PORTER'S DIAMOND MODEL APPROACH: ASSESSING THE COMPETITVENESS OF BRITISH COLUMBIA'S LUMBER INDUSTRY'S EXPORTS TO INDIA

by

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ABSTRACT

The British Columbia softwood lumber industry continues to pursue market diversification to reduce the reliance and market vulnerability of the United States (US) for exports. Recently, the industry has been successful in penetrating the China market and is looking to emerging markets such as India for further growth and diversity, but India remains an elusive market which poses many challenges. The purpose of this study is to examine how to enhance B.C. exports to India and maintain its competitive advantage in this lucrative market.

This study employs two competitiveness models, Porter's (1990) diamond model and also the generalized double diamond model developed by Rugman et al., (1993) as the analytical framework for analyzing the competitive dynamics of Softwood Lumber industry's drive for market development outside North-America and to identify opportunities to achieve this.

Using the four determinants (1. factor conditions, 2. demand conditions, 3. related and supporting industries, 4. firm strategy, structure and rivalry) of Porter's diamond model, the B.C. softwood lumber industry's current home advantages and competitiveness is identified. Through the identification of the home advantages, the generalized double diamond model internationalizes these advantages with India and examines the prospective competitive advantages, directions and solutions for the industry in enhancing the market share in the Indian lumber market.

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Chapter 1

INTRODUCTION

Canada accounts for 10 per cent of the planet's entire forested area (Duflour, 2002). It is one of the leading suppliers of wood and paper products globally. The contribution of forest products exceeds its contribution to GDP and plays an important role in the development of many regions and rural areas of Canada. Canada has excess supply of lumber products and its main traditional market is United States (US). The demand for softwood lumber in US represents nearly half of the world's consumption (Song et al., 2011). Softwood is the major building material in US where housing industry accounts for 7 per cent of its national income (Song et al., 2011). Canada has been the principal source of softwood lumber in the US market, providing more than 90 per cent of the US total imports and more than 30 per cent of US consumption.

Statistics Canada estimates that there exists nearly 1,000 sawmills that employed more than 80,000 workers in 2001, the majority of them were in British Columbia, Quebec and Ontario. British Columbia had nearly 43 per cent of the workforce in the lumber industry in Canada (Duflour, 2002). Canada exported in 2001 nearly \$ 11 billion of lumber of which 53 per cent came from British Columbia (Duflour, 2002). The lush softwood forests of British Columbia have been called the 'green gold'. B.C. is the most diverse province both biologically and ecologically in Canada. Its forests cover is over 60 million hectares (149 million acres), with 40 different tree species and has a wide range of commercially available softwoods and hardwoods (FII, 2013).

Evergreen coniferous (softwood) forests dominate B.C.'s vegetation cover. Coniferous tree species harvested in B.C. include; Lodgepole Pine (*Pinus contorta*), Ponderosa Pine (*Pinus ponderosa*), White Spruce (*Picea glauca*), Subalpine fir (*Abies lasiocarpa*), Douglas-fir (*P. Menziesii*), Western Red Cedar (*Thuja plicata*) and Hemlock (*Tsuga heterophylla*) (BC Ministry of Forests, 1991). Lodgepole pine is the most plentiful tree species in British Columbia. Lodgepole pine, interior spruce, and subalpine fir are marketed together as a single species group (spruce-pine-fir or SPF). Of B.C.'s total land base, 94 per cent is publically owned. Management of the forest resources lies primarily with the government which allocates the right to harvest crown land through forest tenures with an annual allowable cut (AAC). The province receives stumpage fees from harvested timber which is allocated to, and relied on by, systems such as health care, education, and transportation.

Forest resources including harvesting, are governed through the Forest and Range Practices Act (FRPA), the Forest Act and the Foresters Act to ensure sound forest stewardship and that this crown resource is managed in an ethical and sustainable manner. British Columbians and Canadians are involved in decisions related to how the forests are managed. Governments at all levels respond with policy development that is open and transparent, based on community involvement and backed by comprehensive legislation (FII, 2013). Private forest

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land accounts for 5.4% of the land base and is regulated by over 30 Acts and regulations including the Water Act, Wildlife Act, Drinking Water Protection Act and Fisheries Act, that apply to the 3 million hectares of B.C.'s forests (5.4%) privately owned by over 20,000 private forest owners (FII, 2013).

Softwood lumber is used extensively in Canada and North America as it is the primary material for home construction and also used in commercial buildings, public and recreational facilities, and industrial buildings. The United States (US) has historically been Canada's and B.C.'s largest export market for softwood lumber accounting for over half of softwood lumber exports. With such a large market share, B.C.'s forest sector is 'coupled' with US import demand and housing market. The United States and Canada has fought many softwood lumber 'trade wars' for more than two decades; the trade dispute started in 1982 when the Canadian share of US softwood lumber consumption increased from 20 per cent in the middle of 1970s to 27 per cent in 1982. The dispute when through, found rounds between 1982 and 2001 (Zhang, 2001, 2006; Baek, 2006, 2012). The fifth round of dispute started around March 2001 when the 1996 US-Canada Softwood Lumber Agreement expired. The US lumber industry argues that the Canadian producers have expanded their market share with subsidized, low stumpage rates¹ and thus trade restrictions are the only way to maintain a 'level playing field'. In recent years the US financial crisis and the collapse of the housing market in 2008 in US considerably depressed Canadian lumber imports. Housing starts fell from a historic high of over 1.5 million to 0.55 million in 2009. Nearly 10.7 million

¹ Stumpage rates refers to the fees paid by forest product companies to the provinces for the rights to cut trees on Crown land.

mortgage borrowers in US were 'under water' (negative equity) in 2009². Given these challenges and its consequent impacts on Canadian economy and employment situation, efforts were made to 'de-couple' the lumber industry from the US and diversify into faster growing markets like China and India. China's flourishing economy, tied with policy constraints limiting domestic forest production, has resulted in a large demand for lumber imports over the last several years. Today, China is the largest importer of lumber in the world, surpassing the U.S. in 2010 (COFI, 2013). Over the last number of years China has emerged as a significant market for B.C. softwood lumber accounting for close to 1 billion fbm (board feet) of exports in 2011 and 2012.

India has played a relatively insignificant role in B.C. softwood lumber exports so far and represents a significant challenge to its diversification efforts due to the following reasons. India's appetite for softwood is less as traditionally they have used hardwood for construction and furniture manufacturing. Secondly, Canada does not enjoy the 'first-mover advantage' as countries such as Australia, New Zealand, Malaysia etc. are existing players in the market which has covered supply-demand gaps in the Indian market. Thirdly, the transportation cost of lumber from Canada is relatively more than other countries in Asia-Pacific. But the Indian market promises enormous potential given the fact that India's population is set to eclipse China by 2050 with an annual growth in the 6-9% range over the past decade (FII, 2012). With this, a significant increase in middle class that will expand from 50 million to 583 million people by 2025,

² See US Congress (2011) Economic Report of the President, Chapter 4, p.106.

consumer market forecasts are estimated to become the 5th largest in the world (FII, 2012). Over the same period, business opportunities are emerging across a variety of sectors throughout India providing opportunity for softwood SPF lumber (FII, 2012). The main aim of the present study is to examine how to enhance softwood exports to India and maintain its competitive advantage in this lucrative market. Michael Porter's diamond model provides the analytical framework to examine the determinants of competitiveness position of Lumber industry in India (Porter, 1990). Beginning with Porter's four determinants (factor conditions, demand conditions, related and supporting industries, firm strategy, structure and rivalry), the present study examines the prospective competitive advantages, directions and solutions for the industry in enhancing the market share in Indian lumber market.

This study is organized as follows: chapter II reviews the existing literature on the subject; chapter III discusses the data base and methodology. Chapter IV presents the empirical analysis based on Porter's diamond model and Chapter V presents the conclusions.

Chapter 2

REVIEW OF LITERATURE

In this chapter, we briefly review the existing literature on Softwood Lumber industry in Canada. The existing literature on the Lumber industry can be broadly divided into three segments (a) Determinants of demand for Lumber and (b) Effects of US-Canada Lumber disputes and (c) issues of market diversification (to non-US markets).

2.1 Determinants of Demand for Softwood Lumber from Canada.

Softwood lumber is the major building material in US where housing industry accounts for 7 per cent of country's GDP in 2009 (Song et al., 2011). In US the demand for softwood lumber exceeds its domestic supply and the US demand is approximately around 60 billion board feet in 2000 (Song et al., 2011). For decades, Canada has been the dominant exporter of softwood lumber to US accounting for 90 per cent of US total exports (Yin et al., 2004). In 2001, Canada exported softwood lumber and wood products to the United States worth C\$10 billion (\$6.5 billion). Many researchers have examined the proximate determinants of US demand for softwood lumber from Canada (Buongiorno et al., 1979, 1988; Chen et al., 1988; Jenning et al., 1991; Wear and Lee, 1993; Myneni et al., 1994; Sarkar, 1996; Zhang, 2001, 2006; Baek and Yin, 2006; Bolkesjo and Buongiorno, 2006, Baek, 2007, 2012).

Buongiorno et al., (1988) found US price of softwood lumber is the most important factor influencing Canadian lumber imports. Sarkar (1996) also found that US lumber price to be the major determinant plus additional variables like US disposable income and US housing starts to be the major determinants of US demand for Canadian lumber. Both Buongiorno et al., (1988) and Sarkar (1996) found that exchange rate to have negligible impact on US demand for Canadian Lumber. Baek (2012) found the US price elasticity to be around 0.35 which implies that an increase in US lumber price by 1% increases Canadian demand for lumber by 0.35%. Similarly, Baek (2012) also found that housing starts elasticity to be around 0.50 which implies that a 1% increase in housing starts increases demand for Canadian lumber by 0.50%. Table 1 summarizes the major findings of research on determinants of Demand for Canadian softwood lumber from US.

	Author	Period	Major Determinants
		of Study	
1	Buongiorno et al., 1979, 1988	1965-1978	Housing starts, Price
2	Buongiorno et al., 1988	1974-1986	Exchange rate, Price
3	Chen et al., 1988	1965-1985	Price, Consumption
4.	Baek (2012)	1994- 2009	Price of US softwood lumber, Housing Starts, Exchange rates
5.	Song et al., 2011	1990-2006	Price of US softwood lumber

Table 1.	Summary	of Research	on D	Determinants	of Demand	for s	Softwood
Lumber f	from Cana	da.					

2.2 US-Canada Lumber Dispute and its Impact on Lumber Industry in Canada.

Bilateral trade in softwood lumber is the subject of long standing dispute between Canada and US (Reed, 2001; Van Kooten, 2002; Zhang, 2007; Malhotra and Gulati, 2010). Since 1982 US has claimed and continues to claim that fees charged for harvesting softwood on public lands (stumpage prices) by Canadian provincial governments are artificially low and this amounts to subsidizing the Canadian softwood lumber producers. The Canadian softwood lumber industry and government have defended their stumpage pricing system and log export control claiming that increased lumber exports to the US are due to their competitive advantages resulting from production efficiency, US consumer preference and favourable exchange rate (Uhler, 1991; Sarkar, 1996). US argues that trade restrictions on Canadian lumber imports are thus the only way to maintain a 'level playing field' unless Canada changes it stumpage prices and relaxes its log export control (Ragosta and Clark, 2000). Periodically, these arguments have led to trade actions in the form of restrictions (quotas) and levies on Canadian lumber imports to US which had a devastating impact on not only lumber producers from Canada but also on rural communities. In May 2002, US imposed countervailing duties averaging 27% on Canadian imports. The duties hit Canada hard and especially British Columbia, which accounts for about half of the exports. Mills were closed, thousands of workers were laid off and profits have crashed.

Periodically, Canada and US entered into softwood lumber agreements to minimize the impact of trade disputes on their national economies. Table 2 summarizes the history of the Softwood Lumber Agreement between Canada and the US.

Countervailing duty investigations	Outcome
Softwood Lumber I: 1982	U.S. authorities decided no subsidy.
Softwood Lumber II: 1986	15% Provisional duty replaced by 15% export tax in MOU after Canada unilaterally terminates MOU.
Softwood Lumber III: 1991	Countervailing case filed: Interim bonding requirement.
	Canada wins appeal against countervailing duty in CUSTA (1993 and 1994).
	United States revokes duties against Canadian lumber (August 1994).
	Bilateral consultation process for softwood established.
Threat of a Countervailing Duty Investigation: 1996	Softwood Lumber Agreement is signed: The first 650 million board feet over 14.7 BBF was subject to a tax of \$50 per thousand board feet, and any further exports were subject to a tax of \$100 per thousand board feet.

Table 2. History of Softwood Lumber Agreement between Canada and US

Source : Malhotra and Gulati (2010), p. 278.

The National Association of Home Builders in US (2000³) estimates that the Softwood Lumber Agreement (SLA) raises the cost of lumber on an average

³ This estimate was made on April 13, 2000 for a submission to the Trade Policy Staff committee of the Office of United States Trade Representative titled "Regarding Softwood Lumber Practices in Canada and Softwood Lumber Trade between United States and Canada". See Malhota and Gulati (2010) for further discussion.

new home in US by \$800-\$1,300. It also estimates that for every \$50 increase in the price of 1,000 board feet of framing lumber, 300,000 potential home owners are priced out of the housing market.

In recent times, the slump in US housing market due to financial crisis in 2008 has further impacted adversely the demand for Canadian softwood lumber. Given this scenario, efforts were made by Canadian government to "decouple" from United States and diversify their softwood lumber market towards fast growing Asian market especially China, Japan and India. In 2010, British Columbia's softwood lumber exports to China totaled C\$687m (\$667m), a tenfold increase from 2003. The total sales to Japan and China exceeded those to the United States. Whereas five years ago more than two-thirds of shipments went across the border to US, now barely more than one-third goes to the US. The industry forecasts that by 2013, China will be its biggest market. That is the payoff for a marketing effort involving the industry and government: Canada has helped to revise China's building codes, set up colleges there to train workers in timber-frame construction, and forged ties with distributors.

Although, the access to the Chinese market has succeeded, but penetrating the Indian market has been a major challenge due to the following reasons: Firstly, the Indian import of timber has been hardwood (which is used for construction and furniture) and the demand has traditionally been met domestically by illegal domestic logging and imports from Malaysia, New Zealand and Australia. Secondly, the Indian market is more decentralized and there are few big importers of softwood lumber. There are some efforts made by industry organizations to improve market access to India which is discussed in the following paragraphs.

In addition to providing stable access to the U.S. market, the Government of Canada has actively expanded other market opportunities for Canadian wood products through funding provided to open new market opportunities in India as well as other overseas markets (Foreign Affairs and International trade Canada, 2013).

Until recently, India did not allow the importation of B.C. interior SPF lumber into their country without it requiring fumigation as they were worried about a pest called the pinewood nematode. As result of interactions by Canadian industry organizations (CFIA, Department of International Trade, and Canada Wood) India amended their plant health regulations in 2011 to allow SPF lumber into India providing it was heat-treated which pasteurizes the wood and kills any presence of pests. Since then India softwood imports have grown more than 500% (COFI, 2011).

The Council of Forest Industries (COFI) and industry members representing the BC Interior/Alberta, Eastern Canadian hardwood and BC Coast lumber; plywood/OSB; and the BC wholesale sectors travelled to New Delhi to participate in a program of merchant and site visits and attend the DelhiWood show. This exposed Canadian mill sales reps that had previously done business with India from a distance to meet major customers face-to-face for the first time. This event fielded enquiries from a wide array of merchants and users at the DelhiWood show. Indian traders were receptive to commercial relationships and Canada established its credentials as new supplier going forward (COFI, 2013).

Chapter 3

RESEARCH METHODOLOGY

In this chapter, we discuss the analytical framework for assessing the Canadian softwood lumber industry's competitiveness in the Indian market and ways to improve the market access vis-a-vis its competitors. This study employs Porter's (1990) diamond model and also the generalized double diamond model developed by Rugman et al., (1993) as the analytical framework for assessing the competitive dynamics of Softwood Lumber industry's thrust for market development outside North-America.

Michael Porter introduced economic theory into the discipline of strategic management. Applying the structure-conduct-performance (SCP) framework, he built a foundation for research on competitive dynamics. To Porter, a firm's performance is a function of the industry environment in which it competes. The diamond model is an economic model developed by Michael Porter in his book "The Competitive Advantage of Nations (CAN) which explains why some nations gain competitive advantages in international markets. He argues that the shape of the "diamond" depends on four influences – 1. factor conditions, 2. demand conditions, 3. related and supporting industries, and 4. firm strategy, structure and rivalry. Porter also suggests that there are four stages of competitive development which characterize a nation's source of advantage in international competition: the

factor driven, investment driven, innovation driven and wealth driven. Porter prescribes an appropriate role that governments should play in each of them. We discuss in the following paragraphs, the single diamond model and its extension double diamond model.

3.1 Single-diamond framework

Porter (1990) conducted a four-year study of ten important trading nations⁴ and suggested the "diamond model". Porter concluded that a nation succeeds in a particular industry if it possesses a competitive advantage relative to the best worldwide competitors. Porter's diamond model consists of four determinants: 1. factor conditions, 2. demand conditions, 3. related and supporting industries, and 4. firm strategy, structure and rivalry (see Figure 1).





Source: Porter, 1998, p.127.

⁴ Denmark, Germany, Italy, Japan, Korea, Singapore, Sweden, Switzerland, the United Kingdom and the United States.

Factor conditions

According to Porter (1990), factor conditions refer to the factors of production that are required to compete in a given industry. According to factor endowment theory of international trade, a nation will export goods that utilize abundant factor conditions for which it is well endowed (Rugman et al., 2012). Porter grouped these factors into broad categories and these are summarized in Table 3:

Factor Conditions	Description		
Human Resources	Quality, cost and skill of personnel.		
Physical Resources	The abundance, quality, accessibility and cost of physical resources (i.e. land, timber, water, mineral deposits, hydroelectric power sources).		
Knowledge Resources	Scientific, technical and market knowledge that affect the quantity and quality of goods and services.		
Capital resources	The amount, cost and capital resources that are available to finance industry.		
Infrastructure	The type, quality and user cost of infrastructure (communication systems, transportation systems, health care systems and other factors that directly affect the quality of life in the country).		

Table 3. Factor Conditions of Porter's (1990) Diamond Model

These are further broken down into basic factors versus advanced factors and generalized factors versus specialized factors. He explains that basic factors are passively inherited, such as climate, unskilled and semi-skilled labour, whereas advanced factors are conditions a county creates such as highly educated personnel. Further, advanced or specialized factors, as opposed to basic factors, are required for more sophisticated competitive advantages and that they can be created through factor-creating mechanisms such as public or private educational institutions.

Demand conditions

A nation gains competitive advantage in industries where home demand is strong. Porter (1990) explains that this gives companies a view of emerging buyer needs, forces companies to innovate faster and achieve more sophisticated competitive advantages than their foreign rivals as a result of pressures from demanding domestic buyers.

Demand conditions include: the composition of demand in the home market as defined by buyer sophistication, existing market niches and increased level of needs in the home market compared to buyers in other markets. The size and growth rate of the home demand; and the ways in which domestic demand is internationalized and pulls a nation's products and services abroad (Rugman et al., 1991,1993).

Related and supporting industries

Porter (1990) asserted that related and supporting industries include the presence of internationally competitive suppliers and that through early or efficient access to cost-effective inputs create advantages in downstream industries. More significantly (as Porter, 1990 explains), home-based related and supporting industries provide innovation and upgrading – an advantage based on close working relationships. Short lines of communication, ongoing exchange of ideas and innovation, as well as, quick and constant flow of information can be exploited by suppliers and end users located in close proximity to each other (clusters). These factors can enhance a firm's competitiveness (Porter, 1990).

Firm strategy, structure, and rivalry

Firm strategy, structure and rivalry is the final determinant and refers to the national circumstances and context which mold how companies are created, organized and managed, as well as what the nature of domestic rivalry will be (Porter, 1990). This includes the goals companies seek, the motivations of their employees and managers and the persistence of competitive advantage in the respective industry (Rugman et al., 1991,1993). For example, the goals or strategies of individual countries can differ significantly based on the characteristics of national capital markets and the compensation practices of managers (Porter, 1990). Managerial systems, or structure, also differ between nations and are driven by management practices and organizational structure favored in each country. Finally, local rivalry is a strong and powerful stimulus in the creation of competitive advantage by pushing companies to be more efficient and innovative in order to out-compete their competitors (Porter, 1990). Apart from the four determinants of national advantage, two external variables play important roles and can have dramatic influences on the competitiveness of a country, province and on industry. These determinants are:

The role of Government:

Government can influence all four of the country specific determinants through many actions such as subsidies, education policies, regulation/deregulation of capital markets, establishment of local product standards and regulations, purchase of goods and services, tax laws, antitrust laws.

The role of chance:

Chance events can nullify the advantages of some competitors and bring about a shift in overall competitive position because of developments such as:

- new inventions;
- political decisions by foreign governments;
- wars;
- significant shifts in world financial markets or exchange rates;
- discontinuities in input costs such as oil shocks;
- surges in world or regional demand;
- major technological breakthroughs.

Porter's diamond model was chosen for this study as this model integrates the important variables determining a nation's competitiveness into a single analytical framework. Most other models designed for this purpose represent subsets of Porter's comprehensive model excluding important conditions that need to be considered when identifying competitiveness (Moon et al., 1998).

However, there are limitations to this model. Substantial ambiguity remains regarding the signs of relationships and the predictive power of the 'model' (Grant, 1991). This is mainly because Porter fails to incorporate the effect of multinational activities in his model. To solve this problem, Dunning (1992), for example, treats multinational activities as a third exogenous variable which should be added to Porter's model. In today's global business, however, multinational activities represent much more than just an exogenous variable. Therefore, Porter's original diamond model has been extended to the generalized double diamond model (Moon et al., 1998) whereby multinational activity is formally incorporated into the model.

3.2 Double Diamond Framework

A major limitation of the single diamond model is that it cannot fully explain the international success of multinationals relative to industry rivals. The double diamond model, developed by Alan Rugman et al., (1993) seeks to fill this gap. Rugman firmly believes that international trade is driven by the intraregional trade and investment of MNEs' (trade *within* their region). Rugman (1993) argued that firms within countries could also access regional advantages. In this way the domestic diamond (CSAs included in the single diamond model) were added to region specific advantages (RSAs). The inner diamond represents the domestic diamond; the outside one the global diamond (Figure 2). The size of the global diamond is relatively fixed within a certain period, but the size of the domestic diamond of a country or industry differs from those of other countries in size and competitiveness.





Source: Moon et al. (1998, p. 138). Modified by the author

In the next chapter, we use the above mentioned single diamond and double diamond framework to analyze the competitiveness of Softwood Lumber industry in Canada in their thrust for global diversification of markets and its potential to succeed in Indian market.

Chapter 4

SOFTWOOD LUMBER EXPORTS TO INDIA – EMPIRICAL ANALYSIS

In this chapter, we examine the competitiveness of Softwood Lumber industry in Canada in the Indian market. As discussed in Chapter 3, we adopt the "diamond" model (Porter, 1990), and "Double diamond" model (Rugman et al, 1991, 1993) to analyze the international competitiveness of Canadian softwood lumber industry in developing markets such as India. The logic of adopting the double diamond framework is that Canada, with an excess supply of softwood lumber, represents a small economy (in terms of population and internal demand for lumber) and India represents one of the fastest growing economies of the world and a potential large trading partner of Canada in the future. Therefore, one should take into consideration not only home (Canada) country factors but also host (India) country factors in the analytical and empirical framework. In the following paragraphs, we are discussing each building block of Canada and India in terms of the single diamond (Porter, 1990) and double diamond model (Rugman et al., 1991, 1993).

Factor Conditions:

In terms of factor endowments, Canada is endowed with a large supply of timber for the production of SPF lumber and has comparative advantage over India in producing it. India, on the other hand has limited timber supply due to over harvesting in the past that resulted in a ban on the harvest of teak in 1995 by its apex court (SAI, 2012). At the same time, the economic reform has accelerated the pace of development and India has become one of the fastest growing economies of the world, under the BRICS umbrella. The accelerated pace of development has accelerated demand for pulp, paper and wood products in India. Many of the quantitative restrictions on imports of wood were removed in April 2001. The import tariff on wood products is minimal (around 10 percent) (FII, 2012).

Given the factor conditions such as Canada's excess supply situation and Canada's trade conflicts with the US (with regards to lumber), India represent the national counterpart for Canada's excess supply.

The lumber supply – demand imbalance in Canada and in India are reflected in the lumber prices in both countries (Figure 3).



Figure 3. Lumber Prices - Canadian Softwood vs. Myanmar Teak

Sources: NAHB, 2013 & ITTO, 2011

The relatively higher price for teak in India, a proxy for softwood lumber, indicates a shortage of supply and a high demand in the country, which is in fact the case as indicated by a 17 million m3 deficit of wood in 2010 (FII, 2012).

The Gravity model of international trade, predicts bilateral trade flows based on the economic sizes of (using GDP measurement) and distance between two countries. The Canadian and Indian national income is more or less similar (around \$1.8 trillion in 2011) but the distance between Canada and India is substantial. This is so when compared to the existing competitors in the Indian market like Malaysia, New Zealand, Australia etc. This increased distance results in higher costs of shipping products to India (vis a vis its competitors).

The decline in shipping costs worldwide is reflected in the Baltic Exchange Dry Index (BDI). This provides some opportunity for Canadian lumber producers to minimize the time to market and shipping costs to India (figure 4).

Figure 4. Baltic Dry Index: Worldwide Shipping Costs



Demand Conditions

Demand conditions are the nature of home-market demand for the industry's product or service, as described by Porter (1990). He acknowledges that nations gain competitive advantage in industries where the home demand gives their companies a clearer or earlier picture of emerging buyer needs, and where demanding buyers push companies to innovate faster and achieve more sophisticated competitive advantages than their foreign rivals. If domestic buyers are the most demanding and sophisticated buyers, they can provide insight into advanced customer needs and push companies to innovate, upgrade and improve.

In British Columbia, and Canada for that matter, home demand for lumber has put pressure on manufacturing companies to innovate and achieve greater competitive advantages. Consumers, specifically builders/carpenters in B.C. and in Canada as a whole are very sophisticated with lumber and are highly demanding. As a result of building codes, particular grades of lumber are required for specific building applications. The National Lumber Grades Authority (NLGA) is responsible for the establishment, issuance, publication, amendment and interpretation of Canadian lumber grading rules and standards (NLGA, 2013). If a specific grade of lumber is purchased by Builders/carpenters, and the quality expectation of that grade is sub standard, or a significant amount is at the at the low end quality of the grade, builders/carpenters will express concern or shift purchases to another retailer. This has driven retail stores to push back on lumber manufacturing companies to improve the quality of the grade or length if not consistent. Certain retail stores demand more as well. Some have demanded

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special customer specific requirements such as bar coding on each piece of lumber for their own in house efficiencies forcing companies to innovate and adapt. All of these factors push lumber manufacturing companies to continually improve and modify their products, business process and efficiencies inevitably making them more competitive in their home market and internationally proving to be a competitive advantage.

Home demand for B.C. softwood lumber could also be looked at as both Canadian and US consumers as a "North American" home demand, or "internationalized" home demand. Canada and the US are two countries integrated for strategy purposes into a single market forming a Canadian-US "double diamond" (Rugman et al., 2012). Under this double diamond, Canadian business's are in direct competition with firms operating in a diamond of their own in the US. From the influence of this combined lumber demand from both countries, B.C. lumber companies have needed to find ways to produce more lumber while reducing costs to stay competitive.

With an excess timber supply situation, opportunities to increase domestic demand within Canada can be achieved if wood-based construction can be promoted in an increasing manner. The proposed Wood Innovation Centre (WIC) in Prince George is the first step in promoting wood-based construction industry in Canada and abroad.

With the US, accounting for a large market share, the seasonal nature of home building plays an important role in the B.C. lumber market, with lumber prices rising with US housing starts and falling in low building seasons. B.C. has been vulnerable to the US housing market as seen in the recent US financial crisis and the collapse of the housing market in 2008. Housing starts fell from a historic high of over 1.5 million to 0.55 million in 2009 (US Census Bureau, 2012). In an attempt to avoid this risk, the lumber industry and B.C. government have been seeking overseas foreign markets to diversify and reduce market risk.

In times of low lumber demand, B.C. lumber companies are in fierce competition to survive by cutting costs and becoming as efficient as possible. This in turn drives companies to become lean by eliminating inefficiencies, identifying opportunities, upgrading, innovating in new processes and systems and technology. Through the history of B.C. lumber market highs and lows, this need for innovation has fuelled the need for schools to conduct research and education programs to provide specialized and sophisticated knowledge resources to remain competitive.

Technological innovation in forestry is being spearheaded by researchers at British Columbia's Centre's of Excellence, which bring together experts from the public, private and academic sectors to collaborate on applied research, development and commercialization of new technologies. British Columbia enjoys an extensive and globally recognized forest product research network that supports the industry through research and development and innovation (British Columbia, 2012).

Therefore, a new competitive advantage for the B.C. softwood lumber industry is its' *public education system* providing a means for innovation and

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specialized education programs tailored to forestry, lumber/product manufacturing and forest by-product utilization.

Porter (1990) also explains that home-demand conditions help build competitive advantage when a particular industry segment is more visible in the domestic market than the foreign markets.

Wood consumption in India is dominated by hardwoods representing 70% of the total value of log and sawn wood imports. Indian consumers show strong preference for dark-colored wood like teak (Rattan, 1999) representing a differences in "taste" between Canada and India. India has traditionally preferred hardwoods including Teak, Meranti, and Kapur which are the most popular species dominating the market due to the perception of durability and their resistance to 'termites' which are an issue in many parts of the country. However, due to rising teak prices and import restrictions, a market for other species including softwoods is beginning to open up (FII, 2012). Canadian species such as Douglas fir, Western Red Cedar and Hemlock are darker softwoods with attributes closer to teak and other Indian hardwoods and could satisfy India's market demand as substitutes because of their versatility and wide range of applications including woodwork/joinery, interior paneling, flooring and specialty products (Sas-Zmudzinski, 2012).

Related and supporting industries

Porter (1990) asserted that related and supporting industries include the presence of internationally competitive suppliers and that through early or efficient access to cost-effective inputs create advantages in downstream industries. More significantly, home-based related and supporting industries provide advantages in innovation and upgrading based on close working relationships. Porter states that suppliers and end users if located near each other can take advantage of short lines of communication, quick and constant flow of information, and an ongoing exchange of ideas and innovations. The nations companies benefit most when the suppliers are global competitors themselves.

This holds true as a competitive advantage for the B.C. softwood lumber industry. In the lumber manufacturing industry, upstream suppliers of manufacturing equipment, which process logs into finished lumber, are primarily located in Canada with offices in B.C. to serve the large market. These suppliers and end users have short lines off communications where suppliers provide, and are necessarily relied on for, support of their mechanical, electrical and software products. In almost all cases, suppliers have remote access to machine computers to troubleshoot issues or provide solutions to any lumber company's issues during production to minimize machine downtime. To a greater extent, lumber companies frequently request new upgrades to software or in machine design from the suppliers to improve either accuracy, productivity, improve analysis and reporting functions, simulation capabilities or laser and scanning capabilities. Companies have enormous demands on their suppliers and will let them know very quickly if supplier products are flawed or do not serve the end user with what they require. All of these factors have driven these suppliers to continually innovate, upgrade and improve their products to their customers' needs, increasing productivity, lumber recovery and grade recovery increasing the competitiveness of lumber companies as well as the suppliers.

The relationships are intimate as there is a dependence on the knowledge of supplier and education to the end user. Suppliers in the home country regularly visit the manufacturing facilities in B.C. to inspect, and service their products and support the mills through their services and training. These suppliers are global competitors serving companies in their home market and other foreign markets.

Technology can then be seen as a new competitive advantage driven by the forces of supporting and related industry. Due to the close connection and clusters in the B.C. lumber industry and the demands from lumber producers on suppliers to continually improve and innovate, the B.C. and Canadian lumber industry is technologically advanced compared to many countries including India.

Firm strategy, structure and rivalry

Firm strategy, structure and rivalry is a crucial determinant and refers to the national circumstances and context which mold how companies are created, organized and managed, as well as what the nature of domestic rivalry will be (Porter, 1990). This includes the goals companies seek, the motivations of their employees and managers and the persistence of competitive advantage in the respective industry (Rugman et al., 1991,1993). The existence of intense domestic rivalry is of special importance as it encourages firms in the industry to break their dependence on home factor advantages.

British Columbia's forestry companies are highly automated with large volumes of output of higher value stands, resulting in lower cost of production and increased cost-competitiveness. British Columbia's forestry and wood products sector includes large companies and highly-trained workers with wellrespected reputations, producing a wide variety of products for structural and finishing needs (British Columbia, 2012). Management strategy is based on reducing costs and maximizing production through economies of scale to be competitive.

Domestic rivalry is, arguably, the most important because of its powerful effect on all other determinants (Porter, 1990). Lumber manufacturing is geographically concentrated in B.C. due to its vast timber resource. Over a period of time, there has been consolidation of firms in the lumber industry and now there exist a few highly competitive firms (like Canfor, West Fraser Timber etc.) The oligopolistic character of the industry has promoted intense competition that has resulted in a highly efficient supply chain which can withstand global competition.

Economies of scale gained primarily from the Canadian – US double diamond resulting from NAFTA has been a competitive advantage for the lumber industry in B.C. The combined home demand and US demand has created conditions for attaining economies of scale needed to make B.C. companies cost competitors in lumber manufacturing. This has helped lumber manufacturers to be competitive in overseas markets as well, notably Japan and more significantly China, providing needed diversification and reduction of market risk from the US economy.

Thus, market diversification can be seen as a competitive advantage for the B.C.'s softwood lumber industry. As seen from the US housing crisis in 2008/2009, the US accounted for over 50% of B.C. softwood lumber exports (BCStats, 2013). This dependence on the US (for Canadian lumber) demand had detrimental effects on the industry. The demand for housing in the US plummeted, driving lumber prices down forcing numerous higher cost mills to shut down while others had to reduce shifts to hold back production to meet lower demand. Although many companies were looking to alternate foreign markets, companies

who had successfully diversified prior to the downturn had a competitive advantage over others.

In order to diversify into new markets, lumber companies need to be nimble- able to respond rapidly to changing environment- domestic and abroad. Therefore "nimbleness" becomes a means of achieving competitive advantage. Nimbleness in the BC lumber industry means that companies/mills are able to react to customer requirements/requests to gain market share (Byoungho, J. et al., 2006). They have the capability, or will seek to acquire the capability, to produce what the customer wants or requires. This may include creating new lumber grades or dimensions of lumber leading to new packaging and/or branding. This could also relate to quality or logistics requirements as opposed to product changes. Not all companies have nimbleness and are willing to accommodate and make significant changes to gain market share, it may not be part of their strategy. But those who see the advantage and are nimble can exploit this advantage to gain market share and economies of scale.

According to Porter (1990), the four corners of the diamond – factor conditions, aggregate demand, related and supporting industries and amount of rivalry – is also exogenously influenced by government policy and the role of chance. The four corners of the diamond plus the two exogenous influences (government and the role of chance) represent an interactive system that affects firms in the home economy.

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Chance Events:

The most important "chance" event for the Canadian lumber industry is the earthquake in Japan in 1995 and 2011. In both these catastrophic events, twoby-four construction using wood was able to withstand the earthquakes better than other modes of construction. The superior seismic performance of wood created considerable demand for softwood lumber not only in Japan but also Asia (especially China).

The Role of Government:

Porter (1990), states that government plays an important role in shaping the context and institutional structure surrounding companies by creating an environment that stimulates companies to gain competitive advantage. He explains that government is a catalyst and a challenger, encouraging or even pushing companies to move to higher levels of competitive performance, but recognizes that government cannot create competitive industries, only companies can do that. Government policies that succeed are those that create an environment in which companies can gain competitive advantage rather than those that involve government directly in the process, except in nations in the early development process (Porter, 1990). In the case of the lumber industry, the government in Canada has played a 'catalyst' role in creating fresh demand for lumber products. The role played by government along with industry associations in developing building codes, especially in China, and setting up colleges to train workers in timber-frame construction has played an important role in furthering the industry's interest.

In the Indian context, the government of Canada has played an important role in reducing tariff and non-tariff barriers to trade with India. A free trade agreement with India is under negotiations. Over the last 5 years, Canada has concluded new trade agreements with 8 countries and 50 more are under way.

The "Double Diamond" Model of International Competitiveness

The single diamond model of Porter (1990) has been criticized by several scholars (Rugman et al., 1993). They argue that the double diamond and/or multiple linked diamonds may reflect the source of competitive advantage better than porter's single diamond framework.

The double diamond model shows that two countries are integrated into a single market for strategy purposes (Rugman et al., 2012). As per Rugman et al., 1993 explanation, B.C. softwood lumber companies are now in direct competition with firms operating in a diamond of their own in India. To be successful in competing with India's wood market and their fragmented industry, B.C. businesses have to develop competitive capabilities of a higher order. We can no longer rely entirely on our home diamond and natural resources base. Innovation

and cost competitiveness are just as important and require strategies that are designed to access the India diamond. Now, B.C. lumber managers need a "double diamond perspective" for strategic decisions to provide further direction and solutions for the industry with the identified new competitive factors from the single diamond.

One of the barriers for B.C. softwood lumber going to India is Indian government policy that protects small businesses and supports the fragmented wood manufacturing industry of sawmills through the structure of import tariffs which are conducive to domestic manufacturing (SAI, 2012). India's Import tariffs for sawn wood are currently set at 14.71% making it more difficult to be competitive in the Indian wood market and against New Zealand's radiata pine.

Thus, a *new competitive advantage* would be the implementation of a Canadian – India free-trade agreement. This would open the market for Canada and the B.C. lumber industry by removing tariffs and opening the door to building economies of scale. In addition to the removal of tariffs and the advantage for Canadian softwood lumber, a free-trade agreement will also encourage both countries to produce other goods and services for which they have a competitive advantage and to buy the other goods and services from the other. As well, as the economies grow, so will the amount of trade as each adapt operations to the desires of the other and starts to tap their markets further. As seen with Mexico and the North American Free Trade Agreement (Rugman et al., 2012), India can create a market for Canadian goods in that, as the middle and upper classes in the

country increase their purchasing power, they can turn more and more to the purchase of Canadian goods.

A free trade agreement would need to be initiated by the Canadian government and Indian governments highlighting the crucial role that governments play, and influence they have, in creating competitiveness for home industries at an international scale. All of the above factors show advantages to both countries businesses and economies and should be considered by both governments for the promotion of a Canada-India free trade agreement.

With consideration to the new identified competitive advantage of free trade between Canada and India, the role of the Canadian government would be to create an environment which stimulates competitive advantage for Canadian companies through reduced tariffs and B.C.'s lumber industry through price competitiveness and exposure to economies of scale. Further advantages to free trade will prove beneficial for growth of both countries. Although free trade is not the "silver bullet" in gaining market share in India, as there are many other noted challenges, government plays a role that succeeds only when working in tandem with favorable, underlying conditions in the diamond. Therefore, a free trade agreement would be an important step, coupled with other diamond advantages and conditions, leading to B.C's success in India's wood market.

With the turmoil, duration and negative impact on the lumber industry in B.C. and in Canada, the experiences from the Canadian – US softwood lumber dispute should not be forgotten. If a Canada – India free trade agreement is

successful, a suitable measure would be to apply the lessons learned from Canada and the US and negotiate and implement a Canada – India softwood lumber agreement. With an agreement upfront, both countries can avoid the negative impacts previously experienced, maintain and strengthen business relations and focus efforts on competitiveness at an international scale.

Demand conditions

In India, consumers are not very familiar with softwood SPF lumber and have an absence of prior experience and reference. Therefore they are unknowledgeable of the advantages, characteristics, strength or possible applications for it. The India lumber industry is not self-regulated like it is in North America: there are no standardized grading agencies. Indian wood importers rely heavily on the exporter to suggest wood species and types depending on the end use. Therefore, educating Indian importers, traders and end users of SPF softwood lumber can be a competitive advantage. Education on grading standards and wood product attributes as well as the benefits and higher qualities compared to alternate foreign softwoods, and showing them how and where it can be used will build acceptance and use of the product. This is an important step in entering the Indian market.

Education and knowledge transfer can be achieved by British Columbia softwood lumber experts setting up demonstration centers to educate India's important players on lumber grade markings and SPF applications. B.C.'s sustainable forestry and certification process should be emphasized. Further, wooden housing demonstration projects would further educate and promote B.C. lumber. Industry education programs and courses could be set up in India to transferring knowledge and expertise about B.C. SPF lumber to distributer's, builders and end users through education programs.

Related and supporting industries

Porter (1990) asserted that related and supporting industries include the presence of internationally competitive suppliers and that through early or efficient access to cost-effective inputs create advantages in downstream industries.

Through technology, a newly identified competitive advantage created by supporting industries (in the diamond) a new competitive advantage in a downstream sector is created. The transportation sector and associated *infrastructure* in B.C. are well developed for the transport of export products via trucking, rail and shipping, to the efficient roadways, railways and ports. B.C.'s transportation is an important advantage to the lumber industry by reducing costs and ensuring timely and reliable transport of lumber to customers, ensuring a functional and reliable supply chain and upholding an important reputation by B.C. exporters to foreign customers.

All three noted means of transport are relied on to move lumber from B.C. mills to reload yards, to ports where lumber is shipped to foreign markets. The infrastructure in B.C. is far advanced in comparison to India (FII, 2012) whose infrastructure is identified as a barrier by adding cost due to inefficiencies and limitation of moving imported goods by truck from ports.

Given India's rapid growth and increased demand for resources to fuel the consumer, manufacturing and construction industries have grown dramatically, and India is importing from international markets to meet many of its needs. With this increase in imports, India's transportation infrastructure has become a bottleneck and a barrier. Inland transportation of goods from the ports is dominated by trucks due to poor rail infrastructure and capacity. As a result, Inland Container Depots (ICDs) or dry ports play a significant role as hubs for the distribution of goods by truck across the country. The ICDs are often severely congested and there can be significant delays and costs associated with shipping product inland (FII, 2012).

With the increased import demand for large commodity items such as lumber, fuels, machinery and equipment and precious metals and gems, India's transportation infrastructure should emulate that of B.C.'s. Similar to India, but from an export perspective, British Columbia relies on efficient rail lines and highways to export similar large commodities (lumber, oil, coal and containers) from remote locations to seaside ports for export. B.C.'s transportation efficiencies could be duplicated in India to remove the transportation infrastructure barrier thus reducing costs. Upgrading and expanding rail, port and highway capacity to handle growing imports would create a competitive advantage for India, as it has with B.C., to move goods from ports to inland efficiently reducing costs for exporting companies as well as end users.

Firm strategy, structure and rivalry

International competitiveness can only improve when leading firm's strategy, structure and rivalries are well suited to "market diversification and "nimbleness". For example, the softwood lumber industry is primarily clustered in B.C. This geographic concentration caters to nimbleness as firms have close ties to suppliers and educated and specialized human resources. These suppliers and specialized resources can efficiently service firms' requests for change if they do not have the ability or expertise to do so in house. This enables companies in this industry to be competitive through the ability to make substantial operational changes to cater to the diversity and dynamics of international markets in an efficient manner.

India's demand for softwood lumber is currently in the remanufacturing industry for interior applications, particularly for interior doors, windows and partition walls and for packaging material used to export goods like machinery and glass (SAI, 2012). Demand for SPF is increasing in response to growing demand for molding, door and window frames and decorative applications. To increase competitiveness in India, B.C. softwood lumber producers can gain competitive advantage through nimbleness by identifying alternate or preferred lumber dimensions, products and applications in the Indian market than making operational changes efficiently to produce a more desired finished product for the Indian market.

Grading standards and dimensions in India do not exist: the end user determines species, dimensions and grade required and Canadian exporters are relied on to suggest the suitable product depending on customer needs. This will pose challenges to mills that are unable to shift production to accommodate custom orders, but for those able to adapt, there are significant opportunities in the Indian market. BC exporters will need to work with importers to understand end uses and educate customers on best fit sizes and grades for different applications (FII, 2012). Having the agility (nimbleness) to make operational changes to provide the market will be instrumental to firm's success in India.

Chapter 5

CONCLUSIONS

The main objective of this study was to examine the determinants of international competitive advantage of Softwood Lumber industry in Canada in securing greater market access in one of the fastest growing economy via., India. Using Michael Porter's diamond framework (factor conditions, demand conditions, related and supporting industries, firm strategy, structure and rivalry), along with factors such as chance and government towards a better understanding of the sources of competitive advantage of the Softwood Lumber industry in the Indian market. We also supplemented the single diamond framework of Porter with double diamond framework of Rugman et al., (1993).

Canada's endowment of timber and excess lumber supply represents a small economy (in terms of international demand). India on the other hand represents a potential large trading partner as one of the fastest growing economies in the world. This supply – demand imbalance in Canada and India are reflected in the lumber prices when comparing the two countries. Canada's excess supply coupled with India's large demand provides opportunity for Canadian lumber exports to India. As shown through the Baltic Dry Index, although distance is a disadvantage to Canadian exports compared to other international competitors, low shipping cost may make India a viable destination for Canadian softwood lumber exports A major challenge for Canadian Softwood Lumber producers in India is the lack of knowledge about virtues of softwood in construction industry vis-à-vis traditional hardwood like timber which is widely used in India. The study recommends that Canada should focus on educating, and developing education programs about Canadian softwoods in India. Setting up demonstration centers, wooden housing demonstration projects, and education programs can expose Indian wood users to Canadian softwood product attributes and the benefits of higher qualities compared to alternate foreign softwoods and substitutes.

To decrease costs for B.C. export companies and India's end users, India's rail, port and highway infrastructure need to be upgraded to handle the capacity of growing imports. In this paper we identified B.C.'s transportation infrastructure and efficiencies as a competitive advantage. These can be and should be duplicated in India to remove the transportation infrastructure barrier that exists, in turn, creating a competitive advantage for India as it has with B.C.

To increase competitiveness in India, B.C. softwood lumber producers should assess their "nimbleness" and ability to respond and make operational changes efficiently to provide alternate products and preferences for the Indian market. The ability to do this will provide a competitive advantage by producing a more desired finished product for the Indian market, therefore increasing market share and economies of scale. Canadian Federal and Provincial governments should push for the implementation of a Canadian – India free-trade agreement. This would open the market for Canada and the B.C. lumber industry by removing tariffs and opening the door to building economies of scale. A free-trade agreement will economically benefit both countries by encouraging the two countries to produce other goods and services for which they have a competitive advantage and increase the trade of other products as each adapt operations to the desires of the other and starts to further tap each other's markets.

Finally, we examined the effects of the two external determinants, chance and government, on factor determinants. Chance plays an important role by bringing about a shift in overall competitive position of the softwood lumber industry. As previously discussed chance events such as earthquakes can fundamentally change the demand of lumber almost instantaneously as seen from the earthquakes in Japan and educate the market on the advantages of softwood lumber.

The role of federal and provincial governments has influence over all four factor determinants and should act as a catalyst pushing companies to increase competitiveness. Federal and provincial governments are required to initiate and negotiate a Canada-India free-trade agreement. Government agencies and industry need to take an active role in developing and promoting Canadian softwood lumber education and educational programs in India.

5.1 Limitations and Future Research Directions

This study using Porter's diamond framework, with an emphasis on initial factor endowments (and other international diamonds), builds a competitive Softwood lumber industry by enhancing the access to the lucrative Indian market. In this framework, government has an important role in removing tariff and non-tariff barriers, enabling critical capabilities (like R&D) and leveraging the industry in India. The main limitation of the Porter model is the lack of role for multinational enterprises (MNEs) which had an important role in furthering both firm-specific and country-specific advantages in the real world (Rugman et al, 1991 & 1993). Besides, other dimensions of international competitiveness such as government conditions and macroeconomic policy, which Porter originally considered as exogenous factors, may actually be part of the internal diamond. This is an area which needs further elaboration and research/ investigation.

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