree of competitiveness it has. This is the diagnostic step that can allow one to make prescriptions about changes in private business strategy or its application, and/or about public policy as it affects the industry. This definition and approach imply that without knowing how well the industry is doing, it is not useful to know why and provides no basis to figure out how to help it improve or maintain its competitiveness.

4.0 Assessing Competitiveness in the Agri-Food Sector

In many cases, when we examine competitiveness we measure relative productivity against our competitors and call it a day. However, in order for a company, sector or country to improve upon its competitiveness (productivity), we must not only know its level of competitiveness, but what is affecting it and why.

The agri-food sector, like other industrial sectors, can be fragmented into categories within which competitiveness can be considered and measured. These are:

- Marketing/product quality
- Technology
- Resource endowments
 - Human resource endowments
 - Natural resource endowments
- Trade environment and relationships
- The policy environment
- Human resource skill sets and management

The nature of the agri-food sector being measured can be applied to isolate the most significant categories. Technology is generally freely traded and ubiquitous; where it differs markedly across countries it is likely to be due to labour cost considerations, therefore measuring technology competitiveness are of secondary interest. Labour is only partially mobile and drives substitution/investment in technology so the nature of human resource and labour costs in competitiveness is important. Natural resource endowments (soil, water, climate) are not transferable across regions, and ultimately form the feed grain cost basis of a region, which is of crucial importance to livestock sectors. The nature of product quality and marketing can vary markedly across regions and can more than offset the effect of other aspects of competitiveness. Finally, as a high wage country competing with lower waged countries Canada must focus the labour pool on high-skilled activities and utilize skills to improve productivity in the sector and justify the high wages. Effective management of resources, markets and meeting customer needs is not an easily taught skill, no matter what the sector.

Understanding the more important components of competitiveness described above allows us to filter the usefulness of empirical measures and to understand that a comprehensive examination of competitiveness does not always stem from commonly accessed data. Indeed, the more refined the analysis, the more detailed the data required and the greater the need for additional context to interpret it. A single measure is unlikely to provide useful, unequivocal insights. It is critical to understand this to avoid getting trapped using the same data sets and conducting the analyses that lead to a particular set of results.

5.0 Conclusion: Competitiveness as agricultural policy

The above discussion highlights the fact that competitiveness is a complex and elusive concept with many layers but that understanding it is fundamental in moving the agri-food sector forward. However, policy discussions seldom capture the breadth of competitiveness neither as a concept, nor as a goal in and of itself. For example, in the Saint Andrews Statement agreed

upon and released by the Federal/Provincial/Territorial Agriculture Ministers this past July, competitiveness was addressed as one of the broad policy outcomes of the new agri-food policy framework. But, competitiveness occupies the same significance as adaptability and sustainability, which allows it to be segmented in the policy discussion- when in fact adaptability and sustainability are central elements of competitiveness.

The tendency has been to treat competitiveness as an element on the policy agenda- along with other items like innovation, research and development, business risk management. What is clear from the above is that this confuses ends and means (all are elements of competitiveness), confuses priorities, and blurs focus and measurement. The result is that competitiveness is not monitored on an ongoing basis; instead it is periodically stumbled upon and highlighted as an issue of concern.

As a trading nation with a structural interest in exporting, and an open economy in which market share is contested, competitiveness should be the focus of policy. The elements of policy should have as an explicit objective to enable competitiveness, and the status of Canadian agri-food competitiveness should be monitored and evaluated on a regular basis. The scope and complexity demands an extensive effort in monitoring and assessment of competitiveness. We have a long way to go if we are taking this seriously.

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Appendix A: Competitiveness: Definition, Measure, and Determinants

Approach	Competitiveness			Major Representatives
	Definition	Measures	Factors	
<i>Mercantilism</i>	Ability to accumulate wealth	Net Export	Export supporting policy	Thomas Mun (1571-1641), James Steuart (1712-1780)
<i>Absolute Advantage</i>	Ability to produce goods more efficiently than competitions (be in absolute advantage)	Absolute Advantage Index	Technology	Adam Smith (1723-1790), David Hume (1711- 1776)
<i>Comparative Advantage</i>	Ability to produce relatively efficient goods	Comparative Advantage Index	Technology, technology and demand	David Ricardo (1772-1823) Dornbusch, Fisher, & Samuelson, 1977
<i>Factor Endowment</i>	Possession of abundant cheap resources	Capital-Labour Ratio	Abundant land, labour and capital	Eli Heckscher (1879 – 1952), Bertil Ohlin (1899-1979)
<i>The Product Life Cycle Theory</i>	Ability to create industrial capability, enough capital and labour ahead of your competitors	Dynamic Comparative Advantage Index	Demand, industrial capabilities, capital, and labour	Raymond Vernon (1913-1999)
<i>New Trade Theory</i>	Ability to build and support large –scale economies	Level of concentration and specialization	Large scale economies, timing (first movers advantage)	Paul Krugman (1953-)
<i>National Competitive Advantage (Porter’s Diamond)</i>	Ability of a national economy to grow	Business Competitiveness Index, Growth Competitiveness Index	Sophistication of company, quality of microeconomic business environment	Michael Porter (1947-)