Mapping the Value Chain of SMEs in the Forest Products Industry

Prepared for
Environment Canada and the Canadian Forest Service

By
Drs. David Cohen and Robert Kozak

March 31, 2006

This report was prepared by the David Cohen and Robert Kozak and sponsored by Environment Canada. Publication of this report does not necessarily imply that the contents reflect the views and policies of Environment Canada.

Executive Summary

The objective of this report is to provide an initial assessment of levers of change that could be used to support the environmental performance of small and medium enterprises (SMEs) in the wood sector using the value chain model for analysis. The focus is on the secondary (or value-added) manufacturing sectors (actually various subsectors within the wood industry comprised largely of SMEs). This report characterizes this sector and highlights the point(s) of influence in the value chain that can be leveraged to encourage environmental behaviour changes.

The Secondary Wood Manufacturing Sector

- Sales grew from $CAN 10.2 billion in 1999 to $15.4 billion in 2003 (many types of products summarized below); exports = about 1/3 of production, shipped predominantly to the US.

- Provided 141,000 direct jobs in Canada; vast majority of firms employ less than 250 and most employ less than 25.

Comparison of Categories of Secondary Wood Manufacturing for NAICS, Mapping and Detailed Data Analysis

NAICS Codes	Mapping	Detailed Data Analysis
Furniture NAICS 337123 - Other Wood Household Furniture NAICS 337121 - Upholstered Household Furniture NAICS 337213 - Wood Office Furniture, including Custom Architectural Woodwork	Furniture	Furniture
NAICS 337110 - Wood Kitchen Cabinet & Counter Top	Cabinets	Cabinets
NAICS 321911 - Wood Window and Door	Finished Building Products	Finished Building Products
NAICS 321919 - Other Millwork	Millwork	Architectural Millwork Building Components
NAICS 321991 - Manufactured (Mobile) Home NAICS 321992 – Prefabricated Wood Building	Housing	Housing
NAICS 321920 - Wood Container and Pallets NAICS 321999 - All Other Miscellaneous Wood Product Manufacturing	Other	Crafts • Musical Instruments • Other Crafts Remanufacturers Miscellaneous Other Products Pallets
NAICS 32121 - Veneer, Plywood and Engineered Wood Product Manufacturing	Engineered Building Products	Engineered Building Products

Sector Characteristics & Competitive Assessment

- During the 1990's, Canada increased exports of secondary wood products, but since 2000 new global supply (eg, plantations and illegal logging) and new manufacturers in newly emerging economies (eg, China and Vietnam) have changed the global competitive environment.

- ***Furniture*** – Firms with between 4 and 25 employees are the most common, while those with over 100 employees are concentrated in Ontario and Quebec. They source most of their wood from local suppliers and sell over 50% of their production locally. They focus on developing and manufacturing new products, while minimizing expenditures on research and development.
  China continues to capture significant market share in Canada and the US for commodity products but there are opportunities for custom designed furniture and in supply chain management for a mix of domestic and imported furniture products.

- ***Cabinets*** – The majority of firms employ 4 and 25 employees, with larger firms located in Ontario, Quebec, and Manitoba. The majority of firms (>90%) source wood locally with 50% getting supply from other parts of Canada and the US. Three quarters of the firms sell over 80% of their production locally (the smaller firms), although half of the cabinets produced in Canada are exported to the US by larger firms.
  Producers emphasized using skilled employees in manufacturing specialty products, while investing little in R&D. The greatest competition for Canadian producers of cabinets is from US producers with success reliant on design, process innovation, value chain management, and cost control.

- ***Finished Building Products*** – There is a larger proportion of SMEs that employ over 100 persons in this sector. Suppliers are predominately local with some coming from across Canada and the US. Over 60% of the firms sell over half their products locally, with < 20% selling half their production to other parts of Canada, while over one-third sell half their production to the US. They believed they had strong leadership and employed skilled labour to produce new and specialty products for high priced markets. They did not focus on R&D.
  Flooring production has already shifted to China with the greatest Canadian opportunity in laminate flooring. Producers of doors are losing share to lower cost producers from both Brazil and China but Canada can compete in higher end products by keeping ahead in terms of fashion and design.
  Window producers are now shifting to outsourced lower cost components. By focussing on energy efficient quality products, Canadian window producers will continue to be globally competitive.

- ***Engineered Building Products (EBP)*** – This sector is concentrated in the west (Alberta and BC), as well as Ontario and Quebec with a wide range of company sizes. Slightly more than 40% source their wood supply locally, 30% from other parts of Canada, and almost 10% from the US. Most products are sold locally. However, over one-quarter of the firms export half their production to the US. They have strong partnerships with suppliers, customers, and distributors. They believed they had strong leadership and employed skilled labour to produce specialty products. They spend little on R&D, but consider themselves innovative in their production processes.
  The quality of Canadian wood strong engineering expertise, a knowledgeable work force, and process and product development will keep Canadian producers competitive in NA markets.

- ***Prefabricated Buildings & Log Houses*** – This sector includes manufactured, log, and panelized housing and is concentrated mostly in British Columbia, Ontario and Quebec. Most companies employ between 4 and 25 employees. They source their wood locally or from other parts of Canada. This may be because the sector is largest in BC where a good source of supply for timber frame and log houses is located. Slightly less than half of the producers sell half of their housing locally, with the same number selling half their housing to the rest of Canada.
  Over 25% of the manufacturers export at least half of their production to the US. They have strong

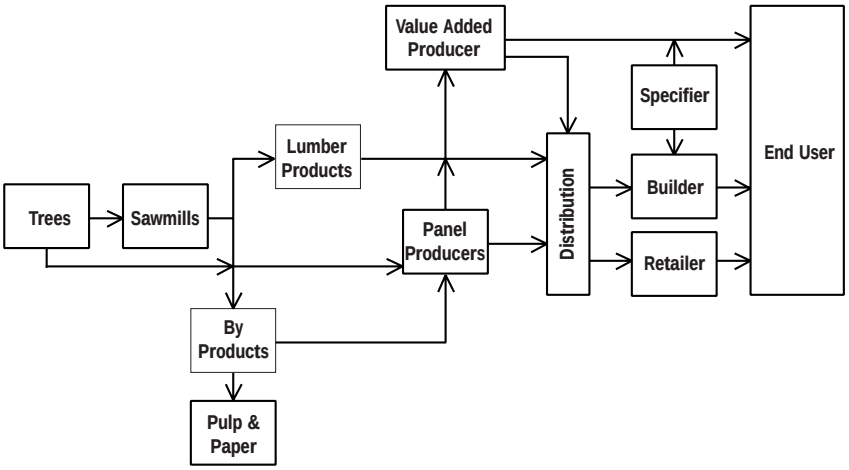
partnerships with suppliers and customers but do not feel close to their customers. They believed they had strong leadership and employ skilled labour to produce specialty products, but spend little on R&D.

Canada can maintain its global leadership in the design, manufacture, and sales of crafted log homes. Drivers similar to EBP will help Canada compete in the panelized home market globally.

Value Chains

Value chains are graphical representations of the flow of a good or service from raw material supplies to provision of the final product to the end user. In theory, value should be added at each step of the value chain. The concept was described and popularized by Michael Porter in "Competitive Advantage: Creating and Sustaining Superior Performance"[1]. The value chains for the wood industry and major groups of value added SMEs are shown below.

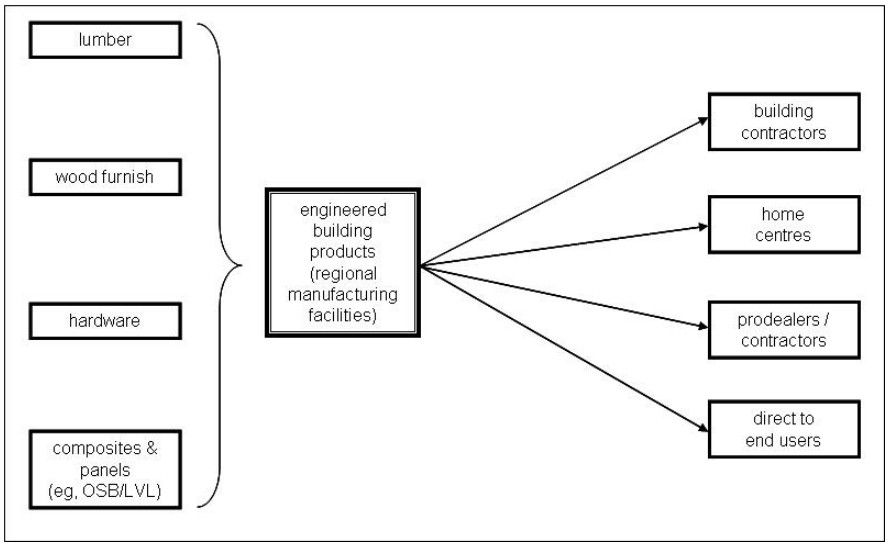
Simplified value chain of wood industry



This is the simplified value chain for the wood industry and includes primary producers (lumber, pulp and panels) and value-added producers. Most pulp flows into the paper sector and most primary solid wood products (lumber and panels) are used for the construction industry, either for new residential construction (through builders) or the repair and remodelling market (through retailers). Specifiers, such as engineers and architects, influence the selection of wood products. Some primary wood products flow into the value-added sector which is mostly comprised of SMEs who use these commodity products to produce finished goods such as furniture, engineered wood products and so on.

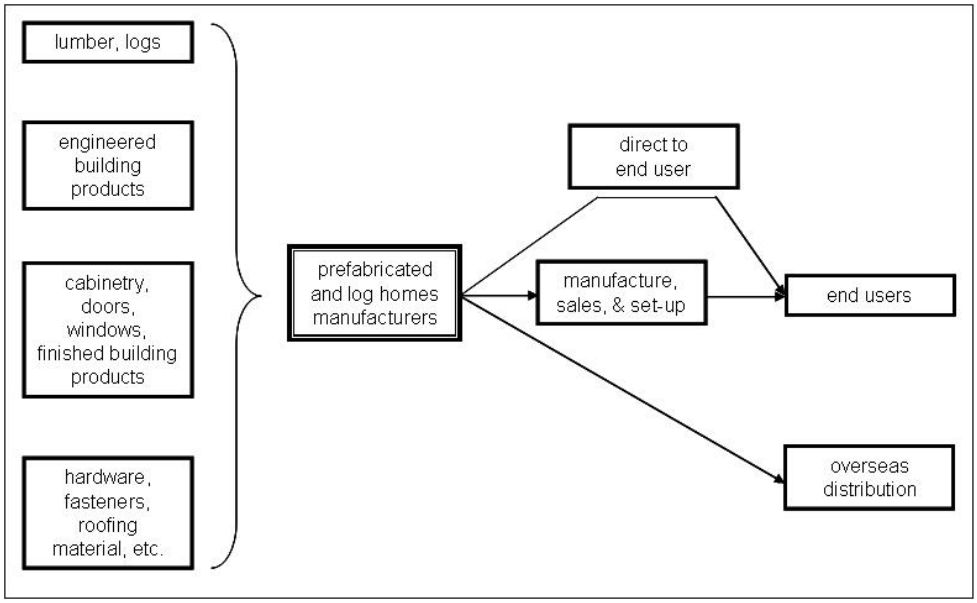
[1] Porter, Michael E. (1985). Competitive Advantage: Creating and Sustaining Superior Performance. Free Press New York. 557 pages.

Generalized Supply Chain for Engineered Building Products (EBP) (NAICS 32121)



- EBPs are produced at regional manufacturing facilities due to their awkward shape & difficulty shipping custom produced products such as roof trusses, I beams, engineered laminated veneer lumber and glue laminated beams long distances.
- Key influencers include structural engineers and architects who specify these products in building blueprints, wood industry associations who promote specific products to these specifiers, and builders and technical code committees who can impact how these products are specified.

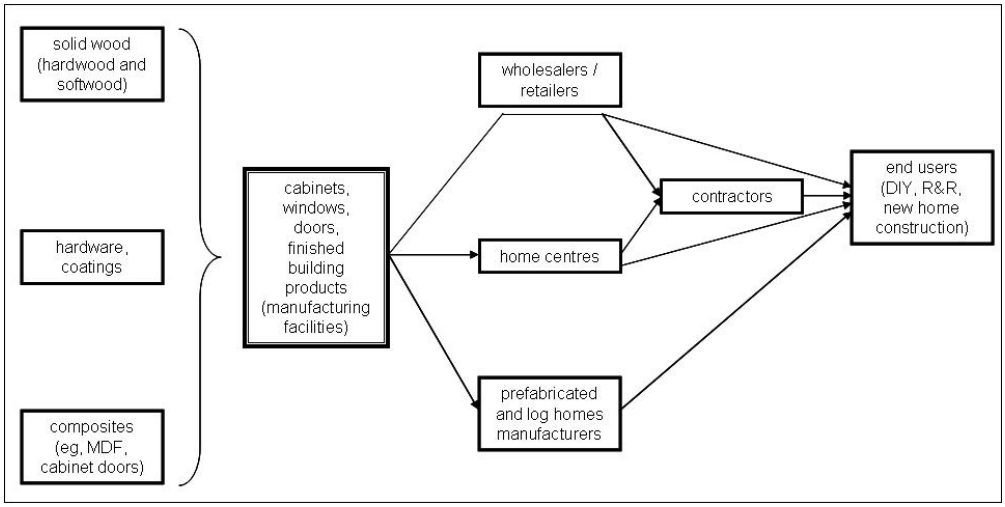
Generalized Supply Chain for Prefabricated and Log Homes (NAICS 321992)



- Custom homes are produced in one location and shipped as a unit to the building site. This product group has the highest proportion of its products exported outside of North America.

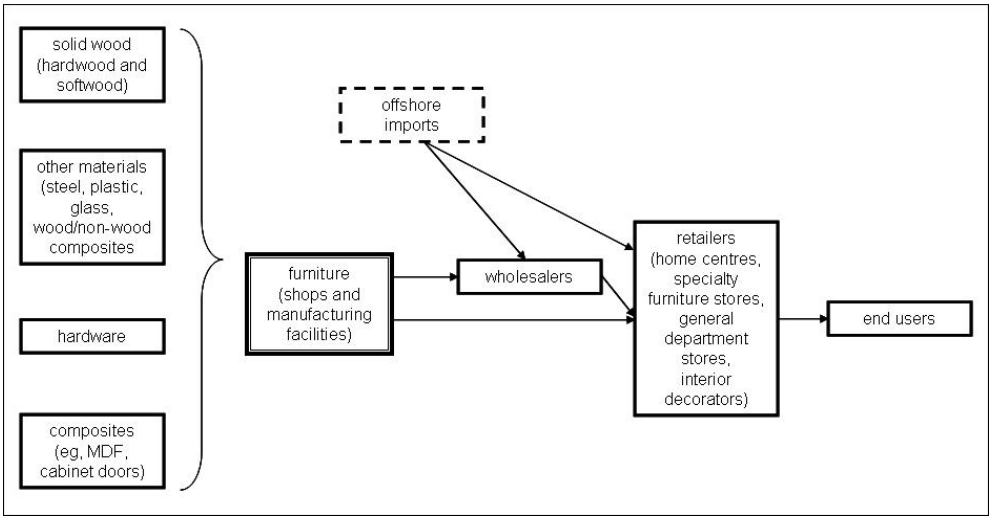
- End users, transportation regulations, government codes and standards, and distribution channels in overseas locations have the greatest influence on material selection and environmental operations. For log homes, access to raw material (ie, logs) and land use management policies also can influence environmental behaviour.

Generalized Supply Chain for Cabinets, Windows, Doors, and Finished Building Products (NAICS NAICS 337110, 321911)



- Most products in this chain are architectural products distributed through wholesalers, large retailers, and home centres for use in new construction (residential, commercial and industrial) and repair and remodelling
- Large retailers (eg, Home Depot and Rona) and builders have the greatest influence on this sector. In addition, interior designers, architects, and building contractors can influence environmental decisions in this sector.

Generalized Supply Chain for Furniture (NAICS 337123, NAICS 337121, NAICS 337213)



- The furniture sector is in the midst of significant change with increasing imports from China and Vietnam as manufacturers and retailers in North America outsource their production and concentrate on becoming value chain and brand managers. The smaller producers of higher valued custom furniture are currently under little threat from offshore production.
- The furniture sector is most influenced by design, channels of distribution and retailers. Magazines devoted to home décor, remodelling etc. can also influence styles and the need for environmental performance. In addition, ENGOs are applying pressure to reduce the use of illegally logged wood in furniture production and sales in developed countries.

Environmental Impacts

Like most industrial processes, the manufacture of value-added goods has environmental impacts, although comparatively less so than in the production of commodity products like lumber and pulp and paper. In this report, we concentrate on the environmental impacts inherent in producing and delivering value-added wood products, including energy use, manufacturing processes, and other value-chain considerations.

- Energy use and the creation of green house gasses (GHG)
  - ✓ manufacturing is energy intensive and many sectors use kiln dried wood which requires high levels of energy; the trend is towards in-house drying, where few kilns are powered by in-house steam generation (however, value-added producers tend to be too small to allow for significant bioenergy generation)

- Manufacturing
  - ✓ health consideration include wood dust, VOCs and noise pollution due to manufacturing
  - ✓ waste, although declining, creates pressure on landfills

- ✪ Other value chain considerations include transportation and use and disposal of end products
  - ✓ transportation of goods is a significant contributor to the overall greenhouse gas emissions due to the wide dispersal of finished products that often are awkwardly shaped (eg, assembled furniture)
  - ✓ while these wood products sequester carbon during their service lives, their disposal is a concern due to the release of methane, a problematic GHG
  - ✓ the off-gassing of chemicals during use (often caused by finishes and adhesives) can lead to health and environmental problems

The environmental impacts by sector are summarized in Table 9. Below is an example for two sectors, furniture and cabinets (see report for full contents of table).

Sector	Resource Extraction	Manufacturing	Transportation/ Installation/ Construction	Occupancy/ Maintenance	Demolition	Recycling/ Reuse/ Disposal
Furniture	- minimal impact given that this is a secondary manufacturing process	- KNOWLEDGE GAP	- transportation solely, although impact is low as markets tend to be localized - little waste since finished product is manufactured in factory	- very little in the way of maintenance required - finish or decay of materials may produce harmful off-gassing KNOWLEDGE GAP	- product life spans are becoming shorter as styles change more quickly - little environmental impact involved in the demolition process	- contemporary products are generally not recycled or reused - most products are land-filled after use - difficult to use for co-generation due to myriad materials (eg, composites) and finishes
Cabinets	- minimal impact given that this is a secondary manufacturing process	- KNOWLEDGE GAP	- transportation throughout North America - minor energy expended in installation - little waste since finished product is manufactured in factory	- some maintaining required over the lifespan of products, - typically they are replaced and often due to style changes - finish or decay of materials may produce harmful off-gassing KNOWLEDGE GAP	- product life spans are becoming shorter - little environmental impact involved in the demolition process - current construction technique amenable to re-use, although this is not commonplace	- contemporary products are generally not recycled or reused - most products are land-filled after use - may be issues with recycling, reuse or co-generation due to myriad materials and finishes

Levers of Change

Unlike larger commodity producers, the smaller scale of operations in the secondary sector, its geographical dispersal across provincial boundaries, and its variety of manufacturing processes and products, hinder supply chain levers from being as effective as environmental change agents.

- ✪ Large suppliers or buyers (eg, forest land owners or retail chains) have little impact on the value-added sector due to their small size
- ✪ Forces from within these companies provide the impetus for environmental change. Management leadership with employee support potentially have the greatest influence.
  - ✓ ***Carrot*** – incentives include market opportunities by joining trend towards corporate responsibility (eg, opens doors to larger, CSR committed buyers, meeting Japanese

formaldehyde guidelines increases export opportunities); however, there is a need to emphasize environmental stewardship as a competitive tool to make a compelling business case.

- ✓ ***Stick*** – current and expected regulations are a powerful incentive for value-added firms to implement environmental change; however, this requires clear, long term signals from regulatory organizations.

✪ One of the most powerful levers is the industry associations themselves. Applying levers to an agglomeration of SMEs creates the scale necessary for levers to be effective on a national or even regional basis. Efforts to develop minimal environmental standards for association membership as a means to benefit the SME's in the marketplace could improve the efficacy and leverage of government policies.

Table of Contents

List of Figures

List of Tables

1 The Value Chain and the Role of SMEs in the Forest Products Industry

1.1 Introduction

The purpose of this report is to describe the relationships between large companies and small and medium sized enterprises (SMEs) in the wood industry value chain as a means of providing an initial assessment of levers of change that could be used to improve their environmental performance. Because of the concentration, scale, and make-up of the wood products industry, the vast majority of SMEs are in the secondary (value-added) sector, while the primary sector is dominated by larger firms that are becoming even larger with consolidation.

The overriding objective of this study is to identify sub-industries within the secondary wood products sector that have the largest current and future environmental concerns and/or competitiveness pressures and to highlight the point(s) of influence within their value chains that could serve to catalyze environmental behaviour changes. The study uses value chain mapping to explore these SMEs in detail. Each sub sector is defined and characterized according to their economic, environmental and competitive performance, as well as the regulatory environments within which they operate and their relationships to other industrial sectors. Information gaps that prevent full characterization are identified to determine areas for future research and data collection. We recommend that this report be used as a basis to initiate and develop research programs around the very important issue of environmental impacts of the Canadian secondary wood products sector, but it may also provide a template for similar reports in other industrial sectors.

1.2 The Canadian Forest Industry

The Canadian forest industry is a major contributor to the Canadian economy and exports. In 2004, it accounted for 3% of the Canadian GDP and 60% of Canada's trade surplus. The primary sector consists of solid wood products, predominantly lumber and panels, and pulp and paper. Wood manufacturing (solid wood products) and pulp and paper manufacturing each account for about half of the value of primary production ($35 billion and $37 billion, respectively). Additional information on the primary wood processing sector of Canada is available in Tables 1 and 2.

Both of these sectors are dominated by large firms employing more than 500 employees and having revenues that exceed $75 million annually. In recent years, there has been a rapid pace of mergers, acquisitions, and mill closures, contributing to the virtual disappearance of SME in the primary wood industry[2]. While there are still a few small and medium sized primary production facilities, their number and economic health are in decline as industry concentration in commodity production becomes more and more of a prerequisite for global competitiveness. Many of the primary producers that are SMEs are categorized under the remanufacturing sector of the secondary industry. Because of the lack of SMEs in the primary sector and the preponderance of SMEs in the secondary sector, this report focuses on the SMEs that further manufacture primary products into value added, secondary manufactured products.

[2] The State of Canadian Forests 2004-05, from web site http://www.nrcan-rncan.gc.ca/cfs-scf/national/what-quoi/sof/sof05/mergers_e.html, accessed August 2005.

Wood Industry Economic Contribution	Value or Volume for 2004
Total revenue	$81 billion
Forestry and logging	$9 billion
Share of Canada's GDP	3%
Export sales	$45 billion
Contribution to Canada's Balance of Trade	$35 billion
Export sales to U.S.	$35 billion
Annual R&D spending	$345 million
Employment (direct and indirect)	916,200
Lumber (97% Coniferous or softwood)	61 mcum (21 bbf)
Plywood and OSB (part of panels)	10.1 b sq ft (3/8")
Pulp & paper shipments	31.2 million tones
Source: Statistics Canada, 2004; Labour Force Survey **Downloaded August 2005 from the Forest Products Association of Canada web site** **http://www.fpac.ca/en/economy/facts_and_figures.php**	

Table 1: Primary Wood Industry Economic Contribution and Production

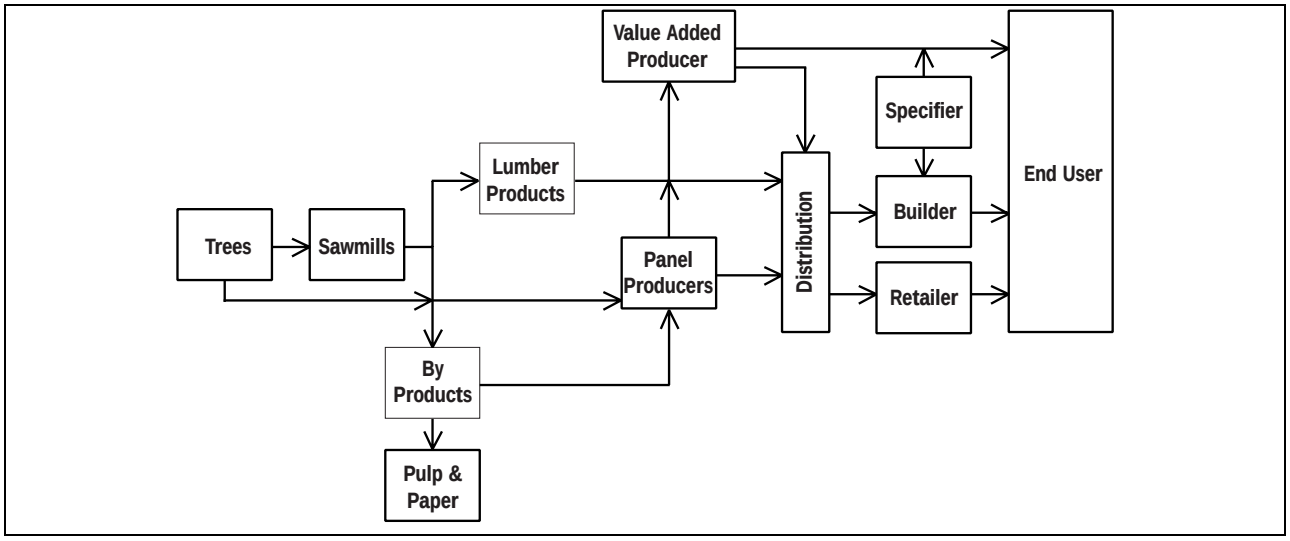
Additional Information on the Primary Wood Sector 2004	
Total Canadian production	197 mcum
Sawlogs	84.6%
Pulp logs	13.6%
Other logs	1.8%
Coniferous (SW)	84.2%
Deciduous (HW)	15.8%
Panels	16.4 mcum
Pulp for Paper	26.2 mt
Paper & paperboard	20.6 mt
Source: Strategis and Statistics Canada	

Table 2: Production Information on Primary Wood Sector

1.3 The Value Chain

The forest industry value chain encompasses two major industries, solid wood products and pulp & paper. From tree to end user, the chain can be simplified as follows:

Figure 1: The Forestry Industry Value Chain



Within the wood products sector, the chain can be sub-divided into three subsectors: (1) lumber products; (2) commodity panel / sheathing products (eg, plywood, oriented strandboard); and (3) value-added products. By products from the lumber manufacturing process, generally in the form of chips, are used in the production of pulp and paper. Lumber and panel products are used primarily for construction purposes, but also serve the important role of supplying the value-added sector with raw materials.

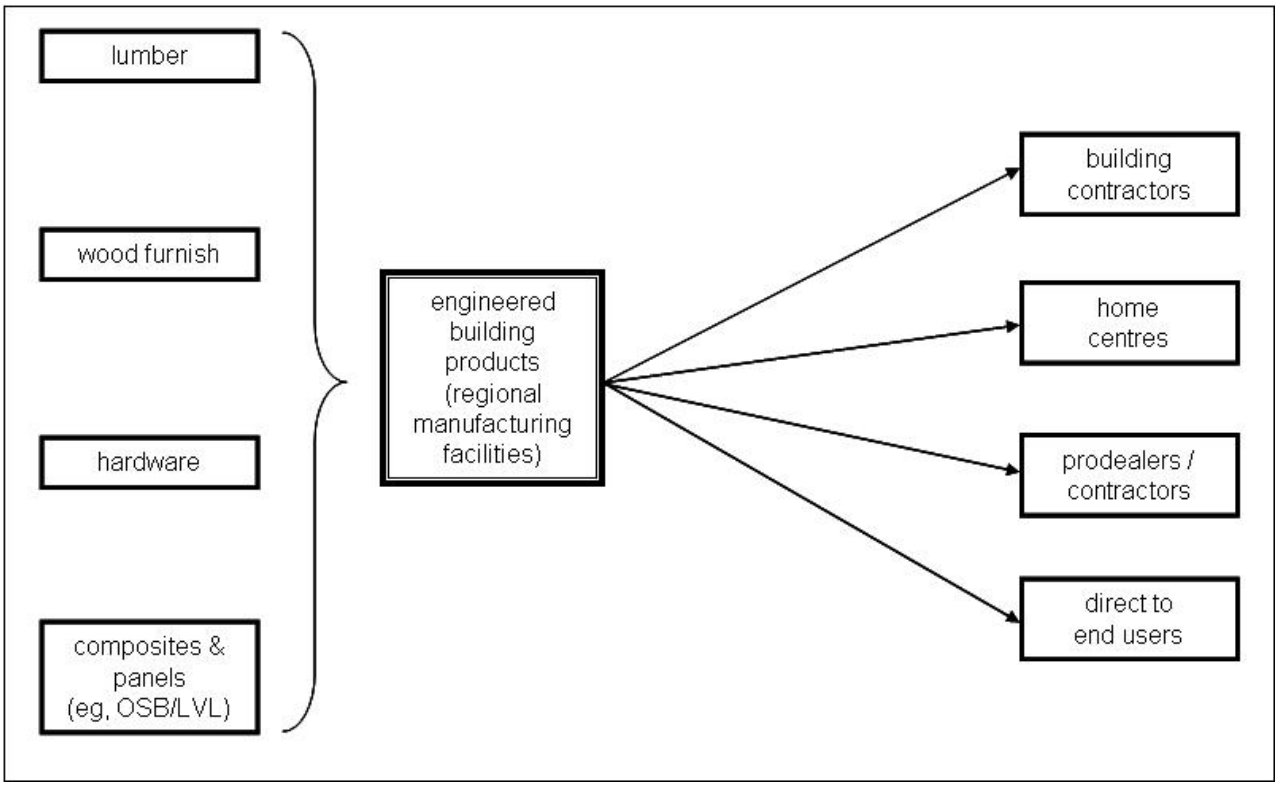
In general, the left half of this chain is comprised of commodity producers and is vertically integrated amongst some of the largest companies in the industry. The remaining half of the value chain leading to end-user (including value added producers, distributors, and builders) is comprised of thousands of SMEs and this is where value-added products are created and made available to end-users. Typically, products reach the end user through a complex network of distributors, retailers, and builders, but this is becoming more and more simplified over time with the advent and deployment of modern supply chain management principles. Given the nature of wood products, it is also worth noting the role of specifiers – architects, structural engineers, interior designers – as influencers in this value-chain. In addition the value added producers (secondary wood manufacturers) produce both structural and aesthetic products serving industrial and consumer markets.

Softwood lumber and panels are predominantly sold in Canada and the US. They move through increasingly simplified supply chains to home centre stores, professional building suppliers, industrial users, and direct to large builders. Each of these large buyer groups are undergoing consolidation and simplifications in their supply chain. Relationships along the supply chain, often dictated by the large and

powerful retailers (eg, Home Depot and Pulte Homes), can determine product specifications and can also drive attributes of environmental performance (as in the case of forest certification). However, this generally applies only to the increasingly concentrated primary producers. Most forest sector SMEs are located in the secondary wood sector and are not large enough to sell directly to the larger retail chains or US house building companies. The characteristics of the SMEs that dominate the secondary wood manufacturing sector are presented in the following section.

It should be noted that the above forest products value chain is a simplified representation of the movement of goods, services, and information within a complex network of suppliers, manufacturers, distributors, intermediaries, and retailers. Furthermore, there is a great deal of variation within this value chain, especially when individual sectors of the wood products industry are considered. For the purposes of this report, we are largely considering the supply chains of the secondary or value-added sector (described in further detail in subsequent sections). At this point, however, it is worth noting that even supply chains within the value-added sector vary considerably. This report groups product categories of the secondary sector with similar supply chains to provide contextual information for the remainder of this report. The supply chains of cabinets, windows, doors, and finished building products producers are very similar and, thus, have been collapsed into one figure.

Figure 2: Generalized Supply Chain for Engineered Building Products (NAICS 32121)[3]

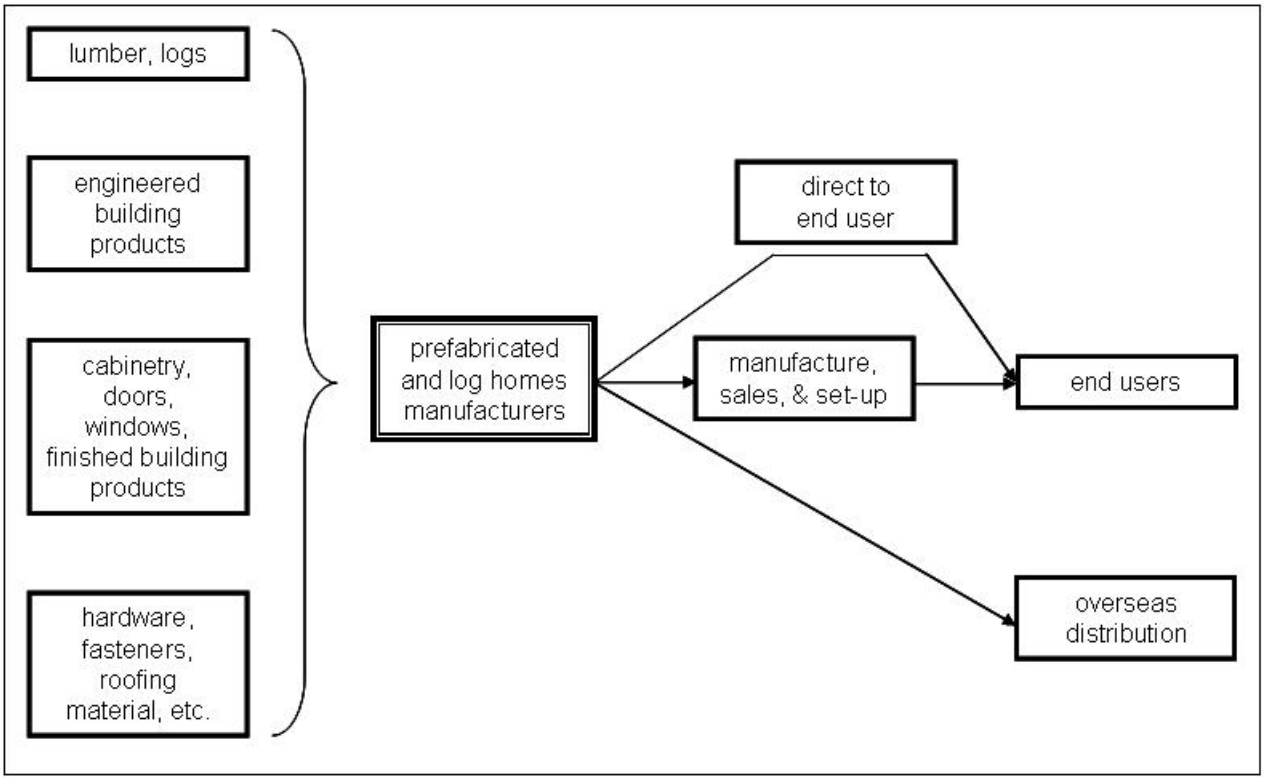


[3] Product description for NAICS codes are shown in Table 4.

Key influencers include structural engineers and architects who specify these products in building blueprints, wood industry associations who promote specific products to these specifiers, and builders and technical code committees who can impact how these products are specified.

Engineered building products are often produced at regional manufacturing facilities since they are frequently awkwardly shaped and difficult / costly to ship long distances. In addition, they are often custom produced to specific sizes and lengths for individual construction projects. Engineered building products include roof trusses, I beams, engineered laminated veneer lumber, glue laminated beams, and wall panels.

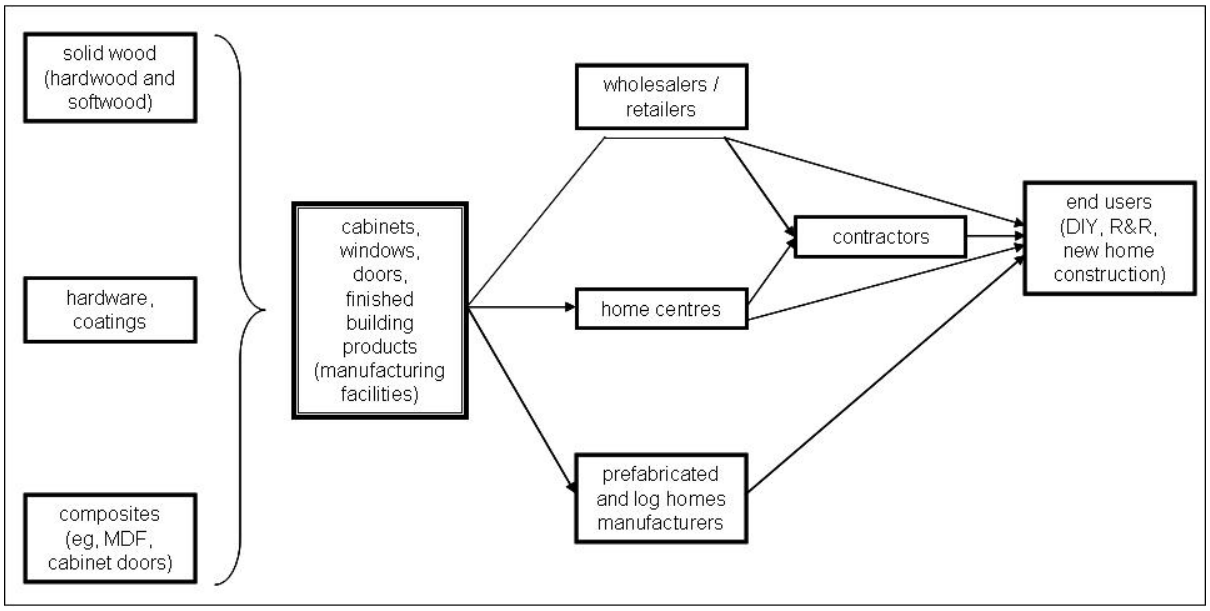
Figure 3: Generalized Supply Chain for Prefabricated and Log Homes (NAICS 321992)



End users, transportation regulations, government codes and standards, and distribution channels in overseas locations have the greatest influence on material selection and environmental operations. For log homes, access to raw material (ie, logs) and land use management policies also can influence environmental behaviour.

Generally, prefabricated and log homes are produced in single locations and shipped as whole units to building sites. Many are customized to best fit the end user specifications. This explains the short supply chain from production to end user, since producers must be in close contact with the end user to customize each house package.

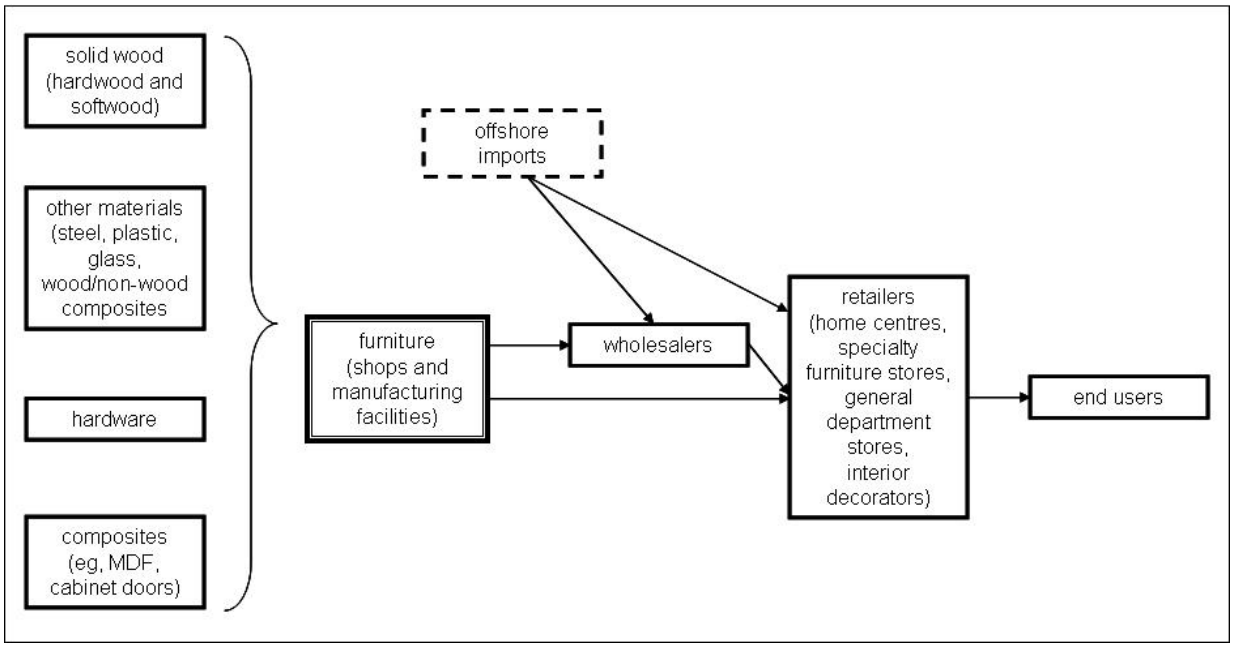
Figure 4: Generalized Supply Chain for Cabinets, Windows, Doors, and Finished Building Products (NAICS 337110 and 321911)



Large retailers and builders have the greatest influence on this sector. Home centres such as Home Depot, Rona and Loews carry many of these products for small builders and the repair and remodelling sector. Builders buy from pro dealers as well as these home centres. In addition, interior designers, architects, and building contractors can influence environmental decisions in this sector.

Most doors, windows, cabinets, and finished building products (including millwork) are distributed through wholesalers, large retailers (such as professional dealers), and home centres. Finished building products are used for new construction (residential, commercial, and industrial) and repair and remodelling. Most of these products are architectural in nature, where design and style play an important part in end user selection.

Figure 5: Generalized Supply Chain for Furniture (NAICS 337123, NAICS 337121, NAICS 337213)



The furniture sector is most influenced by design, channels of distribution and retailers. Design trends can affect material selection, style, shape, form, and function. Channels of distribution can influence the increased use of knock-down furniture to be assembled either by the retailer (eg, Sears) or by the end user (eg, Ikea). Magazines devoted to home décor, remodelling etc. can also influence styles and the need for environmental performance. ENGOs (environmental non government organizations), such as Forest Trends, Greenpeace and WWF, are spearheading efforts to reduce the use of illegally logged wood in the production of furniture by targeting end users in developed countries.

The value chain map for the furniture sector is in the midst of significant change. More goods are being produced in China and Vietnam, often under contract to existing North American producers, distributors and retailers (eg, Ikea). While design and specifications may be North American, manufacturing is rapidly shifting to Asian countries. Large manufacturers in North America are outsourcing their production and concentrating on becoming value chain and brand managers. The smaller producers of higher valued custom furniture are currently under little threat from offshore production.

1.4 Definition of Small and Medium Enterprises (SMEs):

There is no globally accepted definition of small and medium enterprises (SMEs), other than to say that they are companies with metrics (usually number of employees or annual turnover) that fall below a certain threshold. It is in the delineation of these limits where definitions vary. For instance, Statistics Canada and Industry Canada define SMEs as business establishments with 0 to 499 employees and gross revenues of less than $50 million[4]. That said, considerable variation and inconsistencies still exist in defining this term and even Industry Canada has defined SMEs as companies with less than 250 employees[5].

The European Union seems to have taken the first steps in formally adopting a universally accepted definition of SMEs, but even so there is still debate among nations in the EU. On May 6, 2003, the Commission of the European Communities adopted a definition of medium-sized, small and micro businesses, which provides a framework for defining SMEs (Table 3)[6].

Enterprise Type	# of Employees	Revenues (Turnover)	Revenues (Balance Sheet)
medium-sized	< 250	≤ € 50 million	≤ € 43 million
small	< 50	≤ € 10 million	≤ € 10 million
micro	< 10	≤ € 2 million	≤ € 2 million

Table 3: European Definition of Micro, Small and Medium Sized Businesses

In other words, SMEs are defined as companies with less than 250 employees. With respect to financial criteria, revenues cannot exceed 50 million euros (measured as turnover) or 43 million euros (measured by a balance sheet). In addition, the European Union specifies terms of ownership, stating that SMEs must be independent, with less than 25% being owned by outside interests.

We adopt this definition which coincides with one of the definitions put forth by Industry Canada. For the purposes of this report, an SME is defined as **an independent company with less than 250 employees and revenues not exceeding $CDN 75 million**. This definition applies to the vast majority of the Canadian value-added wood products sector, with very few exceptions (ie, it is unlikely that there are many value-added wood producers with less than less than 250 employees and revenues exceeding $75 million).

[4] http://strategis.ic.gc.ca/epic/internet/insbrp-rppe.nsf/en/rd01068e.html
[5] http://strategis.ic.gc.ca/epic/internet/insbrp-rppe.nsf/en/rd01011e.html
[6] http://europa.eu.int/comm/enterprise/enterprise_policy/sme_definition/index_en.htm

1.5 Bounding the Study

The focus of this report is on the SMEs in the forest sector as defined in the previous section. The primary sector, both sawmills producing commodity lumber and pulp and paper producers, are dominated (in terms of production) by large companies. Recent consolidation (globally and in Canada) has resulted in increasing concentration within the primary wood manufacturing sector. These large companies have concentrated on economies of scale and are attempting to develop globally efficient commodity manufacturing facilities. The size of these operations excludes them from qualifying as SMEs. However, a proportion of the end products produced by the solid wood products sector are processed by the secondary wood manufacturing sector.

The secondary wood manufacturing sector produces over $15 billion worth of value added wood products annually and exports about a third of its production, predominantly to the United States (Tables 4 & 5). From 1998 – 2003, the sector increased its sales by over 50%. The size and importance of the secondary wood products sector is often overlooked because it is dominated by SMEs. However, the more detailed production and trade information shown in the two following tables clearly illustrates its importance.

Canadian Production (Manufacturing Shipments) in millions of Canadian dollars					
	1999	2000	2001	2002	2003
NAICS 337123 - Other Wood Household Furniture Manufacturing	1,937	2,551	2,690	2,707	2,601
NAICS 337121 - Upholstered Household Furniture Manufacturing	846	997	1,053	1,206	1,209
NAICS 337213 - Wood Office Furniture, including Custom Architectural Woodwork,	1,093	1,397	1,449	1,311	1,253
SUB-TOTAL FURNITURE	3,875	4,944	5,191	5,224	5,063
NAICS 337110 - Wood Kitchen Cabinet and Counter Top Manufacturing	1,586	2,029	2,094	2,279	2,398
NAICS 321911 - Wood Window and Door	1,357	1,649	1,714	1,994	1,970
NAICS 321919 - Other Millwork	1,897	2,692	2,912	3,283	3,508
NAICS 321920 - Wood Container & Pallet	450	621	582	644	685
NAICS 321991 - Manufactured (Mobile) Home Manufacturing	270	280	284	328	356
NAICS 321992 - Prefabricated Wood Building	416	608	553	723	681
NAICS 321999 - All Other Miscellaneous Wood Product	401	636	700	623	761
TOTAL FOR SELECTED SECTORS	10,252	13,460	14,030	15,097	15,422
Source: Strategis and Statistics Canada					

Table 4: Production of Secondary Wood Products in Canada

With very few exceptions, the secondary manufacturing sector in Canada consists of domestically-owned and operated companies that are not part of a larger multinational ownership structure. The sector provided over 141,000 direct jobs in 2003, representing approximately 40% of the direct employment of the primary sectors including wood manufacturing, forestry operations, and pulp and paper production (Table 6). There is a strong argument that the multiplier effect should be larger for the secondary sector since so much of the supply is locally sourced and a higher proportion of the products are sold within Canada.

Canadian Exports in millions of Canadian dollars						
	2001	2002	2003	2004	in 03 % exported	% to USA
NAICS 337123 - Other Wood Household Furniture Manufacturing	1,460	1,478	1,268	1,205	49%	>93%
NAICS 337121 - Upholstered Household Furniture Manufacturing	368	371	358	330	30%	>98%
NAICS 337213 - Wood Office Furniture, including Custom Architectural Woodwork, Manufacturing	703	689	657	631	52%	>97%
SUB-TOTAL FURNITURE	2,531	2,538	2,283	2,166	45%	
NAICS 337110 - Wood Kitchen Cabinet and Counter Top Manufacturing	1,174	1,230	1,148	1,142	48%	>98%
NAICS 321911 - Wood Window and Door	448	479	448	500	23%	>97%
NAICS 321919 - Other Millwork	469	554	561	613	16%	>89%
NAICS 321920 - Wood Container and Pallet Manufacturing	181	207	180	194	26%	>98%
NAICS 321991 - Manufactured (Mobile) Home Manufacturing	16	27	21	21	6%	>91%
NAICS 321992 - Prefabricated Wood Building Manufacturing	280	304	275	272	40%	>66%
NAICS 321999 - All Other Miscellaneous Wood Product Manufacturing	501	559	547	565	72%	>98%
TOTAL FOR SELECTED SECTORS	5,600	5,897	5,462	5,472	35%	

Table 5: Exports of the Canadian Secondary Wood Manufacturing Industries

Mapping Category and NAICS Code:	Employment (2003)
Furniture	
NAICS 337123 - Other Wood Household Furniture Manufacturing	22,913
NAICS 337121 - Upholstered Household Furniture Manufacturing	10,323
NAICS 337213 - Wood Office Furniture, including Custom Architectural Woodwork, Manufacturing	10,805
Cabinets	
NAICS 337110 - Wood Kitchen Cabinet and Counter Top Manufacturing	23,262
Finished Building Products	
NAICS 321911 - Wood Window and Door Manufacturing	11,830
Millwork	
NAICS 321919 - Other Millwork	18,595
Housing	
NAICS 321991 - Manufactured (Mobile) Home Manufacturing	2,681
NAICS 321992 - Prefabricated Wood Building Manufacturing	3,643
Other	
NAICS 321920 - Wood Container and Pallet Manufacturing	4,724
NAICS 321999 - All Other Miscellaneous Wood Product Manufacturing	6,026
Engineered Building Products	
NAICS 32121 - Veneer, Plywood and Engineered Wood Product Manufacturing	26,376

Table 6: Production and Administrative employees in the Secondary Wood Manufacturing Sector

According to our definition of SMEs, there are very few companies within the Canadian value-added sector that are not SMEs[7]. In order to understand where some of the larger value-added wood producers are located in Canada, we need to apply a more liberal definition of SMEs. Table 7 below shows how companies (by sector) with more than 100 full-time equivalents (FTEs) tend to be 'clustered' across Canada. That said, this represents a relatively small proportion of the number of value-added producers in Canada. However, it can be concluded that most of the "larger" SMEs in Canada tend to reside in Alberta, New Brunswick, Manitoba, Ontario and Quebec. British Columbia, the province with arguably the most abundant and high quality resource base, has comparatively few value-added companies with 100 employees or more.

[7] We base this on expert opinion and a database that was developed for the Canadian Forest Service in 2004 (see Section 3 of this report). However, we do not have exact information on this.

Sector	Clusters of Value-Added Producers with 100+ FTEs
Cabinets	Alberta, Manitoba, New Brunswick, Ontario, Quebec, Saskatchewan
Engineered Building Products	Alberta, Manitoba, New Brunswick
Finished Building Products	Alberta, New Brunswick, Ontario, Quebec
Furniture	Alberta, Manitoba, Nova Scotia, Ontario, Quebec
Housing	Alberta
Millwork	British Columbia, Manitoba, Ontario, Quebec
Other	Quebec

Table 7: Clusters of Canadian Value Added Producers with 100 or more FTEs

Detailed information on how FTEs are distributed by sector and province is given in each of the sectoral summaries (following sections). In general, no clear trend can be discerned with respect to which sectors are primarily made up of SMEs – they all are. However, it can be stated that the vast majority of Canadian value-added producers employ 25 or fewer workers.

2 SME Characteristics in the Secondary Wood Manufacturing Sector

2.1 Introduction and Overview

The structure of the secondary wood manufacturing sector is reflected in the relevant NAICS codes. However, much of the detail for individual sectors is lost in the amalgamation of data for the reporting of activities by NAICS code. For example, it is not possible to separate low value commodity furniture from higher value, custom designed furniture, two distinct furniture sectors. Thus, information here is presented at a finer resolution than for the NAICS codes, using mapping and detailed data analyses (see Table 8 for a breakdown of how information is reported).

Section 3 provides a brief overview of the competitive position of the Canadian secondary wood manufacturing sector. There are two categories of information presented for each segment of the secondary wood products sector in Section 4: maps and detailed data analyses. The first level contains maps of Canada showing the location of all companies in the secondary wood products sector. The maps were developed from the most comprehensive data base on the secondary sector in Canada for a project supported by the Canadian Forest Service in 2004 and 2005 (conducted by Cohen, Delong, and Kozak) and contain the locations of companies operating within each of the secondary wood manufacturing sectors in 2004, along with railway lines. The second section contains detailed data analyses of each sector and its respective value chain. These analyses characterize employment levels, supply sources, locations of markets for finished products, and competitive and strategic assessments for each secondary wood products sector. Included in this section are graphs summarizing additional results from this study prepared specifically for this report.

The material in this section will be presented using the same heading as used in preparing the Canadian maps. The map will be presented followed by the detailed analysis for each category noted in column 3 of Table 8. For each sector, the analysis of employment uses the following full time equivalent (FTE) employment classes:

- Class1 has 1-3 employees and could be considered non production manufacturing or a micro enterprise (ie crafts);
- Class 2 has 4-25 employees;
- Class 3 has 26-50 employees;
- Class 4 has 51-100 employees; and
- Class 5 has over 100 employees.

Comparison of Categories of Secondary Wood Manufacturing for NAICS, Mapping and Detailed Data Analysis		
NAICS Codes	Mapping	Detailed Data Analysis
Furniture NAICS 337123 - Other Wood Household Furniture NAICS 337121 - Upholstered Household Furniture NAICS 337213 - Wood Office Furniture, including Custom Architectural Woodwork	Furniture	Furniture
NAICS 337110 - Wood Kitchen Cabinet & Counter Top	Cabinets	Cabinets
NAICS 321911 - Wood Window and Door	Finished Building Products	Finished Building Products
NAICS 321919 - Other Millwork	Millwork	Architectural Millwork Building Components
NAICS 321991 - Manufactured (Mobile) Home NAICS 321992 – Prefabricated Wood Building	Housing	Housing
NAICS 321920 - Wood Container and Pallet Manufacturing NAICS 321999 - All Other Miscellaneous Wood Product Manufacturing	Other	Crafts • Musical Instruments • Other Crafts Remanufacturers Miscellaneous Other Products Pallets
NAICS 32121 - Veneer, Plywood and Engineered Wood Product Manufacturing[8]	Engineered Building Products	Engineered Building Products

Table 8: Overlap of Sectors of the Canadian Secondary Wood Manufacturing Industry

[8] Information on this NAICS code was not reproduced in previous tables since the production of veneer and plywood dominate this NAICS code data and engineered building products only make up a small part of reported results.

3 Competitive Assessment

This section provides a summary of the competitive position of Canadian SMEs in the secondary wood manufacturing sector. It summarizes the results of the following two reports prepared for the Canadian Forest Service in 2004 and 2005:

- *Cohen, D.H., D. Delong and R.A. Kozak (2005). Can Canada be a Global Competitor in the Secondary Wood Manufacturing Sector? A Current Assessment of the Canadian Secondary Wood Products Sector in a Global Context. August 2005. Report prepared for the Canadian Forest Service, Ottawa, Canada. 46 pp.*
- *Delong, D.L., D.H. Cohen and R.A. Kozak (2004). The Canadian Secondary Wood Products Sector: Competitive Success Factors and Current Status. March 2004. Report prepared for the Canadian Forest Service, Ottawa, Canada. 23 pp.*

Results from the second of these reports, summarized in Section 4 – Characteristics by Sector, are based largely on a survey that was mailed out to 4,044 value-added producers across Canada in October 2004. While the maps that were generated included this entire sample frame, the results specifically related to sector characteristics were based only on companies that willingly participated in the study. In total, 618 completed surveys were returned for a response rate of 15.3%, generally thought to be high enough to yield valid results in an industrial context. In fact, statistical tests indicated no evidence of non-response bias, thus enabling inferences to be made onto the population of Canadian value-added producers. That said, we note one possible exception. In this study, surveys were mailed out proportionally, based on the number of firms in each province. Thus, while firms in Québec were mailed 35% of the total number of surveys, the response rate for that province was only 4.5% (the lowest proportion in Canada). This is likely due to the fact that the survey was only sent out in English (several respondents in Quebec indicated that they would not fill out the questionnaire unless it was translated into French). All that being the case, we note that results related to Québec should be approached with some caution.

In addition to summarizing the results of our cross-Canada survey, we also note the following generalizations with respect to the entire Canadian value-added industry. While traditional factors of comparative raw material costs, labour, interest rates, etc. are still important for firm success, they must now be balanced with market based value-oriented factors. The most important of these factors for success fall under the general heading of innovation; specifically, product, process and managerial innovations. While cost control remains a critical factor, it is insufficient for success on its own and must be complemented with programs of continual product development and improvement and process innovation. In today's economy, this requires not only technology development and adoption, but strategies for developing, managing, and maintaining entire value chains and business clusters. In addition, the importance of high quality human resources, from managerial expertise to a trained and skilled workforce, is a critical factor for implementing on the ground strategies. Last, but certainly not least, there is a growing need for companies to have a strong market orientation focusing on customer value. While this may appear to be a very comprehensive list of success factors, increasing competition and a strengthening Canadian currency (with respect to our most important export market, the US) are forcing firms to hone their competitiveness in order to survive in the increasingly global and competitive markets for wood products.

During the 1990's, Canada increased the value of its exports of secondary wood products. While growth in this sector continues, the rate of growth has slowed since 2000 with new global raw material supply regions entering the competitive landscape (from both legal plantations and increased illegal logging) and the growth of new manufacturers in the newly emerging economies such as China and Vietnam. This has changed the global competitive environment for secondary wood manufactured products, particularly in Canada's main export market, the United States. China has become Canadian industry's main competitor both domestically and in the US market. Competition is now focussed on producing low cost and commodified manufactured products using low labour costs, government support (both central and regional), questionable loans from government influenced banks, and an export focus. The specific dynamics of competitiveness within each sector of secondary wood production varies and these are discussed in turn.

3.1 Furniture

China has captured significant market share both in both Canada and the US in commodity (lower value) furniture. The value of Chinese exports to the US have increased fourfold from 2000 – 2004, while Canadian exports remained stable. Vietnam is now increasing exports and is challenging Chinese production through lower wage costs and an established infrastructure. The Canadian (and US) commodity furniture sector will continue to decline, being replaced by production from lower cost offshore regions. Adopting lean manufacturing[9] and rigid cost controls is insufficient to retain global competitiveness given the cost structures in newly emerging economies.[10] There will be continued requests for government assistance to maintain production in existing commodity manufacturing operations. However, there is opportunity for higher end, custom designed furniture. In addition opportunities exist to combine lower cost offshore production with some domestic reassembly and distribution if Canadian firms can become more adept at supply chain management.

3.2 Cabinets

The greatest competition for Canadian producers of cabinets is from US producers given the strength of the Canadian dollar during the past few years, which has only served to bolster the competitive position of US cabinet producers. However, both Canadian and US producers are currently using outsourced components and hardware to remain cost competitive. Hardware is now mostly produced in China and door production is now starting in both China and Brazil. The main competition for higher end cabinets is from Europe. Cabinet sales in North America are reliant on design, process innovation, value chain management, and cost control. This will enable the best managed Canadian firms to continue to compete both in Canada and the US. SMEs can focus on higher value niches and mass customization to prevent market share loss to larger firms exporting into Canada and the US.

[9] For a brief overview of lean manufacturing in the Canadian wood products sector, see: Lean Manufacturing in the Wood Industry (2004). Value to Wood Technology Profile TP-04-04E, edited by T. Lihrah. 4 pp. Available at: http://www.valuetowood.ca/imports/pdf/en/tech_profiles/TP-04-04E_TLihra_English.pdf

[10] Gazo, R. and H. Quesada (2005). A Review of Competitive Strategies of Furniture Manufacturers. Forest Products Journal 55(10):4-12.

3.3 Finished Building Products

Flooring: The situation is similar to the above for hardwood and engineered wood flooring. Much of the global production has already shifted to China where imported hardwood logs and lumber provide raw material inputs for finished flooring which is then exported to developed countries such as Canada and the US. Most of this flooring is sold under established European and American brand names (eg, Bruce Hardwood Floors) and is produced as an outsourced product under strict quality control requirements. The flooring opportunities with the greatest potential for growth are in laminate flooring and specialty hardwood flooring. In the former case, this is due largely to the fact that labour accounts for only a small fraction of the total cost of laminate flooring. In the latter case, restricted hardwood species ensure a competitive advantage to North American producers (e.g alder and maple flooring).

Doors: Canadian producers are losing share to lower cost producers from both Brazil and China, with China ramping up production and targeting the US market (Canada's main export market). Large scale North American door producers are actively seeking to outsource production to lower cost regions such as China. Canada can continue to compete with a focus on unique, higher end products and by using linkages with end markets to keep ahead in terms of fashion and design. The rapid growth of MDF production in China ensures long term supplies of raw materials for the Chinese door manufacturing sector.

Windows: While there are difficulties in transporting windows long distances and providing the necessary support to ensure adequate after sales service, low cost offshore production is starting to compete for lower quality windows. Like cabinetry, the use of some outsourced lower cost components, such as hardware and hardwood supplies of short materials, will enable Canadian producers to continue to be globally competitive. The shift to energy efficient and higher quality windows and the increasing use of windows as a fashion item in North America bodes well for Canadian producers, who tend to focus on design, strong customer relations, after sales service, and value chain management.

3.4 Engineered Building Products

Many of the engineered building products (eg, I beams and joists, laminated veneer lumber, roof trusses) are oddly shaped and difficult to transport long distances. Their manufacture is often best located close to end use to minimize transportation problems. The quality of Canadian wood, the strong engineering expertise that exists within SMEs, a knowledgeable work force, and process and product development will help Canadian manufacturers of engineered building products continue to be globally competitive. While lamination facilities are being developed in China, they are targeting other Asian markets in close proximity, such as South Korea and Japan.

3.5 Prefabricated Buildings and Log Homes

Canada has global leadership in the design, manufacture, and sales of crafted log homes. Abundant log supplies, combined with a well-trained work force, ensure continued competitiveness for log homes.

However Europe leads in lower cost manufactured log homes[11], an area that Canada could consider developing to provide a more complete line of products. Canada has also developed a growing strength in the design, manufacture, and sales of timber frame housing, both for primary and recreational use. Again this is due to engineering expertise, a trained work force, a suitable raw material supply in terms of large scale timbers, and market orientation. These same drivers help Canada compete globally in the panelized home market. The prefabricated wood building sector and engineered building products are areas where Canada can continue to be globally competitive due to the existing strengths noted above.

[11] A crafted log home notches whole, debarked logs to provide the walls of the log home, while a manufactured log home laminates lumber, shapes it to look like logs, and produces log house wall components in a factory setting.

4 Characteristics by Sector

This section summarizes characteristics relating to employment, supplies, markets, and business environments and strategies for each sector in the value-added wood industry. Note that the maps showing the locations of production facilities are included in Appendix 1. For contextual purposes, this set of maps ends with the locations of large and small primary producers across Canada.

4.1 Furniture

The furniture sector has manufacturing facilities in most provinces in Canada, but is concentrated in Ontario and Quebec. Most plants are in close proximity to Canadian concentrations of population near the US border.

Employment: The vast majority of the furniture firms in Canada can be classified as SMEs. While there is a range of firm sizes in the furniture sector, firms with between 4 and 25 employees are the most common. Companies with over 100 employees are concentrated in Ontario and Quebec, with one in Manitoba. Smaller companies are concentrated in BC and Alberta (Figure 6)

Supply: The vast majority of furniture companies source most of their wood supply from local suppliers. However this sector also had the second most diverse source of supply after the musical instrument sector. Over 20% also source supplies from other parts of Canada and the US. Asia and Eastern Europe are gaining ground as competitive wood suppliers to this sector and some of the wood supply purchased from local suppliers may be imported from offshore producers and supplied to the SMEs by the suppliers' distribution channel.

Markets: Over half the firms sell over 50% of their production locally (Figure 7). About a third of the firms sell their product to the rest of Canada (Figure 8), while about a quarter sell their products into the USA (Figure 9). The larger firms tend to export a higher proportion of their furniture, while the smaller firms tend to sell a higher proportion of their products into local markets.

Business Environment & Strategy: Most furniture producers did not consider themselves as part of the forest industry, but rather as part of the manufacturing sector. They believed that they had long term strategies in place and partnerships with both their suppliers and customers (but less so with the distributors) (Figure 10). Figure 11 shows that furniture manufacturers focus on developing and manufacturing new products, while minimizing expenditures on research and development. Companies in eastern and central Canada tend to be older and more established compared to the firms in western Canada.

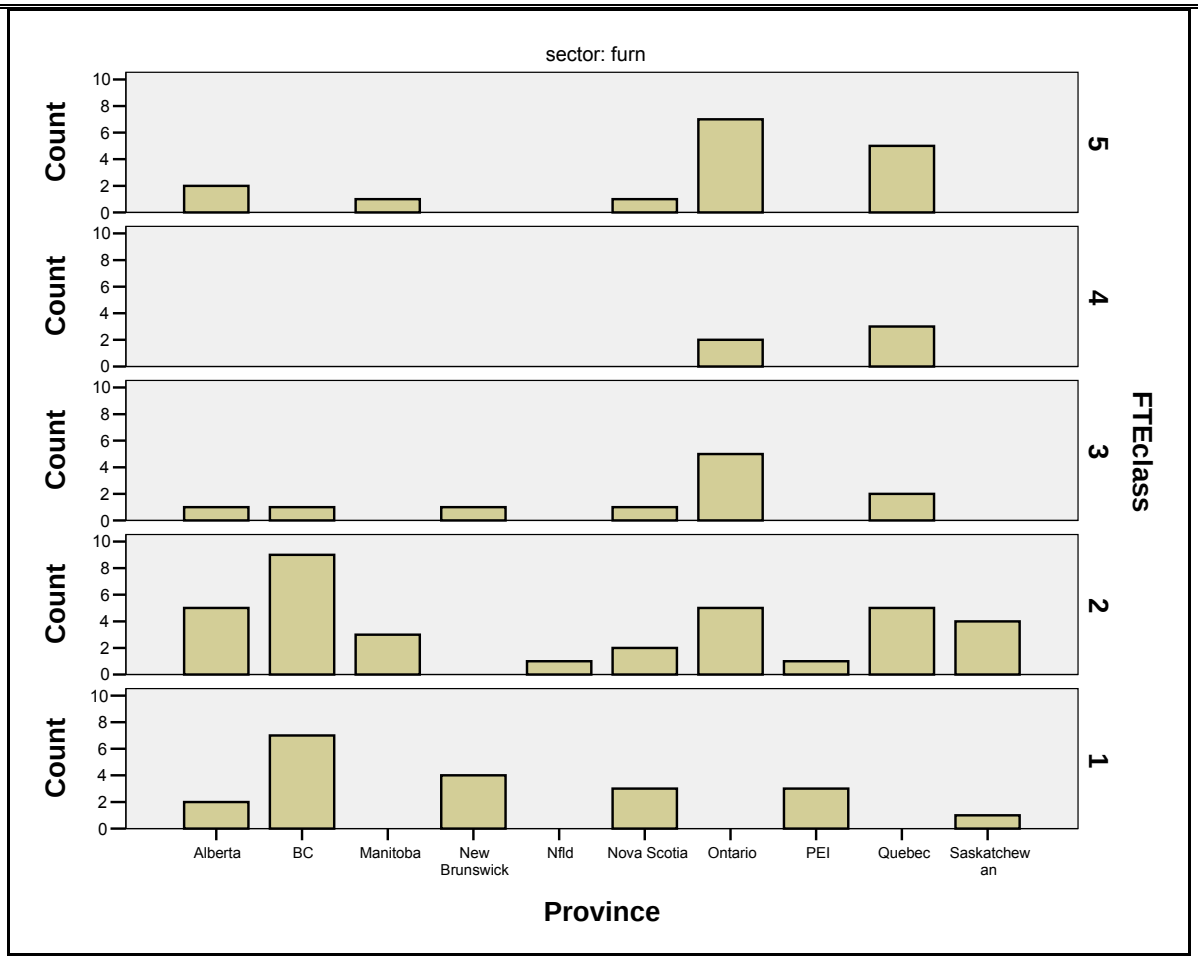


Figure 6: Employment (FTE) Class for the Furniture Sector by Province[12]

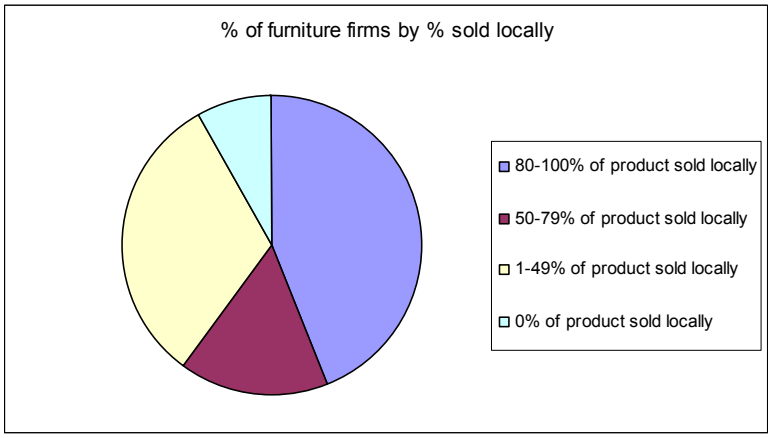


Figure 7: Sales of Furniture Firms to Local Markets

[12] See Section 2.1 for definition of FTE class. These graphs show the distribution of respondents to a survey in 2004 by employee size by province. The numbers indicated in the "count", representing the number of survey respondents, are less important than the general patterns they convey.

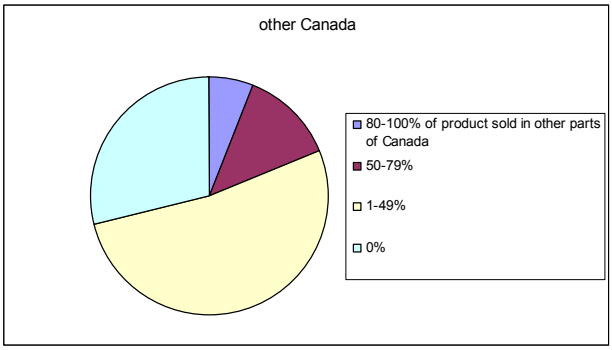


Figure 8: Sales of Furniture Firms to Other Canada Markets.

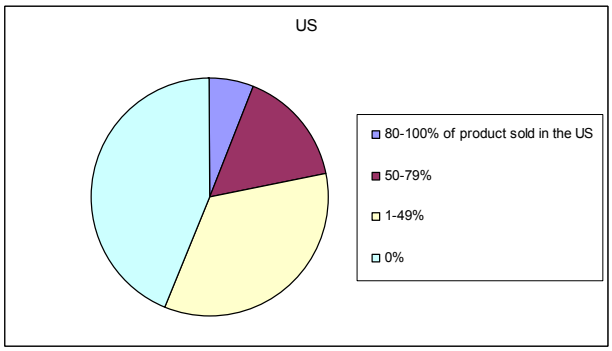


Figure 9: Sales of Furniture Firms to US Markets

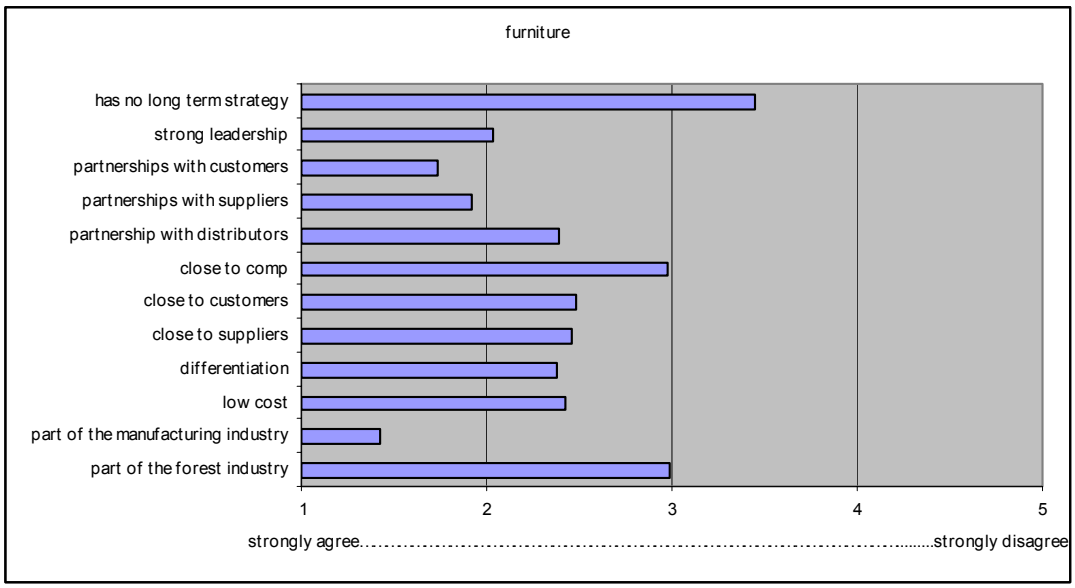


Figure 10: Perceptions of Furniture Manufacturers of Their Firm[13]

[13] For these questions on perceptions, responding companies were asked to state their levels of agreement on various business issues using an interval scale from 1 (strongly agree) to 5 (strongly

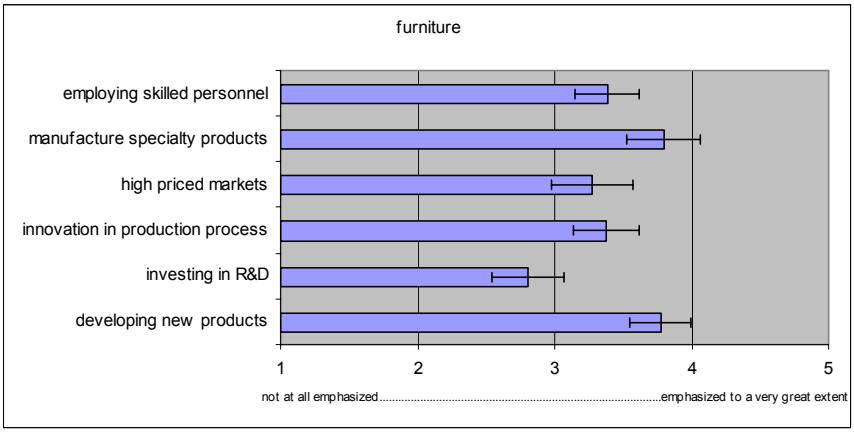


Figure 11: Relative Importance of Current Competitive Strategy for Furniture Manufacturers

4.2 Cabinets

Cabinet manufacturers are located across Canada, with a small concentration in the Prairie Provinces (Alberta, Saskatchewan and Manitoba). While many are located close to the US border, there are producers located throughout each province.

Employment The majority of firms employ between 4 and 25 employees, with only a small proportion of the firms employing more than 100 employees (Figure 12). These larger firms are located in Ontario, Quebec and Manitoba.

Supply: The majority of firms (>90%) in the cabinet sector indicated that they get their wood supply locally. Just over 50% of the firms also went further a field to other parts of Canada and the US to get supply. This is most likely due to the use of hardwoods sourced globally but purchased locally. Like furniture, some of the wood supply purchased from local suppliers may be imported from offshore and supplied to the SMEs by the suppliers' distribution channels.

Markets: Three quarters of the firms sell over 80% of their production locally (Figure 13). While many of the cabinet manufacturers serve local markets, almost half the cabinets produced in Canada are exported mostly to the US. The SMEs serve mostly local markets, with some selling to other parts of Canada (Figure 14).Less than 5% of the companies export over 80% of their production to the US and are typically larger manufacturers (Figure 15).

Business Environment & Strategy: Like the furniture producers, most cabinet manufacturers do not consider themselves as part of the forest industry, but as part of the manufacturing sector. They believed

disagree). These figures summarize the mean responses for each sector. Each of the statements begins with, "my company is…" or "my company has…". Note that "comp" refers to competition, and "low cost" refers to "low cost producer".

that they had long term strategies, strong partnerships with suppliers, customers and distributors (Figure 16). They emphasized using skilled employees in manufacturing specialty products, while investing little in R&D (Figure 17).

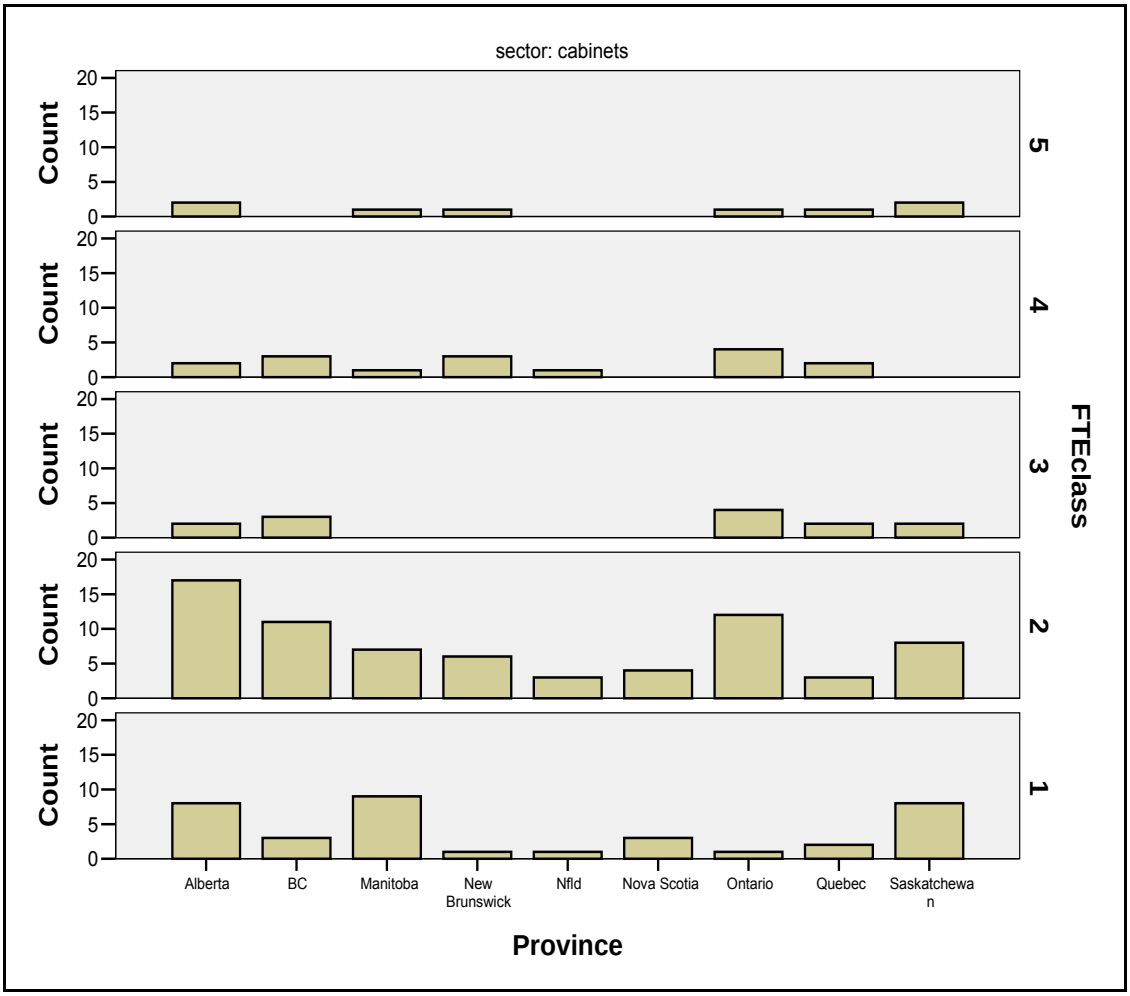


Figure 12: Employment (FTE) Class for the Cabinet Sector by Province

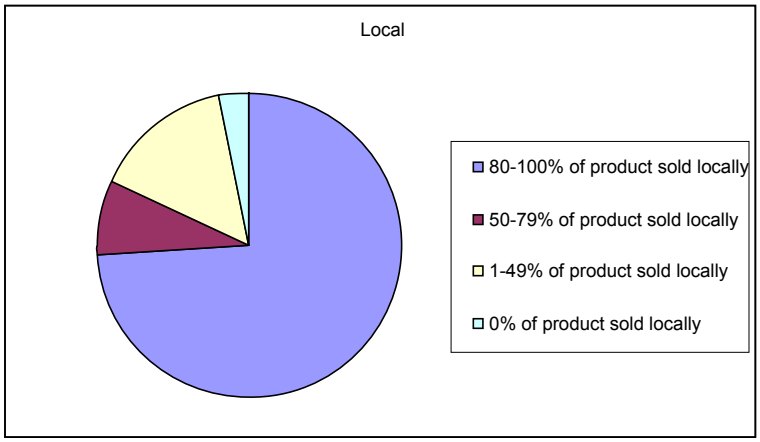


Figure 13: Sales of Cabinet Firms to Local Markets

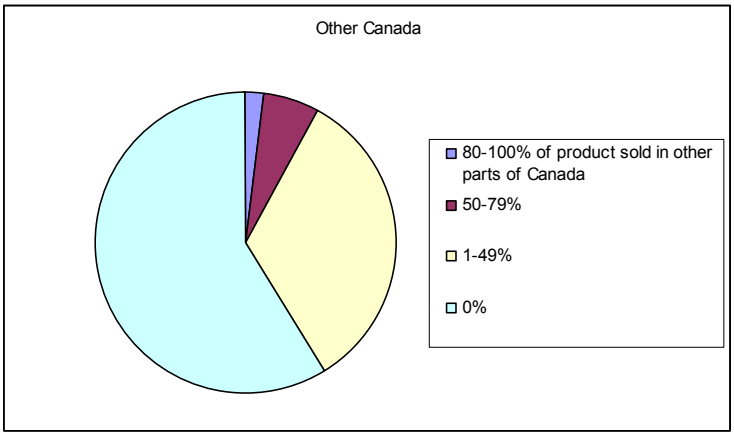


Figure 14: Sales of Cabinet Firms to Other Canada Markets

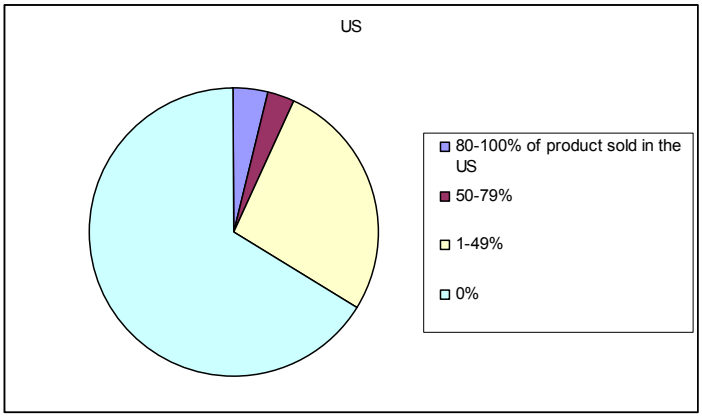


Figure 15: Sales of Cabinet Firms to US Markets

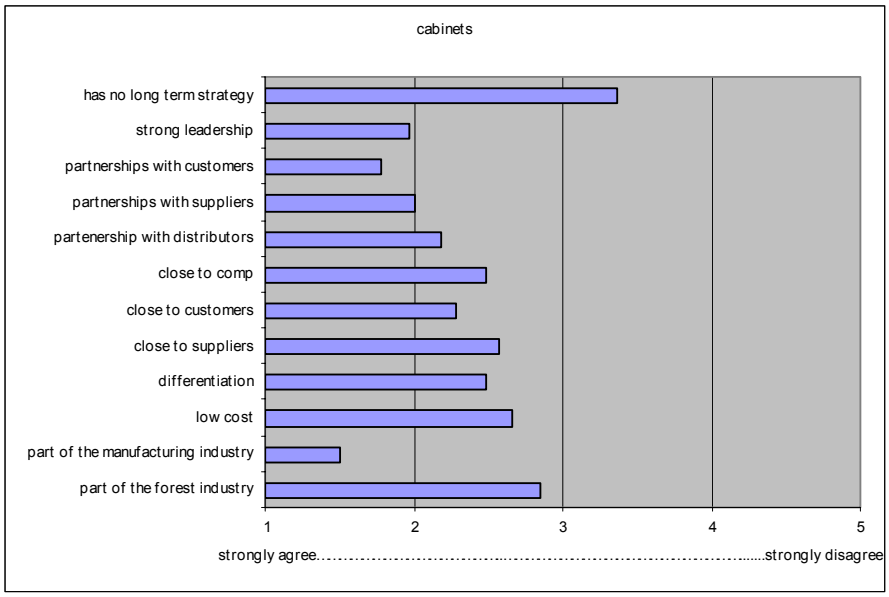


Figure 16: Perceptions of Cabinet Manufacturers of Their Firm

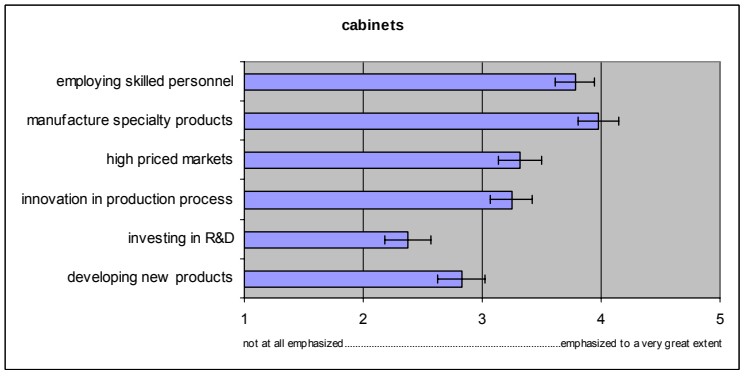


Figure 17: Relative Importance of Current Competitive Strategy for Cabinet Manufacturers

4.3 Finished Building Products

There is a concentration of finished building products firms in BC, but the larger companies are located in Quebec and Ontario. Again most firms are located close to the US border where the Canadian population is concentrated.

Employment: There are not many companies that employ three people or less and, compared to other sectors, there is a larger proportion of SMEs that employ over 100 FTE's. In addition, there are some larger firms, mostly located in Quebec and Ontario (Figure 18).

Supply: Suppliers are predominately local, but there is a little more diversity than in other sectors, with some supply coming from across Canada and the US. There is even some supply from demolition salvage.

Markets: Over 60% of the firms sell over half their products locally. However this does not mean that they are not bundled with other products and then sold outside of local regions (Figure 19). Less than 20% sell half their production to other parts of Canada (Figure 20), while over one-third sell half their production to the US.

Business Environment & Strategy: Most manufacturers of finished building products considered themselves as part of both the forest industry and the manufacturing sector. They believed that they had long term strategies and strong partnerships with suppliers, customers and distributors. They believed they had strong leadership (Figure 22) and employed skilled labour to produce new and specialty products for high priced markets. They did not focus on R&D (Figure 23).

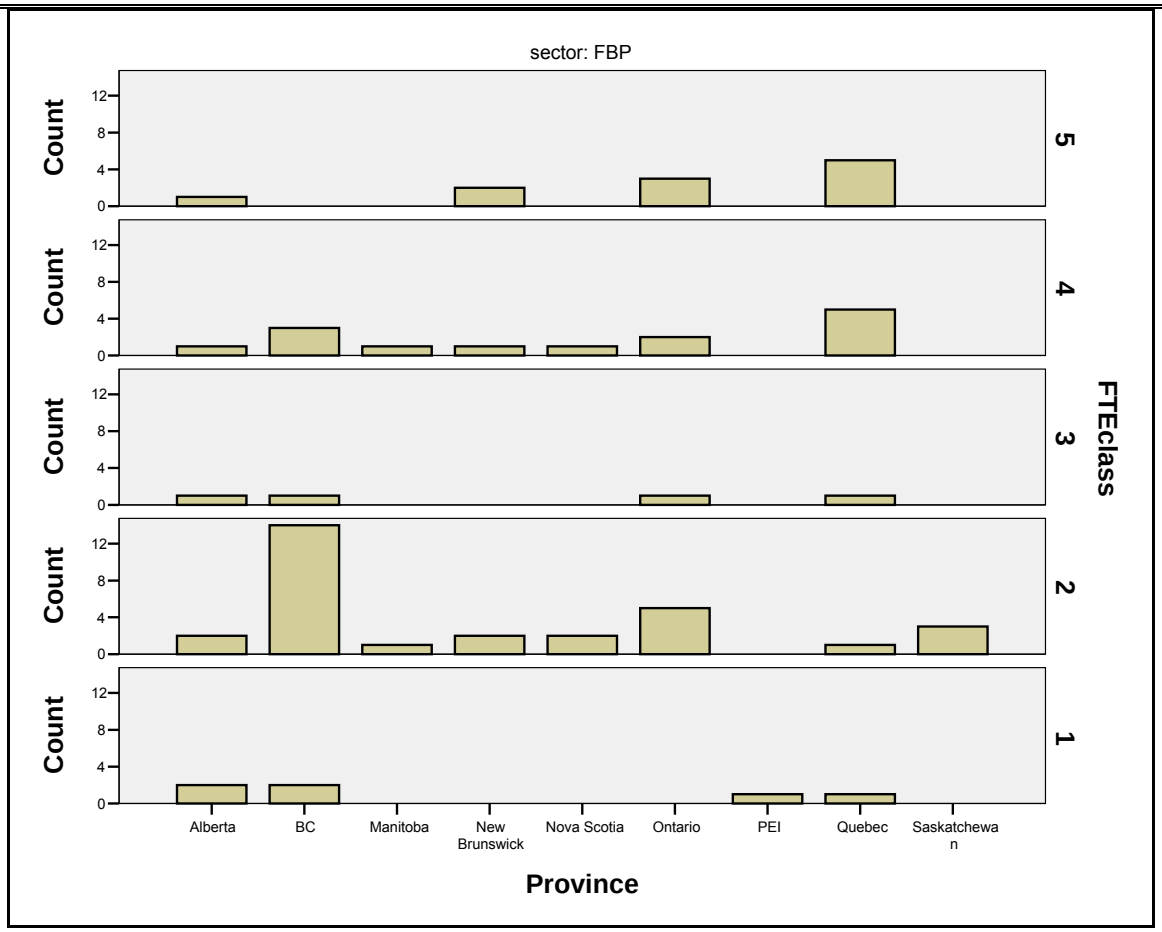


Figure 18: Employment (FTE) Class for Finished Building Products (FBP) by Province

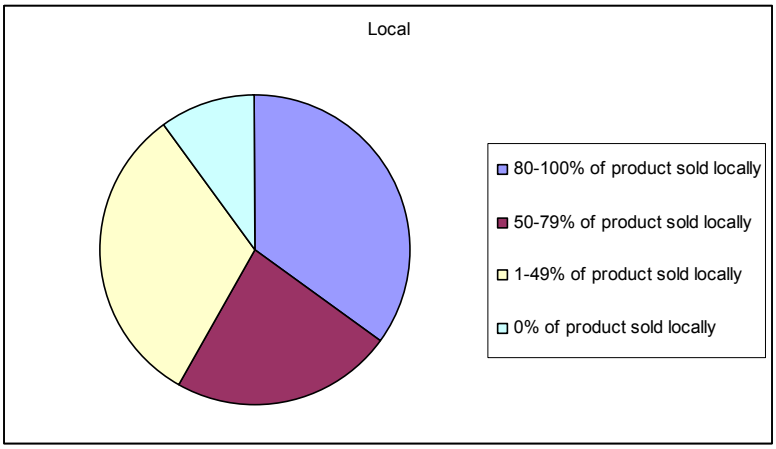


Figure 19: Sales of FBP Firms to Local Markets

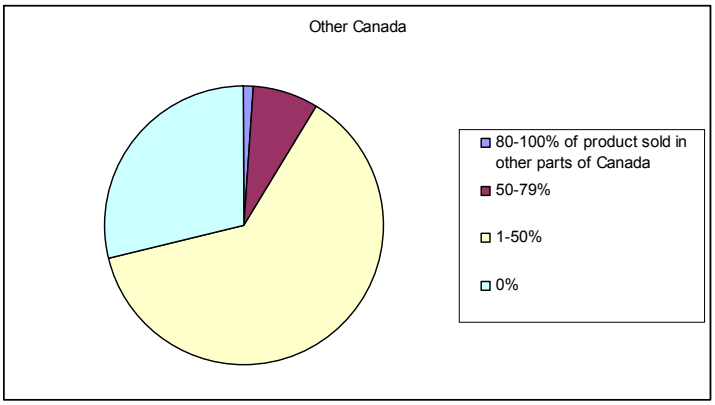


Figure 20: Sales of FBP Firms to other Canada markets

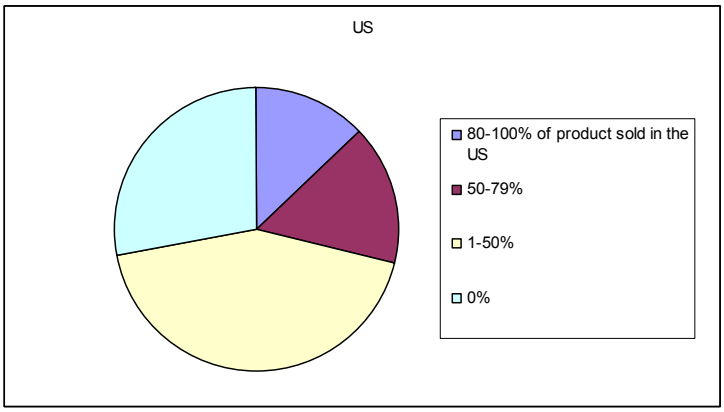


Figure 21: Sales of FBP Firms to US markets

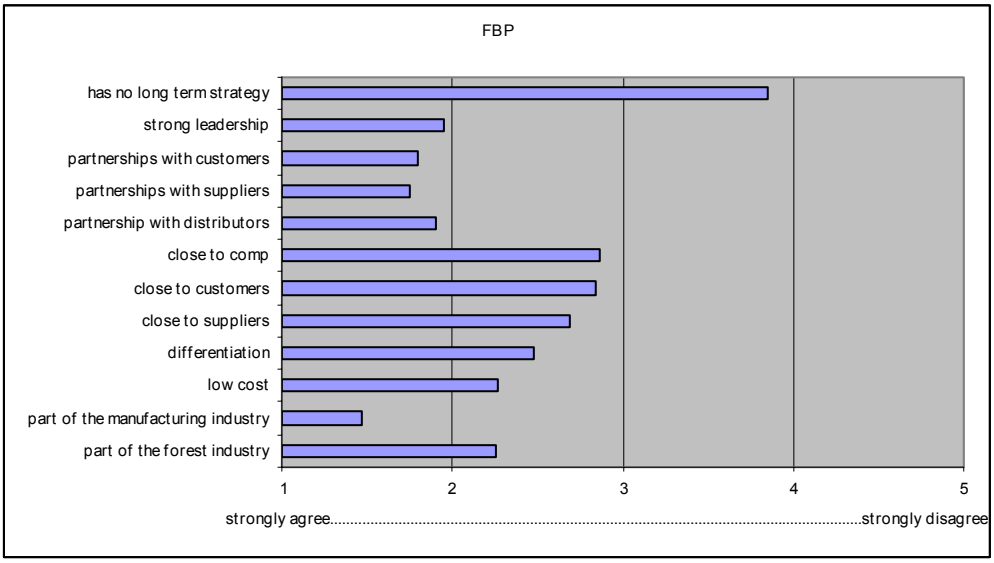


Figure 22: Perceptions of FBP Manufacturers of Their Firm

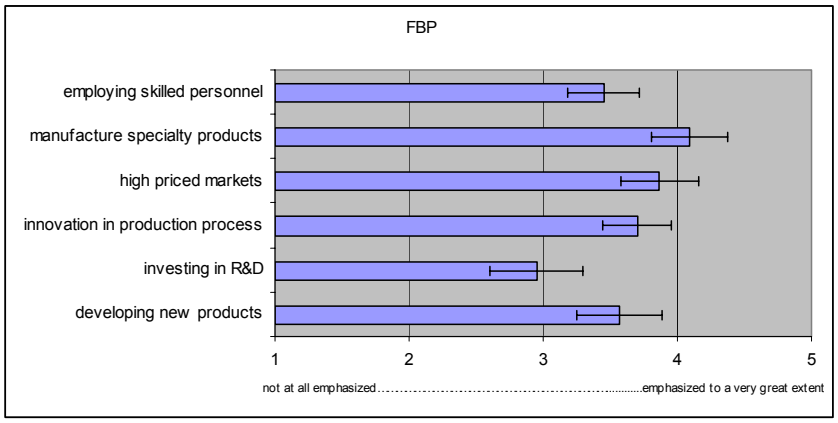


Figure 23: Relative Importance of Current Competitive Strategy for FBP Manufacturers

4.4 Millwork

Millwork is segmented into architectural millwork and building components.

4.4.1 Architectural Millwork

The architectural millwork sector (see Figures 24 through 29) consists of small companies distributed across the country. There is a concentration of slightly larger companies in BC and Alberta, while Quebec and Ontario have the largest number of firms.

The majority of millwork suppliers are local; however, there is some diversity, with 40% of firms sourcing material from other parts of Canada, over 30% sourcing from the US, and some firms sourcing from China and Central and South America. While the majority of the firms sell over 80% of their products locally, this does not mean that they are not bundled with other products and then sold outside of the local regions.

Most manufacturers considered themselves as part of the manufacturing sector and not the forest industry. They believed that they had long term strategies and strong partnerships with suppliers and customers and, to a somewhat lesser extent, with distributors. They believed they had strong leadership and employed skilled labour to produce specialty products. They did not focus on R&D.

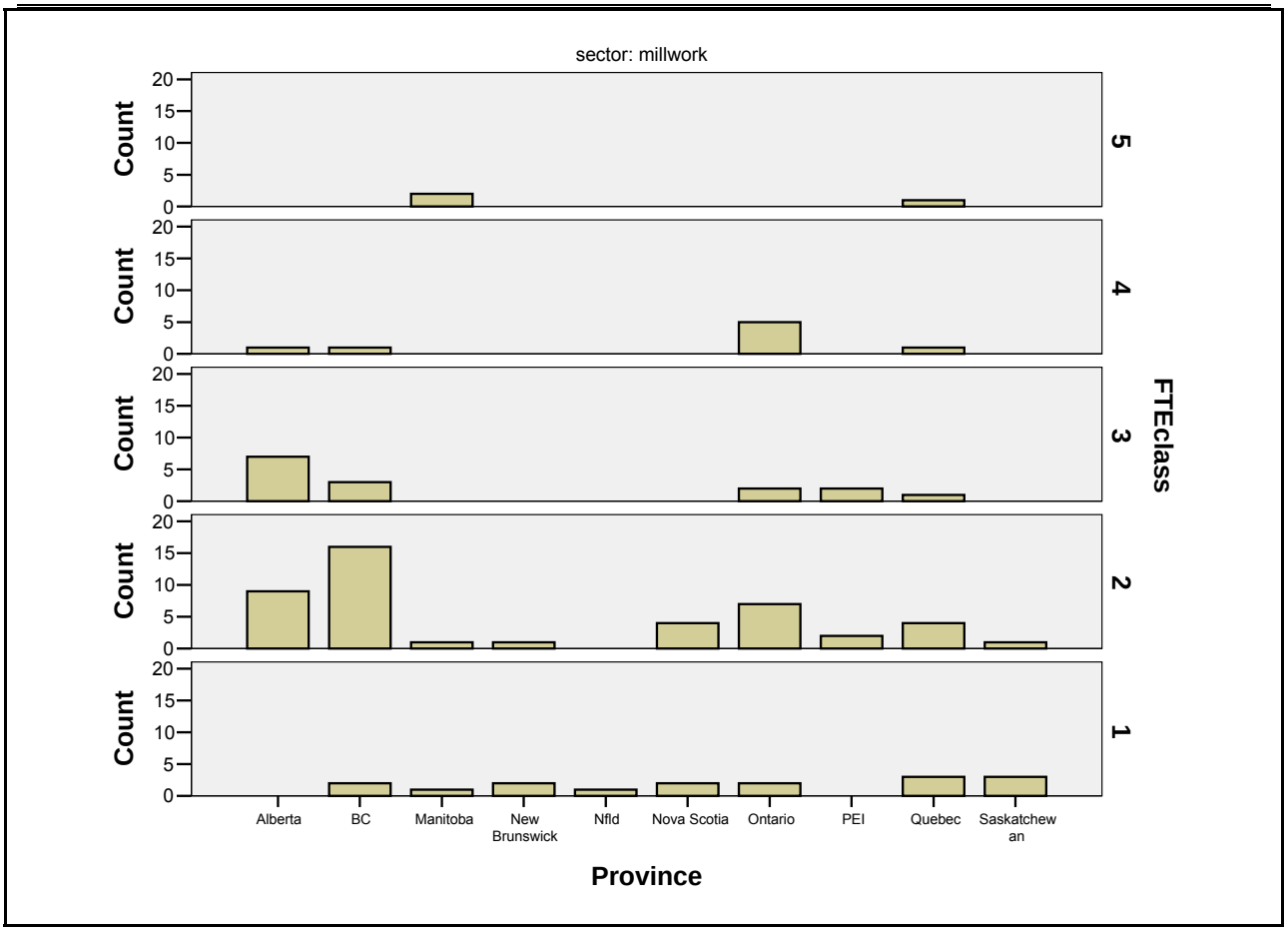


Figure 24: Employment (FTE) Class for Architectural Millwork by Province

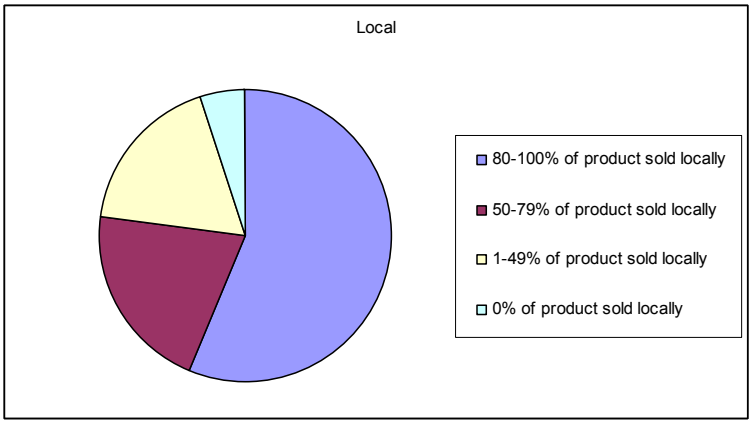


Figure 25: Sales of Architectural Millwork to Local Markets

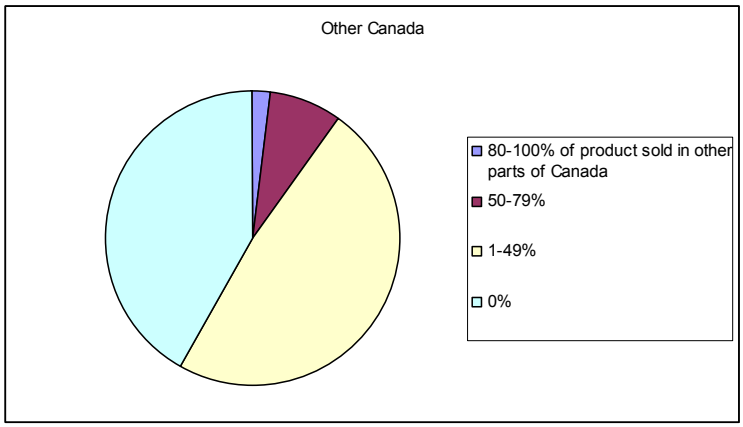


Figure 26: Sales of Architectural Millwork to Other Canada Markets

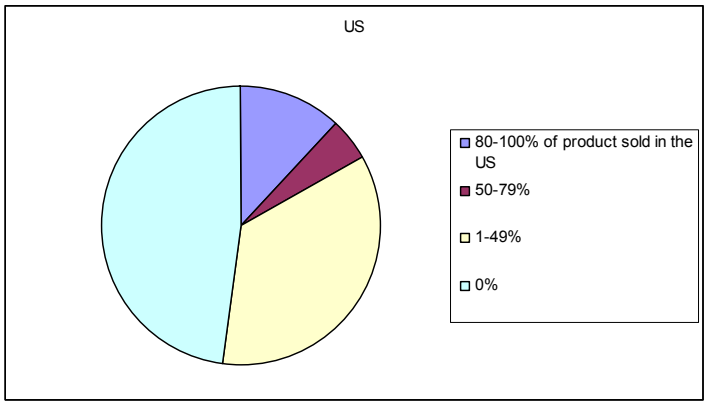


Figure 27: Sales of Architectural Millwork to US Markets

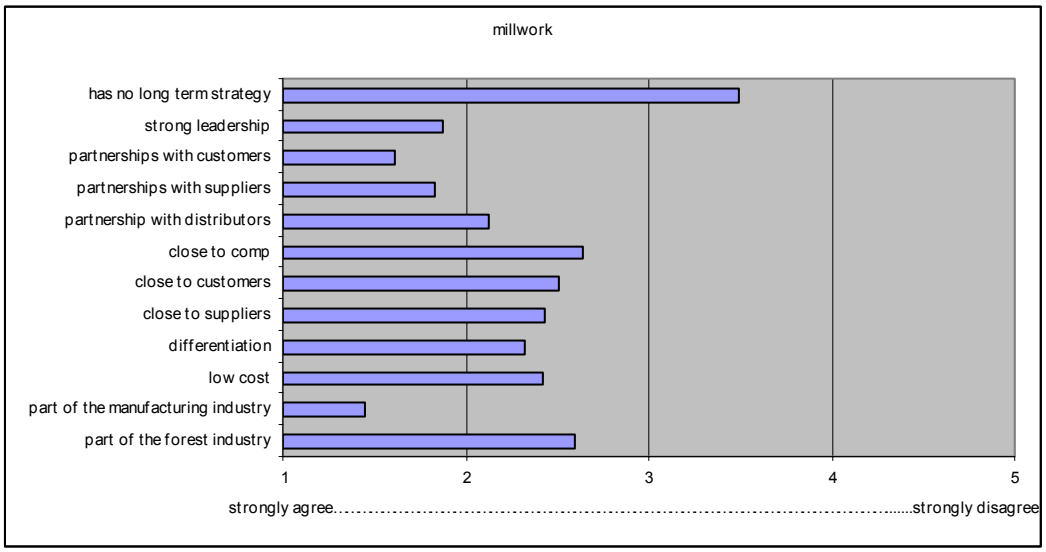


Figure 28: Perceptions of Architectural Millwork Manufacturers of Their Firm

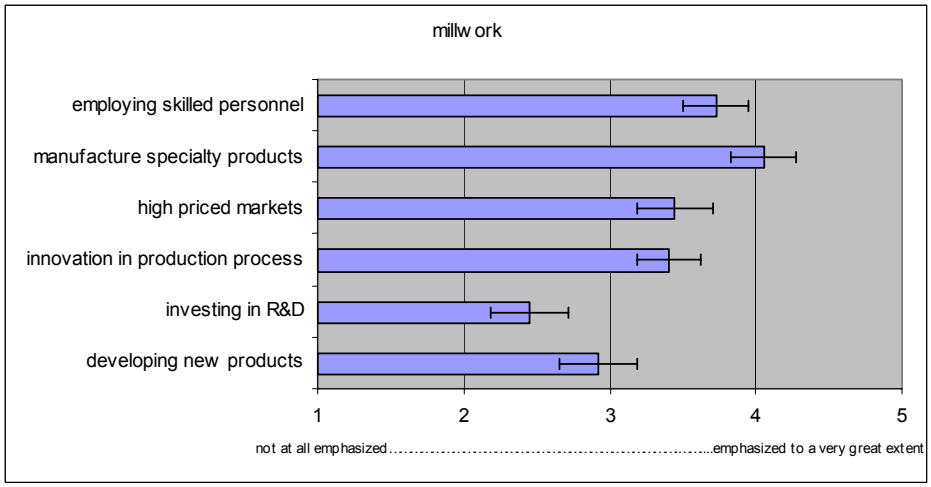


Figure 29: Relative Importance of Current Competitive Strategy for Architectural Millwork Producers

4.4.2 Building Components

The majority of building components firms (see Figures 30 through 35) are located in BC, Ontario, and Quebec. There are a few larger companies (>50 employees) in Quebec. The majority of component firms in central and eastern Canada are part of the furniture industry, whereas in the west they tend to be part of the building products industry.

The component sector indicated that they had local suppliers with only a quarter noting supply from other parts of Canada or the US. It is likely that these component firms have to go further a field to source specific hardwoods, particularly for furniture components. The majority sell at least half their production to local markets, but 40% sell over half to other parts of Canada or the US.

Most manufacturers of finished building products considered themselves as part of the manufacturing sector and not the forest industry. They believed that they had long term strategies and strong partnerships with suppliers and customers, but not distributors. They also believed they had strong leadership. There was little consistency among firms in terms of current competitive strategies.

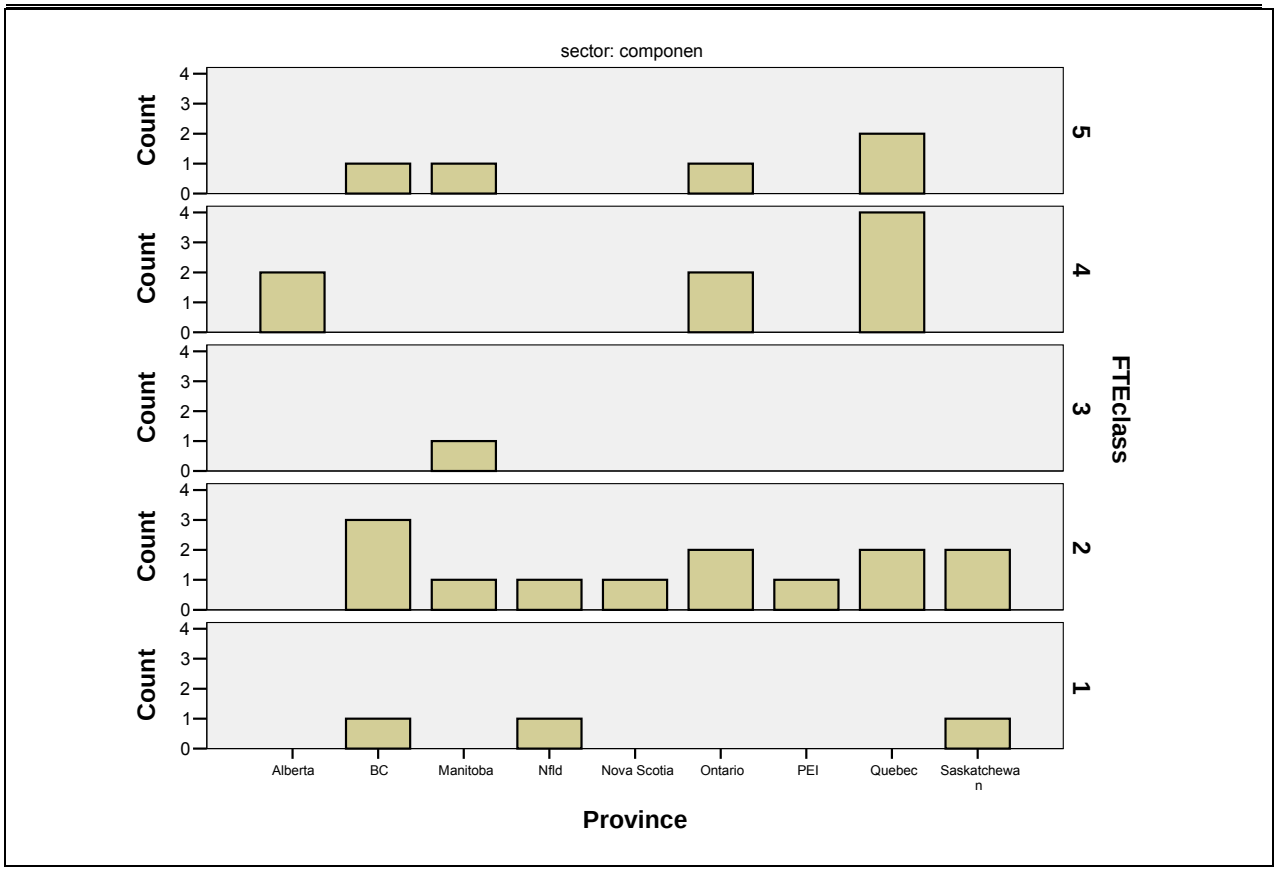


Figure 30: Employment (FTE) Class for Component Sector by Province

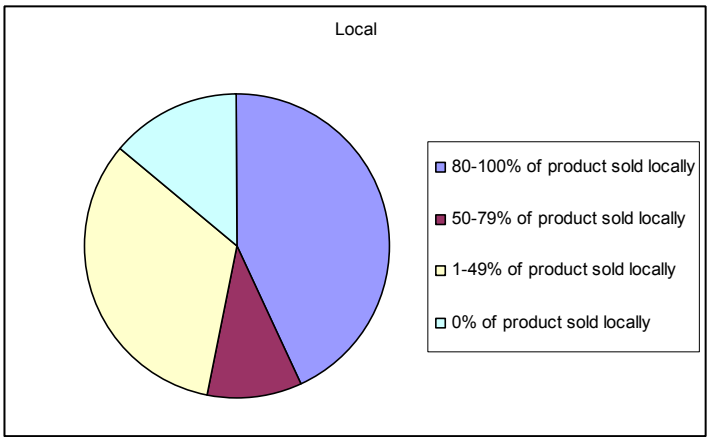


Figure 31: Sales of Component Sector to Local Markets

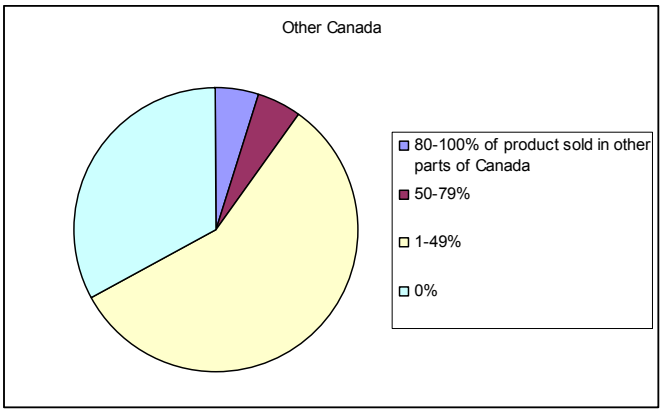


Figure 32: Sales of Component Sector to Other Canada Markets

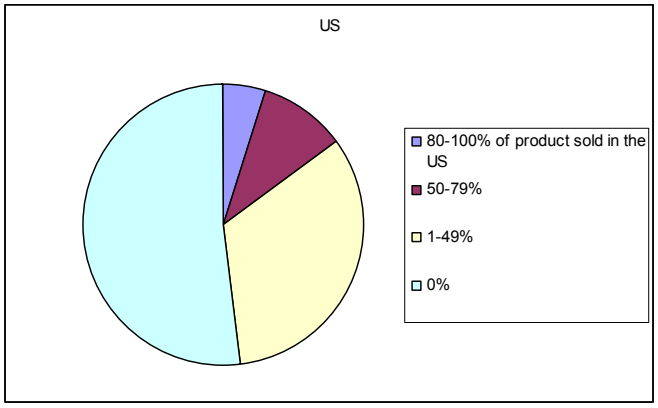


Figure 33: Sales of Component Sector to US Markets

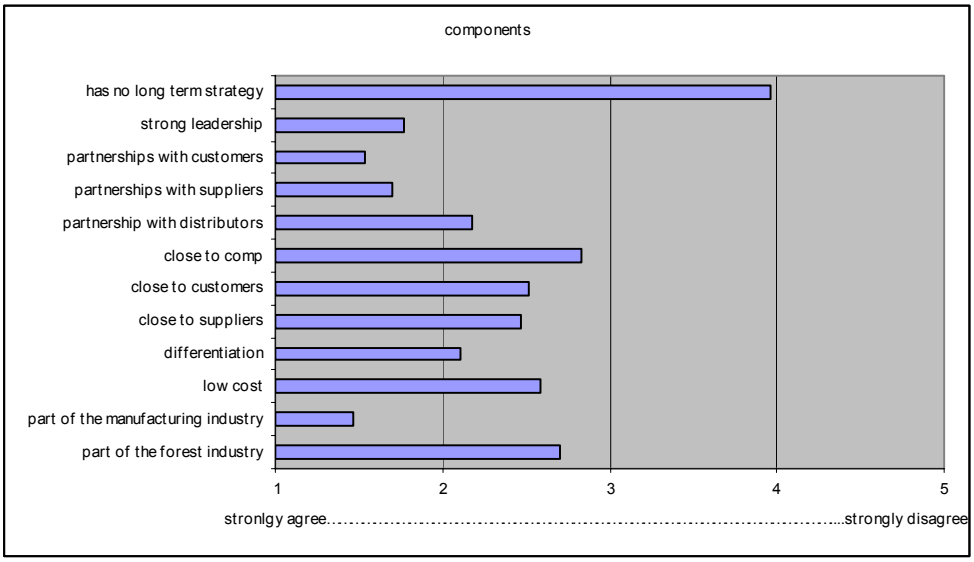


Figure 34: Perceptions of Component Manufacturers of Their Firm

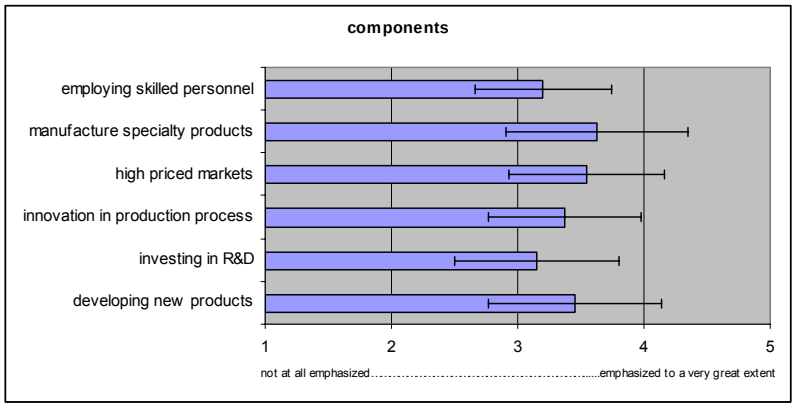


Figure 35: Relative Importance of Current Competitive Strategy of Their Firm

4.5 Housing

Employment: This sector includes manufactured housing as well as log and panelized housing. It is concentrated mostly in British Columbia, Ontario and Quebec, with additional companies located in the Maritimes. Almost all of the companies are SMEs with most employing between 4 and 25 employees (Figure 36).

Supply: Most source their wood supplies from local suppliers or from other parts of Canada. This may be because the sector is largest in BC where a good source of supply for timber frame and log houses is located. Slightly more than 10% source supply from other parts of Canada, with a few sourcing supplies from Europe.

Markets: Slightly less than half of the producers sell half of their housing locally with the same number selling half their housing to the rest of Canada (Figures 37 and 38). Over 25% of the manufacturers export at least half of their production to the US (Figure 39).

Business Environment & Strategy: Most housing manufacturers considered themselves as part of the manufacturing sector and, to a somewhat lesser degree, part of the forest industry (Figure 40). They do not necessarily believe that they had long term strategies. They have strong partnerships with suppliers and customers but do not feel close to their customers. They believed they had strong leadership and they employ a skilled labour to produce specialty products, but spend little on R&D (Figure 41).

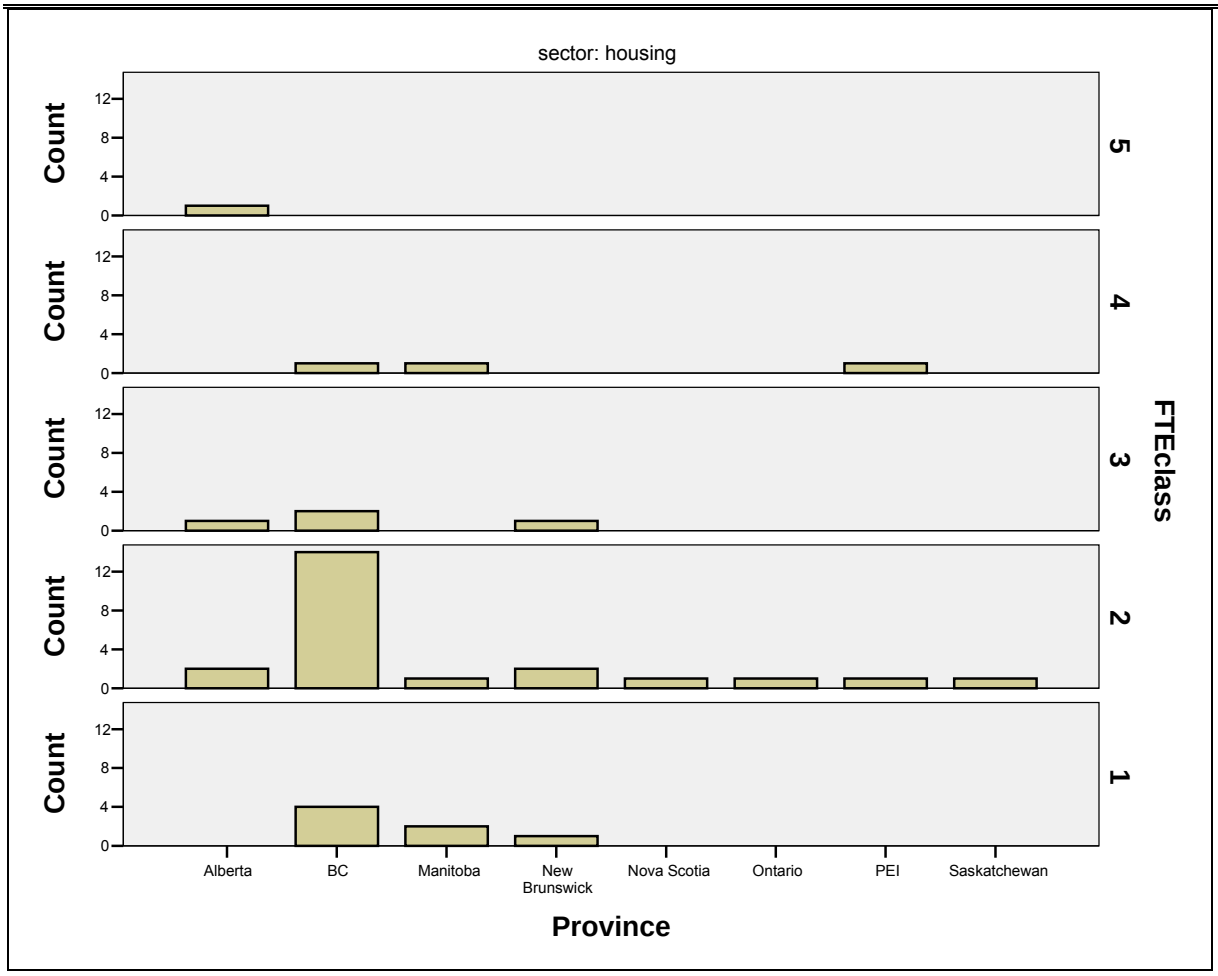


Figure 36: Employment (FTE) Class for Housing Sector by Province

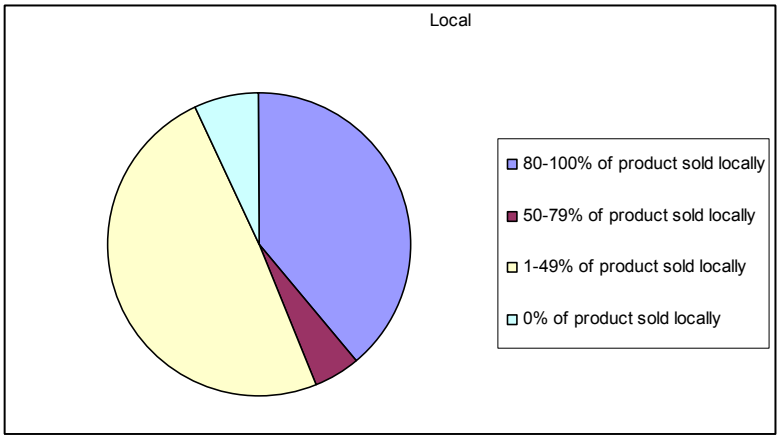


Figure 37: Sales of Housing to Local Markets

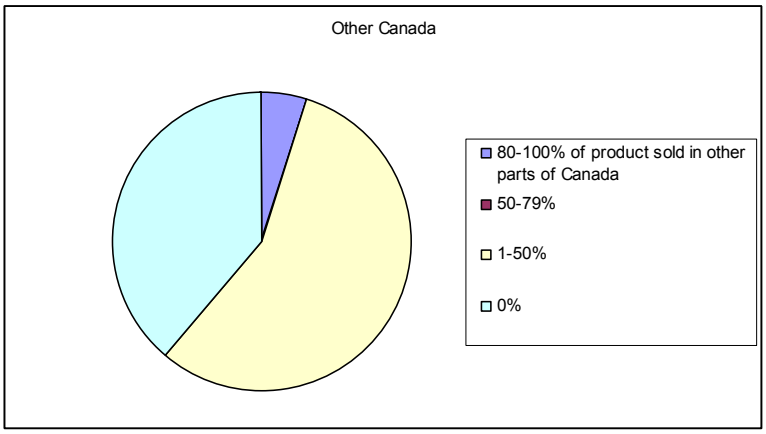


Figure 38: Sales of Housing to Other Canada Markets

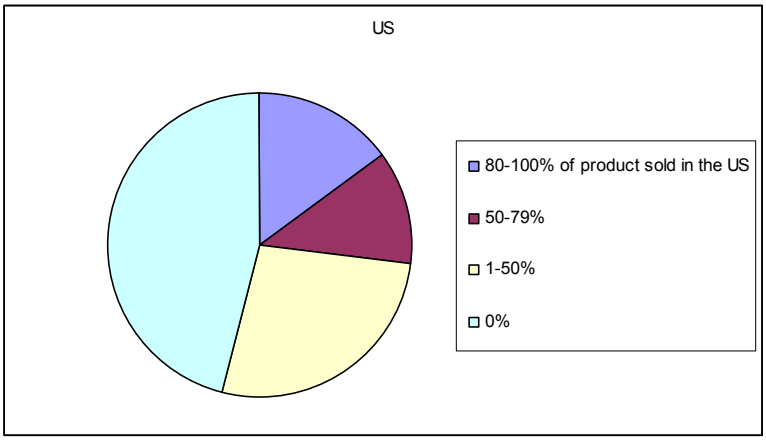


Figure 39: Sales of Housing to US Markets

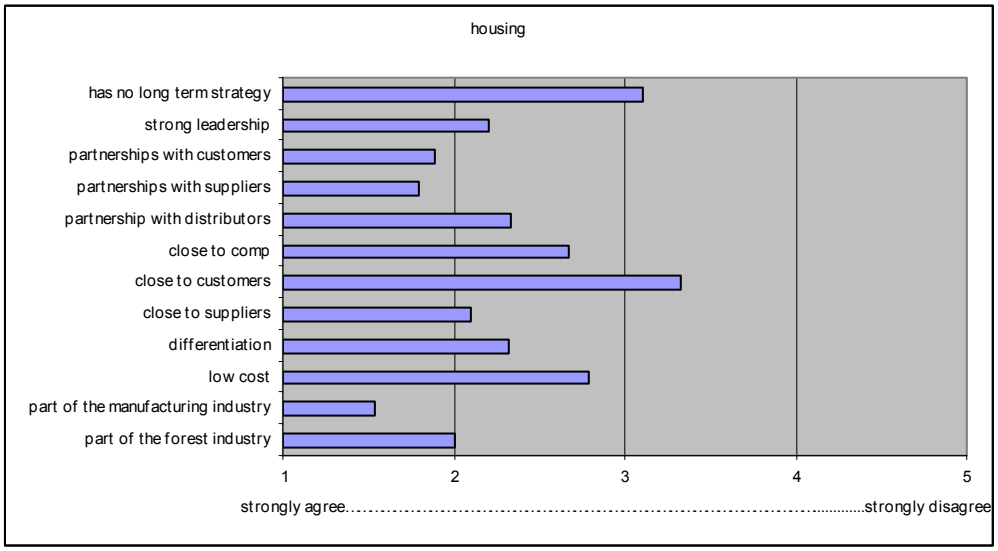


Figure 40: Perceptions of Housing Manufacturers of Their Firm

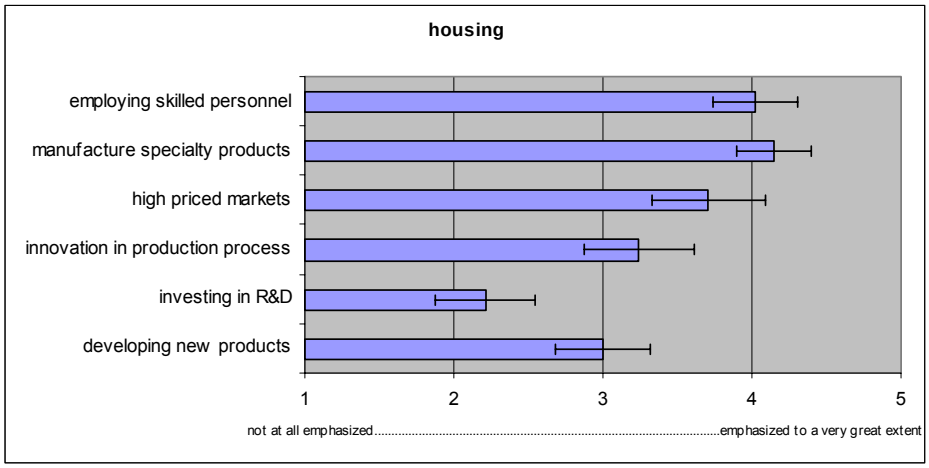


Figure 41: Relative Importance of Current Competitive Strategy of Their Firm

4.6 Engineered Building Products

Employment: The engineered building products (EBP) sector is concentrated in the west (Alberta and BC), as well as Ontario and Quebec. There is a wide range of company sizes, but there are few with less than 3 employees (Figure 42).

Supply: Sources of supply for the EBP sector is very different from other sectors. Slightly more than 40% indicated that they get their supply locally, with another 30% accessing supply from other parts of Canada, almost 10% sourcing from the US, and some material coming from China. Firms that sourced wood from other parts of Canada were mainly the larger EBP firms located in Alberta who source much of their wood from BC.

Markets: Most products are sold locally. However over a quarter of the firms export half their production to the US (Figure 45).

Business Environment & Strategy: Most producers of EBP considered themselves as part of the manufacturing sector and, to a lesser degree, part of the forest industry (Figure 46). They do not necessarily believe that they had long term strategies. They have strong partnerships with suppliers, customers and distributors. They believed they had strong leadership and that they employ skilled labour to produce a specialty product. While they spend little on R&D, they do feel that they are innovative in their production processes (Figure 47).

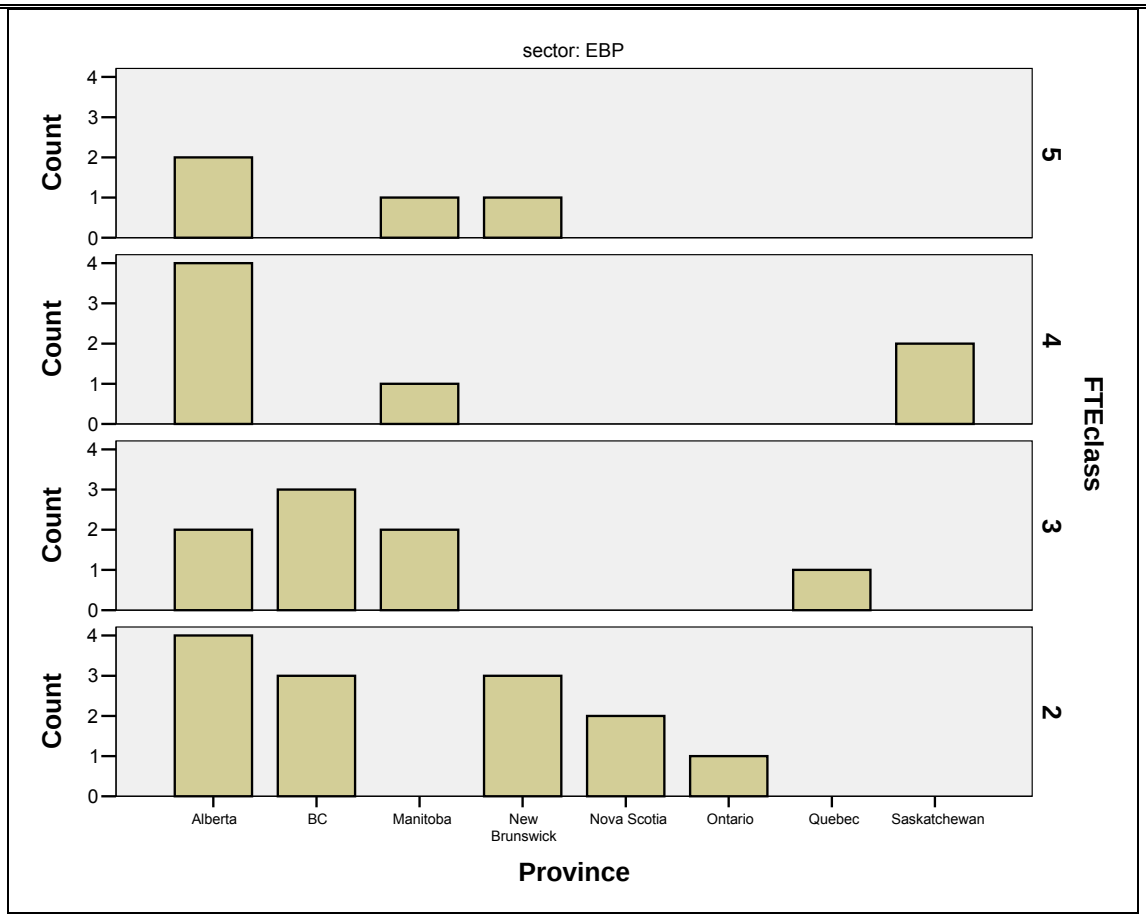


Figure 42: Employment (FTE) Class for Engineered Building Products (EBP) by Province

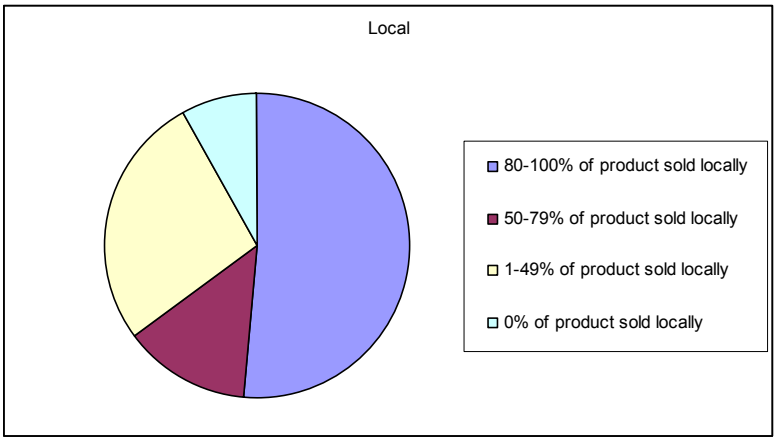


Figure 43: Sales of EBP to Local Markets

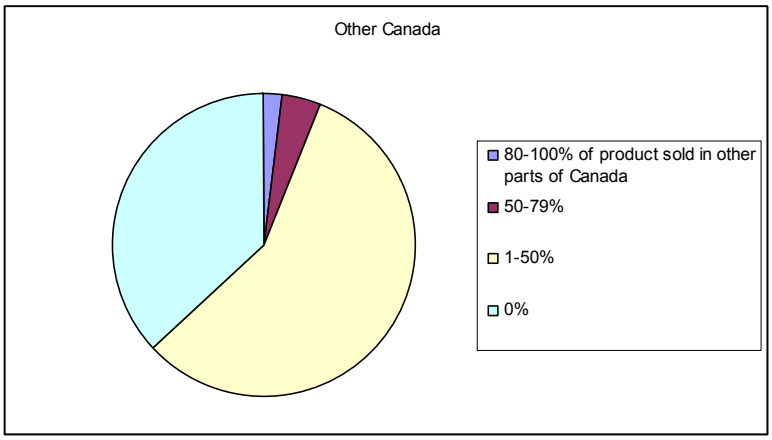


Figure 44: Sales of EBP to Other Canada Markets

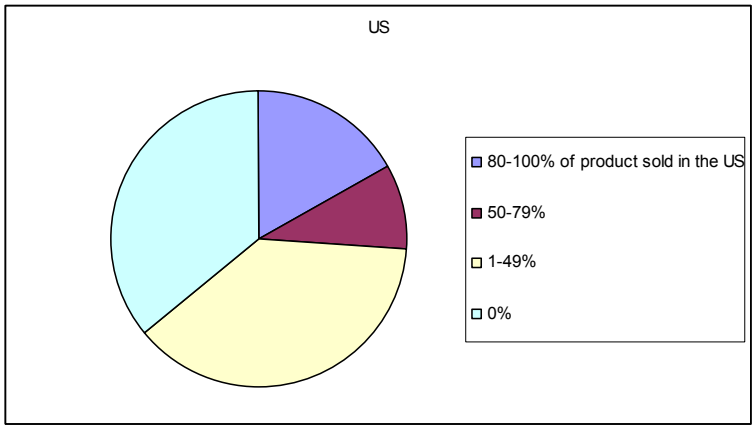


Figure 45: Sales of EBP to US Markets

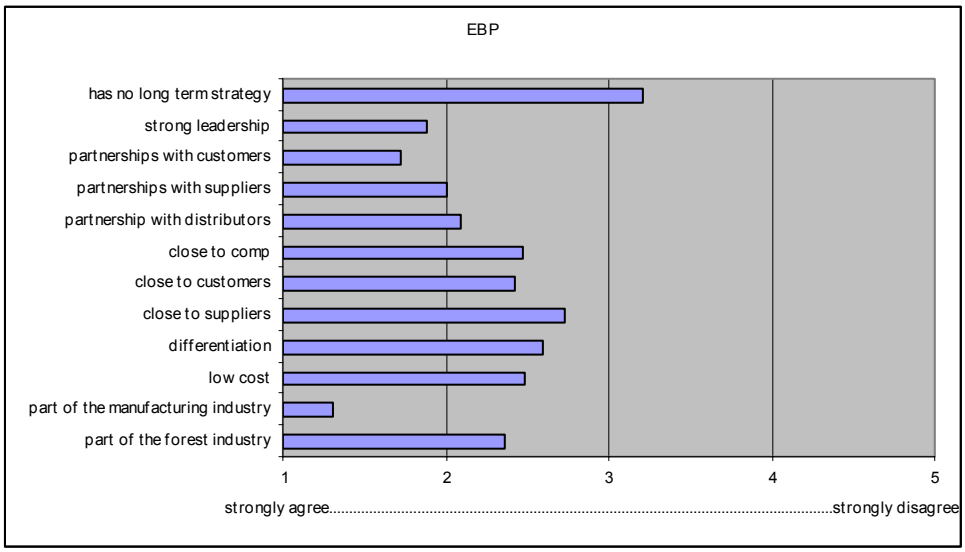


Figure 46: Perceptions of Component Manufacturers of Their Firm

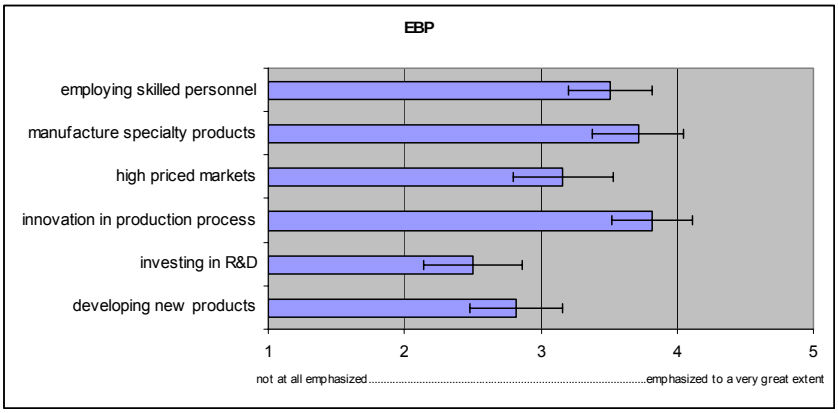


Figure 47: Relative Importance of Current Competitive Strategy of Their Firm

4.7 Other

4.7.1 Crafts – Musical Instruments

The musical instrument sector generally consists of small companies (less than 4 employees) distributed across the country. This sector also has the highest proportion of respondents that get supply from the US. It also sources wood materials globally from a wide range of countries. The musical instrument sector has the highest diversity of supplier locations. This sector sells locally, across Canada and to the US. These small companies have a wide diversity of competitive strategies and most would consider themselves artisans.

4.7.2 Other Crafts

The majority of companies in the craft sector are very small (1-3 employees). These businesses tend to be concentrated in the Maritimes. However, they are located across the country. The majority of respondents in the craft sector indicated that they get their supply from local sources.

4.7.3 Remanufacturers

The remanufacturing sector is concentrated in BC and Quebec. There is a range of company sizes. All of the respondents in this sector indicated that they get their supply locally. About 25% get supply from other parts of Canada, the US and Europe to a much lesser extent.

4.7.4 Miscellaneous Other Products.

This category is mostly made up of boat builders and casket makers. The former are concentrated in the coastal provinces (Maritimes and BC), while casket makers are concentrated in Ontario and Quebec. Most boat builders are small and employ less than 3 people while the casket companies tend to be larger, although still employing less than 50 workers in most cases. The majority of respondents indicated that they get their supply from local sources, followed by other parts of Canada and the US.

4.7.5 Pallets

Pallet manufacturers generally employ less than 25 workers, but more than 3. There appears to be a concentration of this sector in Ontario, as well as in the Prairies (Alberta, Saskatchewan, and Manitoba). Suppliers are mainly local, but other parts of Canada are also frequent suppliers. For pallet manufacturers, wood price is likely more important than wood quality when choosing suppliers.

5 Environmental Impacts and Levers

5.1 Environmental Impacts

This analysis does not include the environmental impacts inherent in using wood from forests, including a general drawdown of natural capital and the net impacts of timber harvesting on non-excludable public ecosystem services like carbon sequestration and climate control, nitrogen fixation, air and water quality, biodiversity and so on. Instead, we concentrate on the environmental impacts from the manufacturing processes required to produce and deliver value-added wood products.

The non-forest environmental impacts can generally be classified into the following categories:

- energy use including the creation of GHG;
- manufacturing processes; and
- other value-chain considerations, including active use impacts.

Key points of each are discussed in turn, followed by a consideration of environmental impacts in each of the secondary wood products sectors.

5.1.1 Energy Use:

Like most industrial processes, the manufacture of value-added goods is fairly energy intensive, although comparatively less so than in the production of commodity products like lumber and pulp and paper. This is especially true in the case of fossil fuel consumption – value-added producers tend to be urban-based SMEs and most of the energy required to run equipment and machinery is derived from “the grid”. That said, there is oftentimes a need to kiln-dry wood, a very consumptive process, meaning that there are clear opportunities for biomass co-generation systems. Unfortunately the small size of these manufacturers tends to impede the development of biomass co-generation systems. To date, the vast majority of value-added producers do not have kiln drying facilities, but rather still rely on the drying capabilities of larger commodity producers. However, this is changing as more and more secondary producers find it increasingly difficult to source lumber to their exacting drying specifications. Nowadays, it is not uncommon to see, for instance, a larger value-added SME with some kiln capacity.

5.1.2 Manufacturing Processes:

The nature of value-added products is such that the use of glues, chemicals, coatings, finishes, additives and complex packaging is commonplace. Each of these material inputs can have significant environmental impact. While greenhouse gas emissions from the use of these materials are likely small due to the generally low volumes used, there are potential impacts related to effluents, disposal and toxicity. For instance, it is not uncommon in the wood industry to generate air emissions including dioxins,

furans, VOCs and particulate matter (The Delphi Group 2005)14, in which case there would be a need for emission monitoring and control. In addition, some of the finishes continue to off-gas during use, potentially impacting air borne pollutants and indoor air quality. Alternatives have already been developed for the Japanese market where stringent regulations prohibit the use of formaldehyde emitting materials and finishes. One example is the use of emulsifiable diphenylmethane diisocyanate (MDI) in the production of medium density fiberboard (MDF) replacing phenol formaldehyde resins which emit formaldehyde at levels unacceptable for indoor use in Japan.

The production of higher value wood products, especially appearance wood products for consumer markets, is unforgiving and a great deal of waste is created in order to make products that meet increasingly strict customer requirements. Decomposition into greenhouse gases is an issue if this material is land-filled, but ample alternatives exist in the form of biofuels and alternative products. It is also worth noting that, in general, the production of waste is decreasing despite increasing specification due to the advent and deployment of modern management and quality programs in many value-added production facilities.

However, there are additional localized environmental impacts from the manufacturing process including particulate from dust, VOCs due to finishing, and noise pollution.

5.1.3 Other Value Chain Considerations:

Transportation is said to account for approximately half of the forest products industry's fossil fuel use (Apps *et al.* 1999)[15]. This includes the primary sector which has markets that are potentially far removed from manufacturing sites and, thus, is likely an overestimate for many value-added producers whose markets tend to be more localized. At any rate, the transportation and distribution of goods (upstream raw materials and downstream finished products) is a significant contributor to the overall greenhouse gas emissions of the manufacturing process, with one study estimating transportation emissions comprising 5% to 15% of the total (Paper Task Force 2002)[16].

Recent trends towards ready to assemble (RTA) furniture can reduce the environmental cost of transportation. This can be RTA targeted to the end user (eg, Ikea) or to the retailer (eg, Sears assembling Canwood furniture). Since many of the Canadian secondary wood manufacturing firms serve local markets the environmental impact of transportation should be relatively minor.

[14] The Delphi Group (2005). Opportunities & Gap Analysis for Canada's Environmental Technology (ET) Sector: Forestry Sector Technology Analysis. Prepared for Environment Canada, Ottawa, Ontario, June 2005. 19 pp.

[15] Apps, M.J., W.A. Kurz, S.J. Beukema, and J.S. Bhatti (1999). Carbon Budget of the Canadian Forest Products Sector. Environmental Science and Policy 2(1999):25-41.

[16] Paper Task Force (2002). Paper Task Force White Paper No. 3: Lifecycle Environmental Comparison: Virgin Paper and Recycled Paper-Based Systems. Prepared for Environmental Defense, New York, NY, December 1995 and February 2002.

While value-added products are able to sequester carbon during their active service lives, the disposal of these products is a concern in so much as their decomposition releases non-climate neutral methane into the atmosphere. In general, the situation here is improving, with increased recycling and re-use and a shift away from land-filling organic materials to burning them for energy. In addition, intelligent design that promotes design for disassembly encourages reuse and recycling. The growth of RTA facilitates the ability to disassemble value-added goods, facilitating reuse and improving carbon sequestering.

These products can also have environmental impacts during their active service lives. Resins and finishes are complex chemical compounds that often degrade over time. This degradation has the potential to cause off-gassing of environmentally harmful fumes. In addition, they can render the product very difficult to reuse or recycle. The trend towards combining a variety of materials in value-added wood products can also contribute to difficulties for reuse and recycling, as well as landfill problems. Japan has recently implemented new laws and regulations limiting specific chemicals, such as formaldehyde, to prevent off-gassing. As the proportion of elderly citizens increases in more developed nations, they too are expected to follow this trend towards ensuring a healthy home environment as a means of promoting good health and reducing health care costs.

5.1.4 Environmental Impacts by Sector:

The secondary wood products industry is incredibly varied, producing a range of goods that typically are used in countless home / work applications. It is not surprising, then, that the processes involved in manufacturing, transporting, installing, and disposing of products will also vary. Table 9 is an attempt to show this variation between sectors in the value-added wood industry. Specifically, we have used a generalized life cycle (cradle-to-grave) continuum as a means of conveying the environmental impacts for each sector during every phase of a product's active service life, from resource extraction to recycling, reuse and disposal. Given the complexity and breadth of this problem, only key environmental impacts are highlighted. Additionally, "knowledge gaps" are identified where little information exists.

From Table 9, it can be seen that the production of secondary wood products generally have a low to moderate impact on issues related to resource extraction. The reason for this is that these processes are typically one level removed from the extraction of wood fibre from forests. The exception to this would be housing and engineered building products sectors, which tend to have closer ties to forest lands. In general, the environmental impacts attributable to manufacturing process also tend to be low to moderate, given the scale and comparatively low energy requirements that are required in secondary manufacturing. However, there is certainly potential for gains here, especially in the areas of environmentally benign coatings, glues and finishes, waste reduction and energy use. It should be noted that very little is known of the environmental impacts of the furniture, cabinetry, and pallet industries and this certainly warrants further investigation. The impacts of transportation are obviously a function of where markets for value-added wood products are located. Many of the markets tend to be localized, with companies having more and more reach throughout North America. Only the housing sector can truly be characterized as being somewhat international. In addition, special consideration needs to be paid to this sector because of the bulky nature of the products themselves and the greater amounts of energy / labour required for installation. Occupancy, maintenance, and demolition tend not to be major environmental issues where secondary wood products are concerned. Again, the exception to this is in the housing sector, where

issues around healthful living and energy efficiency are becoming increasingly important. At this stage, the vast majority of value-added products are land-filled at the end of their service lives, but there is great potential for recycling and reuse. In particular, the recycling and reuse of engineered wood products needs to be better understood as the active service lives of the first generation of these products rapidly draws near.

Sector	Resource Extraction[17]	Manufacturing	Transportation/ Installation/ Construction	Occupancy/ Maintenance	Demolition	Recycling/ Reuse/ Disposal
Furniture	- minimal impact given that this is a secondary manufacturing process	- KNOWLEDGE GAP	- transportation solely, although impact is low as markets tend to be localized - little waste since finished products are manufactured in factory	- very little in the way of maintenance required - finish or decay of materials may produce harmful off-gassing (KNOWLEDGE GAP)	- product life spans are becoming shorter as styles change more quickly - little environmental impact involved in the demolition process	- contemporary products are generally not recycled or reused - most products are land-filled after use - difficult to use for co-generation due to myriad of materials (eg, composites) and finishes
Cabinets	- minimal impact given that this is a secondary manufacturing process	- KNOWLEDGE GAP	- transportation throughout North America - minor energy expended in installation - little waste since finished products are manufactured in factory	- some maintaining required over the lifespan of products - typically they are replaced and often due to style changes - finish or decay of materials may produce harmful off-gassing (KNOWLEDGE GAP)	- product life spans are becoming shorter - little environmental impact involved in the demolition process - current construction techniques amenable to reuse, although this is not commonplace	- contemporary products are generally not recycled or reused - most products are land-filled after use - may be issues with recycling, reuse or co-generation due to myriad of materials and finishes
Finished Building Products	- minimal impact given that this is a secondary manufacturing process	- relatively low impact manufacturing process - use of coatings and finishes may cause environmental concerns unless waste is recycled - low to moderate waste generated	- transportation throughout NA - minor energy expended in installation - little waste since finished products are manufactured in factory	- some maintaining required over the lifespan of products, usually in the form of refinishing - finish or decay of materials may produce harmful off-gassing (KNOWLEDGE GAP)	- product life spans are becoming shorter - little environmental impact involved in the demolition process - current construction techniques not amenable to reuse	- high potential for recycling and reuse, for higher quality solid wood products and the growing trend towards reclaimed materials - most products are land-filled after use
Architectural Millwork	- minimal impact given that this is a secondary manufacturing process - small scale sector	- relatively low impact manufacturing process - use of coatings and finishes may cause environmental concerns - low to moderate waste generated	- transportation throughout North America - minor energy expended in installation	- some maintaining required over the lifespan of products, usually in the form of refinishing	- product life spans are becoming shorter - little environmental impact involved in the demolition process	- high potential for recycling and reuse, if installation of solid wood members permits - most products are land-filled after use
Building Components	- minimal impact given that this is a secondary manufacturing process	- low to moderate risk (like sawmilling) - moderate levels of waste produced	- transportation throughout North America - minor energy expended in installation	- maintenance generally in the form of repair, remodelling, and replacement	- little environmental impact involved in the demolition process - life cycle similar to house life cycle; longer than most other products	- products are typically land-filled or burned for energy at the end of their active service lives. - requires design and installation for disassembly (DFD) for recycling or reuse

[17] To reiterate, this analysis does not include the environmental impacts inherent in using wood from forests, including a general drawdown of forests and the net impacts of timber harvesting on other ecosystem services like carbon, water, and nitrogen cycles.

Sector	Resource Extraction	Manufacturing	Transportation/ Installation/ Construction	Occupancy/ Maintenance	Demolition	Recycling/ Reuse/ Disposal
Housing – Log Buildings	- high impact (nearly a direct link to the forest)	- relatively low impact manufacturing process - potential to generate waste is less in a factory setting than traditional on site construction	- great deal of energy, labour and transportation involved in moving homes from points of production to points of consumption, especially given bulky nature of products - growing international market impacts on transportation	- highest potential for energy savings, especially with the growing trend towards creating longer-lasting, energy efficient, healthy homes - natural materials and finished alleviate off-gassing problems	- housing life cycle tends to be longer than average house due to high cost and traditional construction methods - most log houses can be dismantled for reuse and recycling due to construction techniques, although this is not commonplace	- high incidence of either reuse or recycling of logs
Housing – Prefabricated	- moderate impact based on material selection	- relatively low impact manufacturing process - potential to generate waste is less in a factory setting than for traditional on site construction	- moderate energy consumption used in moving containers of housing components long distances - growing international market impacts on transportation	- high potential for energy savings, that can be designed and built into homes at factory	- moderate risk given large mix of materials and shortening life spans for houses due to re-development pressures -great variety of mixed materials-	- high potential exists especially with design for disassembly, but this has yet to become a widespread mode of practice - most material is currently land-filled
Crafts	- minimal impact as a result of scale	- highly variable, but generally low impact	- most markets tend to be local, with very little in the way of installation concerns	- N/A	- N/A	- low risk as a result of scale, although majority of crafts would be land-filled
Remanufac-turing	- moderate impact, although not as high as for primary processing	- low to moderate risk (like sawmilling) - potential for high energy use if processes include kiln drying - moderate levels of waste produced	- most markets tend to be local, with very little in the way of installation concerns	- N/A	- little environmental impact involved in the demolition process	- products are typically land-filled or burned for energy at the end of their active service lives.
Pallets	- moderate impact	- KNOWLEDGE GAP	- most markets tend to be local, with very little in the way of installation concerns	- N/A	- little environmental impact involved in the demolition process	- high level of reuse, with products typically being reused many times over - products are typically land-filled or burned for energy at the end of their active service lives.
Engineered Building Products	- high impact, especially when fibre is harvested for this purpose	- very energy intensive - high potential for emissions of VOCs and particulate matter, mostly from resins and wood furnish - high levels of waste generated	- energy expended in transportation and installation - transportation costs are higher because of bulky nature of material, however, markets tend to be restricted to North America	- composite products have the potential to off gas the resins which bind the wood furnish together - potential for breakdown of adhesives over long periods of time (eg, 75 years) (KNOWLEDGE GAP)	- KNOWLEDGE GAP	- KNOWLEDGE GAP

Table 9: Environmental Impacts of Secondary Wood Products Sectors along Life Cycle Analysis Continuum

5.2 Levers of Change and Influencers

One of the key levers of environmental change for many primary wood products companies emanates from the power of large firms in the supply chain – large scale suppliers of raw material inputs or buyers of products (wholesalers or retailers) – using their leverage to influence change. For example, forest certification has been driven, in large part, by large distributors and retailers such as Home Depot, Lowes and paper distribution networks (responding, in turn, to pressures from environmental non-governmental organizations). While many of these large retailers or distributors give preference to products that have third party environmental certification, they often do not differentiate these products from others in their retail locations. Thus, product specific information is not passed onto the final consumer and the producer has gained only market access and not recognition by the end user. For example, studies completed by Oregon State University found that ecolabeld plywood outsold unlabeled plywood by a 2 to 1 factor, but only if there was no price differential. With a 2% price differential, the unlabeled plywood outsold the ecolabeled plywood by a factor of 1.7 to 1. Thus, there is little incentive for home centres to sell ecolabeled wood products. However, they do require them to avoid negative impacts of various environmental campaigns[18]. This is an example of how ecolabeling provides market access, but does not necessarily translate into a price premium or an advantage with the end users.

The secondary wood manufacturing sector is dominated by SMEs that typically rely on local suppliers and local markets. This is a key factor that differentiates the secondary and primary wood products sectors. While larger commodity producers can be influenced by large suppliers (eg, forest land owners such as provincial governments) and large buyers, the smaller scale of operations in the secondary sector, its geographical dispersal across provincial boundaries, and its variety of manufacturing processes and products, hinder supply chain levers from being effective as environmental change agents.

For smaller sized enterprises, it is often forces that exist within companies that lever environmental change. Reports suggest that regulation, leadership by senior management, and the support of non management employees have the greatest influence on manufacturing facilities environmental practices. Table 5.1 from the Henriques and Sadorsky (2004) report[19], which included both large and SMEs in their survey, is reproduced below.

[18] Anderson, R. and E. Hansen (2003). Do Forest Certification Ecolabels Impact Consumer Behaviour? Results from an Experiment. 2 pages of Research Brief from Oregon State University. Downloaded from http://www.cof.orst.edu/cof/fp/faculty/hansen/Home%20Depot%20Experiment%20one%20pager.pdf

[19] Henriques, I. and P. Sadorsky (2004). Environmental Policy Tools and Firm Level Management Practices in Canada. Published for the Schulich School of Business (York University) and OECD Environment Directorate. 35 pp.

Table 5.1: Influence of Groups on the Environmental Practices of Facilities

Influence on the environmental practices of your facility by:	Not important	Moderately important	Very important	N/A
Regulatory Authorities				
Public authorities (federal, provincial, municipal)	.8%	27.1%	69.8%	2.4%
Head Office				
Corporate headquarters	7.1%	25.3%	50.6%	17.0%
Product Chain Stakeholders				
Household consumers	36.6%	26.0%	14.2%	23.2%
Commercial buyers	28.5%	36.4%	24.8%	10.3%
Suppliers of goods and services	39.0%	42.1%	12.2%	6.7%
Investors				
Shareholders and investment funds	20.3%	27.9%	29.9%	21.9%
Banks and other lenders	23.7%	33.6%	27.7%	15.0%
Employees				
Management employees	5.5%	34.4%	56.5%	3.6%
Non-management employees	11.0%	42.5%	40.9%	5.5%
External Stakeholders				
Environmental groups or organisations	21.3%	51.4%	21.3%	6.0%
Industry or trade associations	28.3%	41.4%	16.3%	13.9%
Labor unions	23.8%	20.6%	12.7%	42.9%
Neighborhood/community groups	18.7%	41.0%	26.7%	13.5%

This suggests that it is important to "convince" the managers of these small firms to modify their environmental practices. There are basically two approaches: the "carrot" and the "stick". For the "carrot" approach, the advantages of improving environmental practices need to be laid out clearly and with a sound business case. These can include raising the awareness of the growing trend among larger firms for corporate responsibility and independently audited sustainability reports on an annual basis[20]. Many of the products in this sector end up in distribution chains that serve large retailers who are adopting sustainability guidelines for their suppliers. Getting ahead of the demand curve for environmentally sustainable products could provide Canadian SMEs with new market opportunities, as well as facilitate improved competitiveness. Increasing market access can increase sales opportunities for SMEs. For example, access to the Japanese housing market requires reducing formaldehyde emissions from finished wood products to enable a company to meet recently implemented Japanese building requirements. Having products meet newly developing residential green building guidelines could also open up new market opportunities within the North American housing market.

This approach would have to emphasize environmental stewardship as a competitive tool and not a "feel-good" initiative. There may also be an opportunity for conveying how environmental performance can improve the bottom line of small to medium-sized wood manufacturers. However, this would require a realistic case supported by market demand or regulatory regimes. For example, it may be beneficial to adapt manufacturing to meet coming environmental regulatory changes; however, should the change not occur, then unacceptable costs have been borne. That being the case, additional benefits from

[20] For empirical support of this growth globally, see KPMG International Survey of Corporate Responsibility Reporting (2005) by KPMG Global Sustainability Services. June 2005. Downloaded from http://www.kpmg.com/Rut2000_prod/Documents/9/Survey2005.pdf.

environmental activity also need to be conveyed, including reduced environmental fees for reductions in specific environmental impacts beyond current regulations, tax credits for reductions in site specific GHG or effluent production, and energy tax rebates for increased energy efficiency.

The “stick” approach is exemplified by the expectation of additional regulations and this may prove to be the strongest influence in environmental behaviour modification of SMEs. Many companies understand that competitive advantage is afforded to companies that are proactive in meeting changing regulations. They understand that negative impacts (both environmentally and in the marketplace) may be avoided with modified environmental behaviours. That being the case, “sticks” might include plans for long term tightening of energy and/or effluent requirements and increased environmental taxes, environmental liabilities, technical regulations, etc. Signalling increasing fuel costs should trigger increased fuel efficiency. However if the signal is not followed by action, this will lose its efficacy.

A closer look at Table 5.1 makes it clear that it is necessary to motivate the people working for these small and medium sized enterprises if environmental practices are to improve. Small and medium enterprises have very flat hierarchical structures and lines of communication between management and employees tend to be direct. “Directives” from management have little real impact in SMEs. This suggests that management and worker training and education are key to affecting environmental change. Offering subsidized training programs on operational and environmental efficiencies may present one opportunity to influence environmental behaviour. The opportunity to improve operational efficiencies may, in itself, serve as a lever to encourage environmental improvements, particularly if they are intrinsically linked during course development and delivery. This is especially the case currently, as surges in energy prices and erratic prices of some raw material inputs are exacerbating the need for companies to operate more efficiently at lower costs

Table 5.2 from the same report[21] shows that regulatory compliance, accident and incident prevention, corporate image, and cost savings are the key motivators of environmental change. For SMEs serving local markets, corporate image would be supplanted by local reputation.

Table 5.2: Motivations to undertake environmental practices at facility

Motivations	Not important	Moderately important	Very important	N/A
Prevent or control environmental incidents	5.1%	16.9%	72.2%	5.9%
Regulatory compliance	1.2%	14.1%	82.0%	2.7%
Corporate profile/image	3.5%	25.5%	66.3%	4.7%
Cost savings	11.5%	31.6%	51.8%	5.1%
New technology development	17.8%	44.3%	29.6%	8.3%
New product development	20.9%	37.9%	30.4%	10.7%
Similar facilities adopting similar practices	29.5%	43.0%	14.7%	12.7%

Many wood products SMEs rely heavily on their associations for a variety of activities, from market promotion to government lobbying. There is great potential to use associations to promote improved environmental behaviour for specific segments. One example of this has occurred in the primary solid

[21] See footnote 12.

wood sector, where the national association (Forest Products Association of Canada – FPAC) has made third party forest certification a criterion for membership. This has had significant impacts on forest management practices and the reputation of the Canadian wood industry. Government agencies could provide incentives and leadership to enable existing value added associations, such as BC Wood Specialties, QWEB, and the Kitchen Cabinet Association, to develop environmental performance standards and improvements for their members. This, in turn, could lead to better pubic relations and/or improved access to market / distribution channels for specific sectors and regions.

Other stakeholders could also provide pressure for environmental improvements. For instance, unions could be motivated to increase efforts to urge companies to improve environmental performance. Those areas where environmental problems contribute negatively to worker health are most likely to garner union support. This includes improvements such as reducing wood dust pollution, minimizing toxicity off-gassing during construction and use, and providing ethical opportunities for the investment of union managed pension funds. A joint association, government, and workers committee could examine triple win opportunities to help employers, companies, and the environment. Government can also play a role by providing the impetus for these groups to explore such possibilities.

Another group that could be engaged to catalyze SMEs to improve environmental performance are environmental non-government organizations (ENGOs). Despite a confrontational approach taken by some ENGOs in interacting with existing industry groups, there exist many that cooperate with industry to improve the environment. Many environmental groups promote secondary wood manufacturing as a means of maintaining or increasing employment while reducing harvest levels. This tacit support may be galvanized into direct market support should secondary manufactured wood products be manufactured from certified wood materials by companies with progressive social policies. These ENGOs could tap into the growing trend toward corporate social and environmental responsibility[22] and provide positive market levers for environmental improvement. Given the size and scale of the secondary wood sector (ie, a preponderance of SMEs), local environmental groups would likely be the most suitable match as larger ENGOs tend to collaborate more effectively with larger companies. Government could provide seed funding, as well as impetus, for local value-added wood manufacturers to team up with local environmental groups to explore mutually beneficial initiatives that serve to improve the environment.

In addition, specifier groups could lever environmental change among secondary wood manufacturers. For many of the architectural finished products such as mouldings, cabinets, doors, and windows, the specifier groups which could exert the most influence include interior decorators and designers, architects and show home staging companies (firms that design and decorate the interiors of show homes for large developments). For products which fit into the housing category, such as engineered building products and housing, specifiers like structural engineers, developers, and architects could serve to lever changing environmental behaviours.

[22] KPMG 2005. KPMG International Survey of Corporate Responsibility Reporting 2005. KPMG Global Sustainability Services Amsterdam The Netherlands 55 pages

One final potential for influencing environmental change is the growing trend towards “green certification”. LEED (Leadership in Energy and Environmental Design)[23] has been certifying commercial buildings for a decade. They are now developing a green building standard for residential buildings. Concurrent with this development is the creation and promotion of an alternative standard, Green Globes[24], supported by the National Association of Home Builders (NAHB). Should green certification catch on with consumers, this may ensure the leverage required for many of the finished building products, cabinets, doors, etc. to meet specific criteria which contribute to this certification. The development and promotion of environmentally sensitive buildings is in its formative stage and only time will tell how successful the various initiatives will become.

[23] http://www.usgbc.org/DisplayPage.aspx?CategoryID=19

[24] http://www.greenglobes.com/

6 Concluding Remarks

The Canadian secondary (value-added) wood products sector is becoming increasingly important both domestically and globally. It is seen as a potential instrument to reduce our dependence on the production of highly competitive, low cost commodity goods and, as such, may be an important means of generating economic wealth and maintaining community stability. Despite intense global competition, Canadian value-added wood producers are witnessing increasing opportunities and successes in world markets and are fast becoming important global players. In short, the Canadian secondary wood products sector is, in many ways, poised for success despite intensifying global competition.

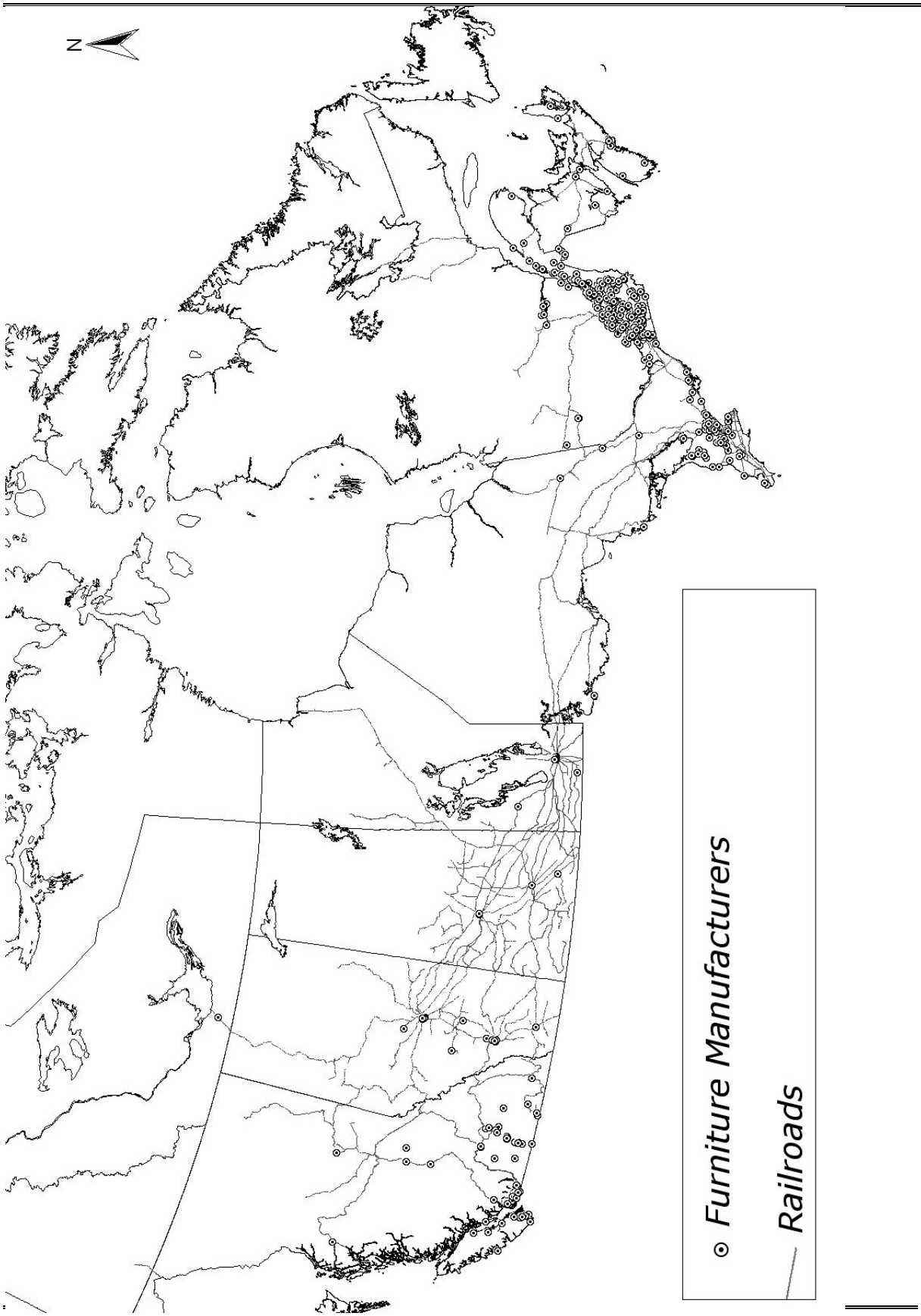
As this sector grows, both in size and importance, its impact on the environment also grows. Now is the time to consider means of mitigating its environmental impacts to ensure that it becomes an energy efficient, environmentally benign, and economically competitive industry. As corporate responsibility becomes a cornerstone for successful companies in the twenty-first century, this sector must develop and grow with a full consideration of social and environmental implications of its operations. Given that the industry is made up mostly of SMEs without the deep pockets required to initiate these sorts of activities, this may require forces external to the sector.

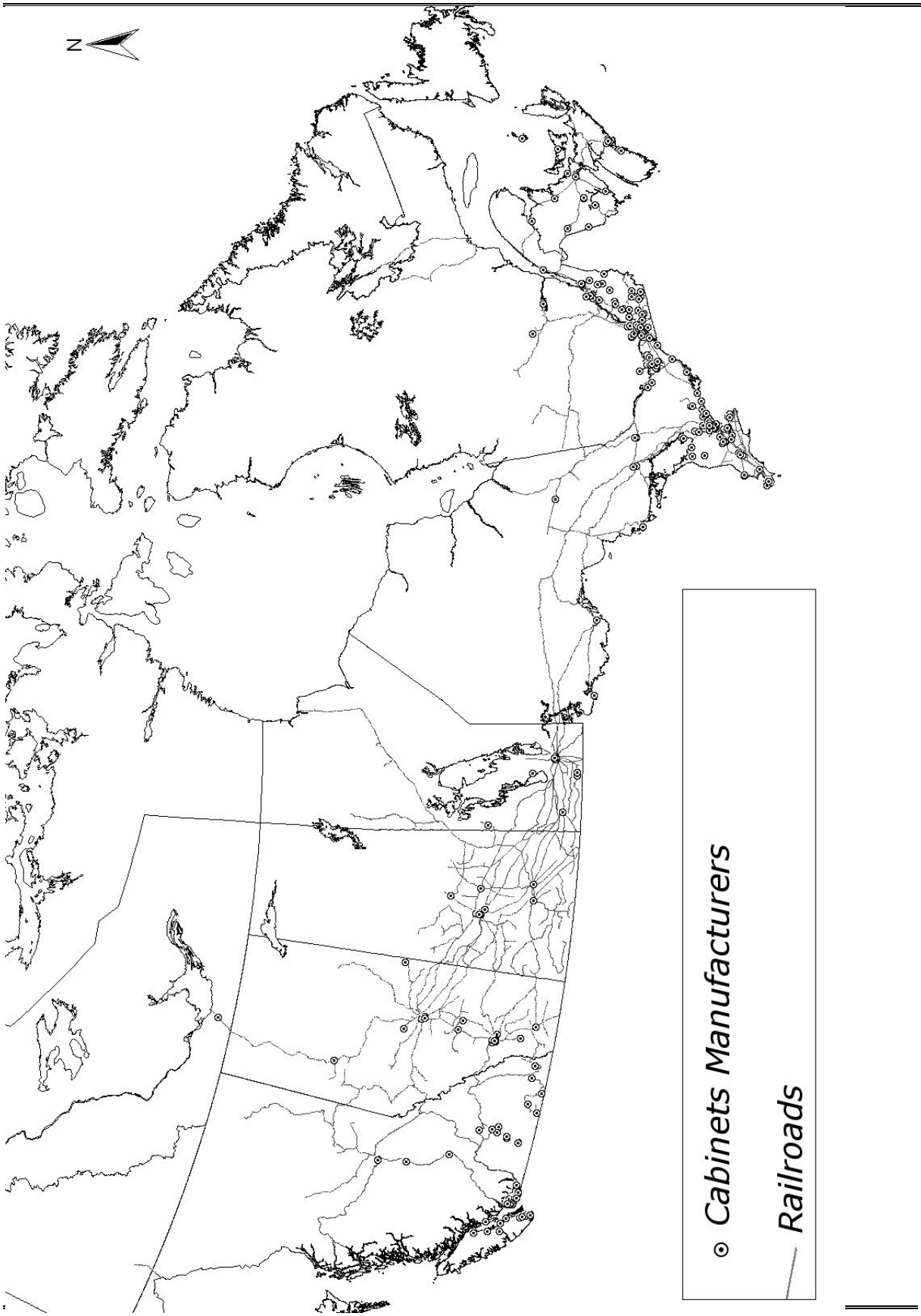
Currently, little is known about the increasingly important secondary wood products economic sector. For instance, what types of wood products best suit Canadian manufacturers? Which regions present the best opportunities for production? What markets should manufacturers concentrate on? How can Canadian producers remain globally competitive? Many of these questions were posed and addressed in two preliminary reports prepared by the authors and are summarized (by sector) in this paper. However, this sort of strategic assessment of the secondary industry represents only the beginning point for long-term success. In order to maintain long-term health of the industry and its stakeholders, a full-scale assessment of both the environmental and social impacts of value-added products is also in order.

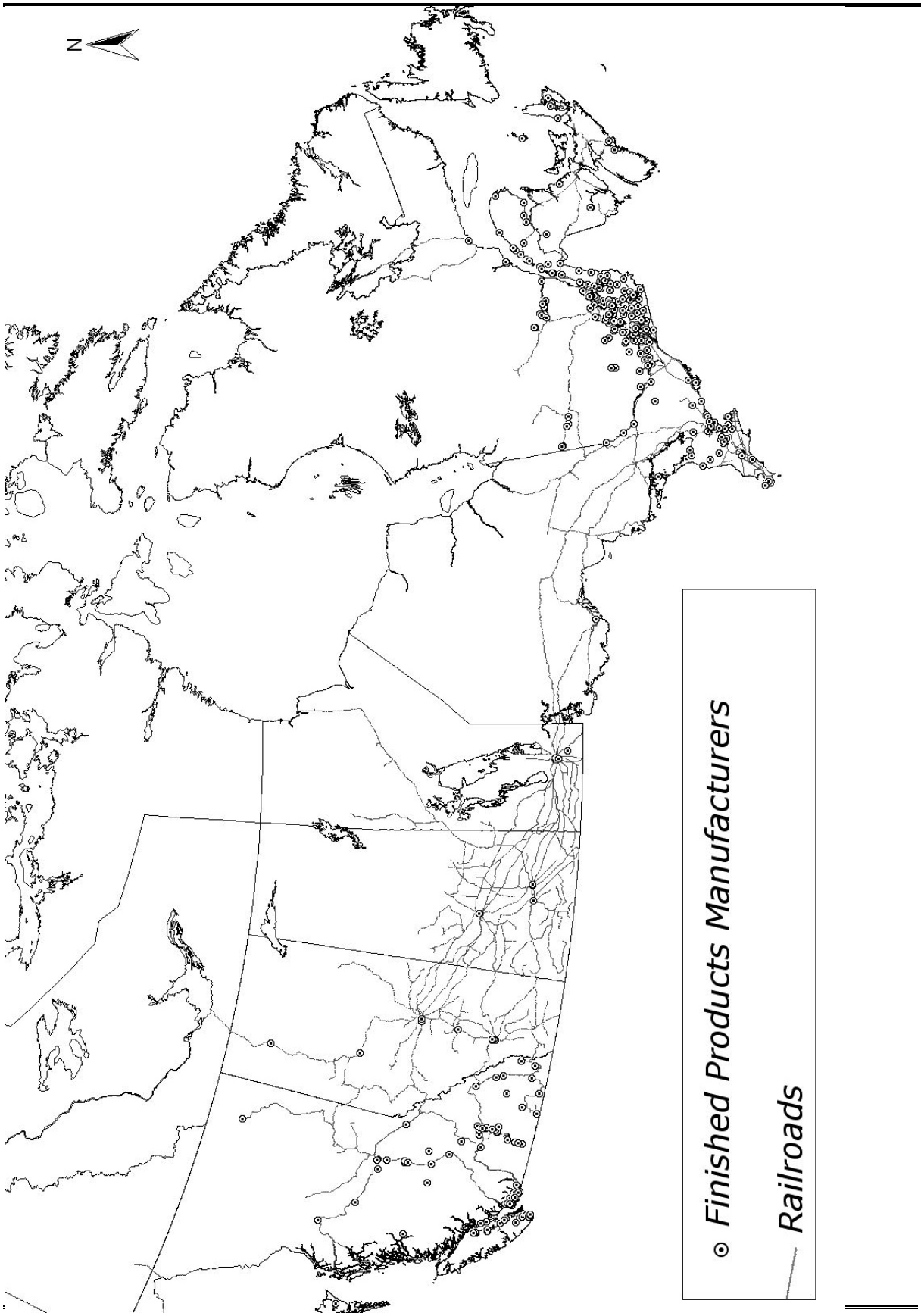
This report represents a first pass at reasoning through some of these environmental issues, especially with respect to levers of change that could be used to improve the environmental performance related to secondary wood products manufacturing and sales. In mapping, analyzing, and dissecting the value chains of specific wood products sectors, we have identified where potential market opportunities exist, along with possible levers of change within supply chains. We have also noted that the secondary wood products industry consists largely of small and medium enterprises and that this presents very real challenges in catalyzing environmental change. To that end, we have proposed that the utility of various “carrots” and “sticks” approaches be assessed. Lastly, we have taken a life cycle approach (by sector) to analyze where the greatest opportunities for environmental change exist and where there are knowledge gaps which must be addressed.

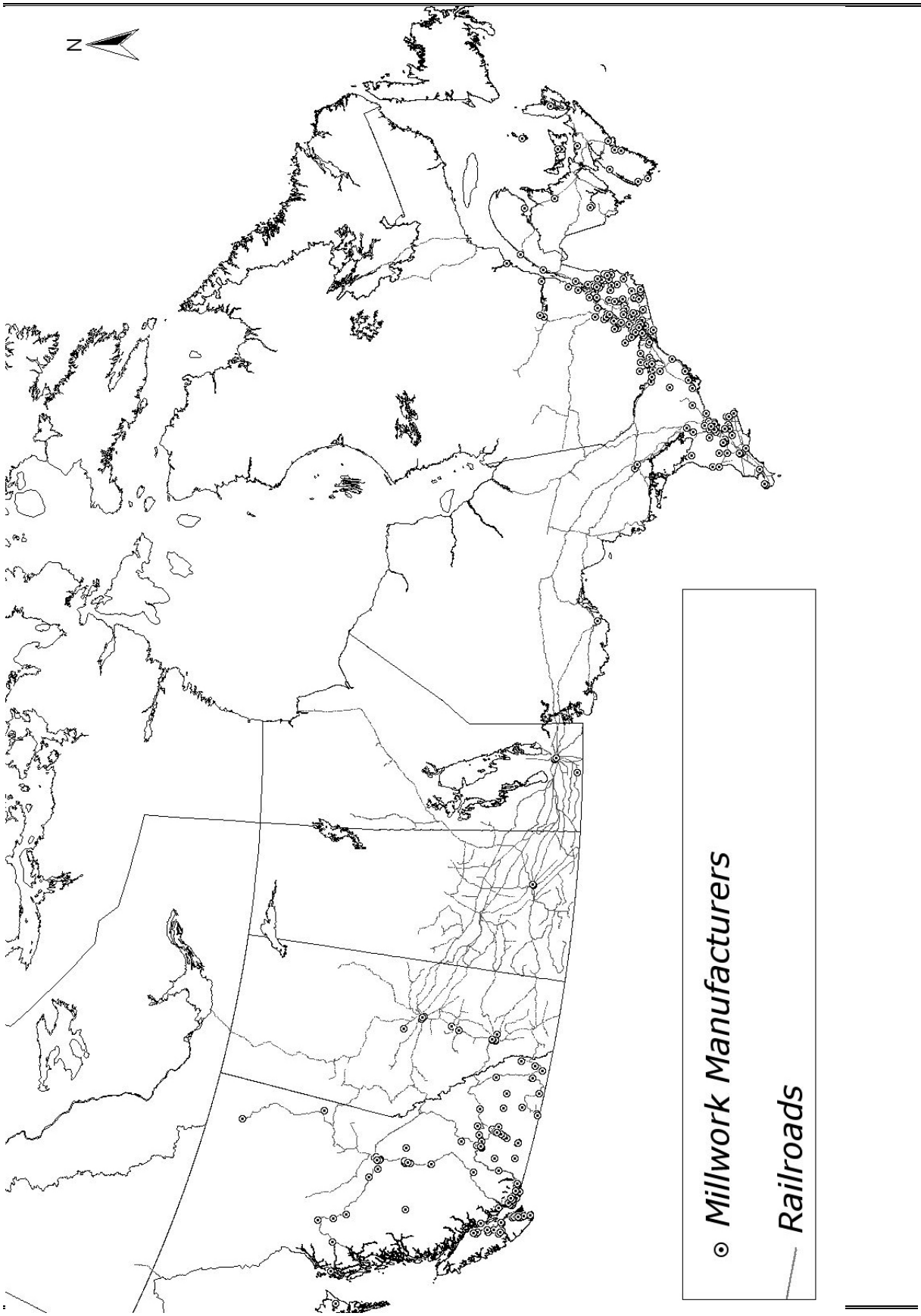
Appendix 1:

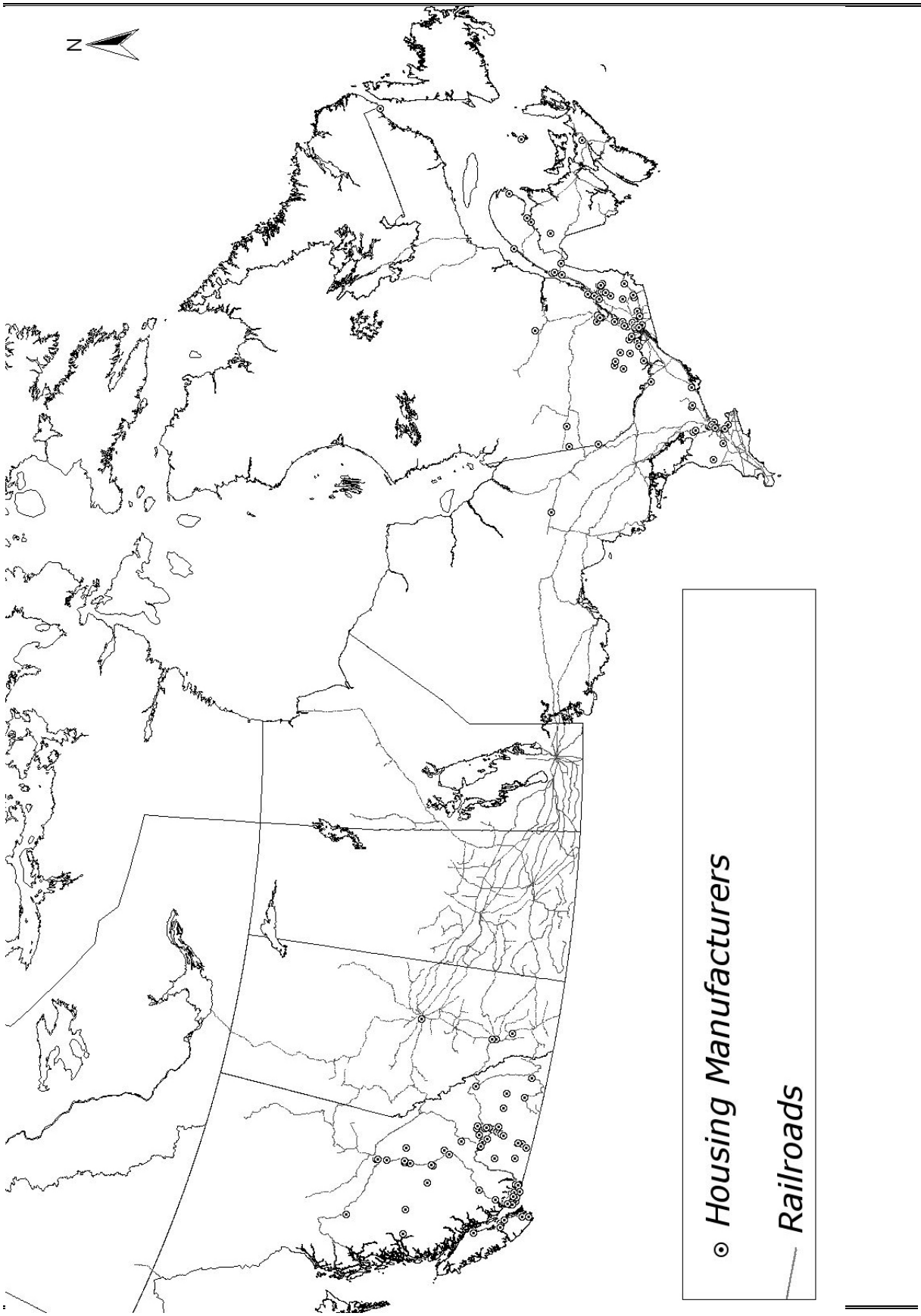
Maps of Wood Products Manufacturing Sectors

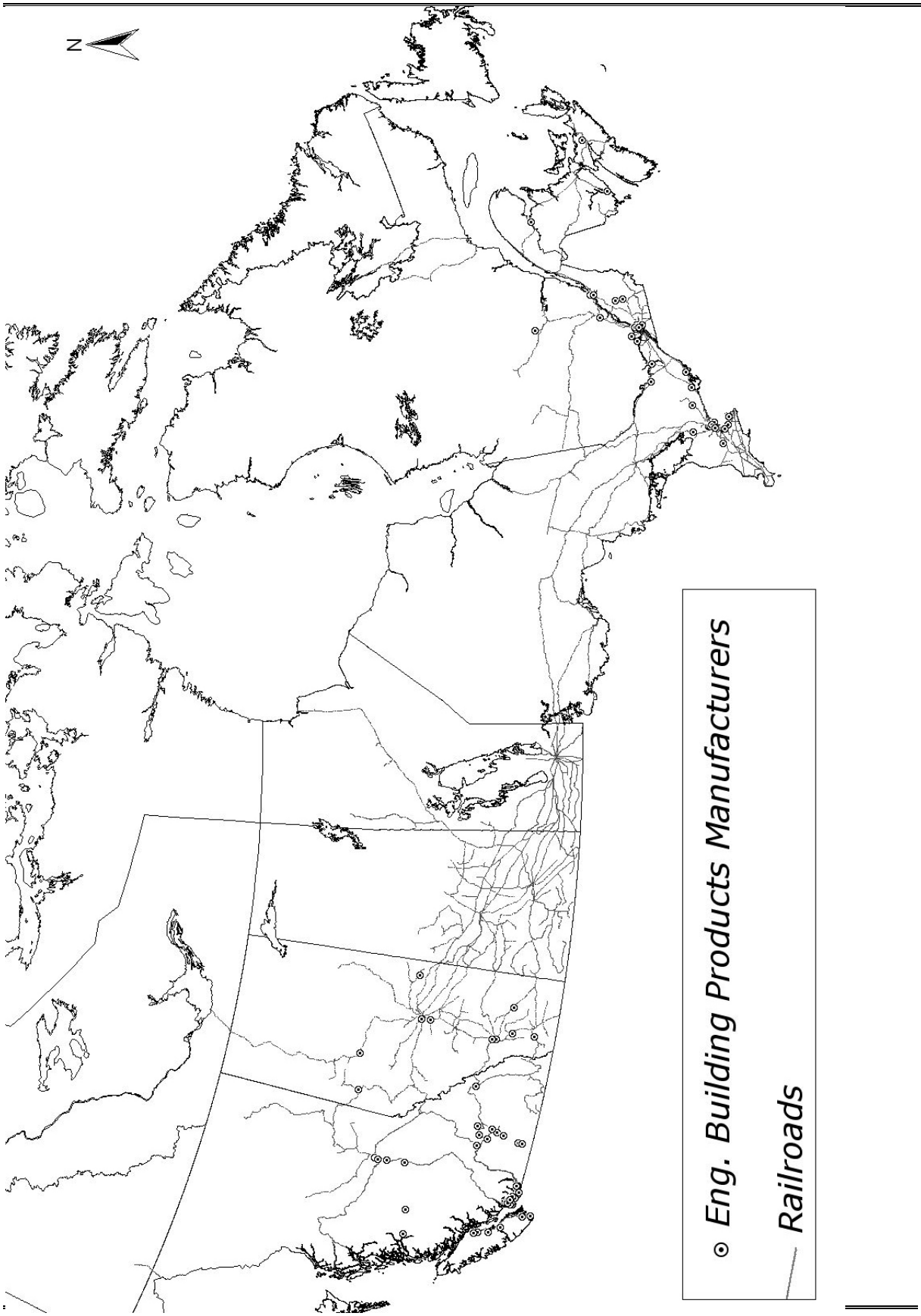

N
⊙ Furniture Manufacturers
Railroads

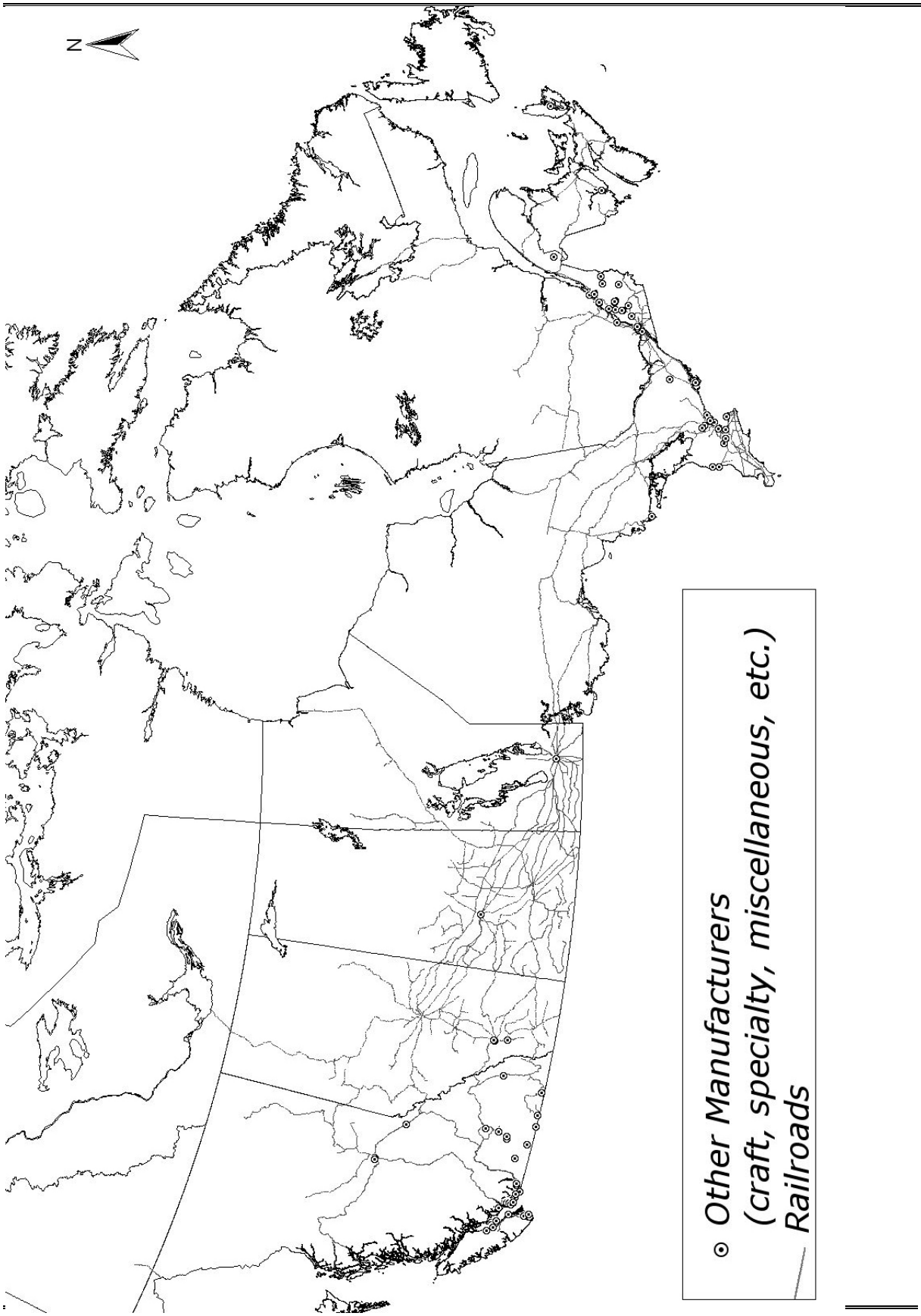

N
Cabinets Manufacturers
Railroads

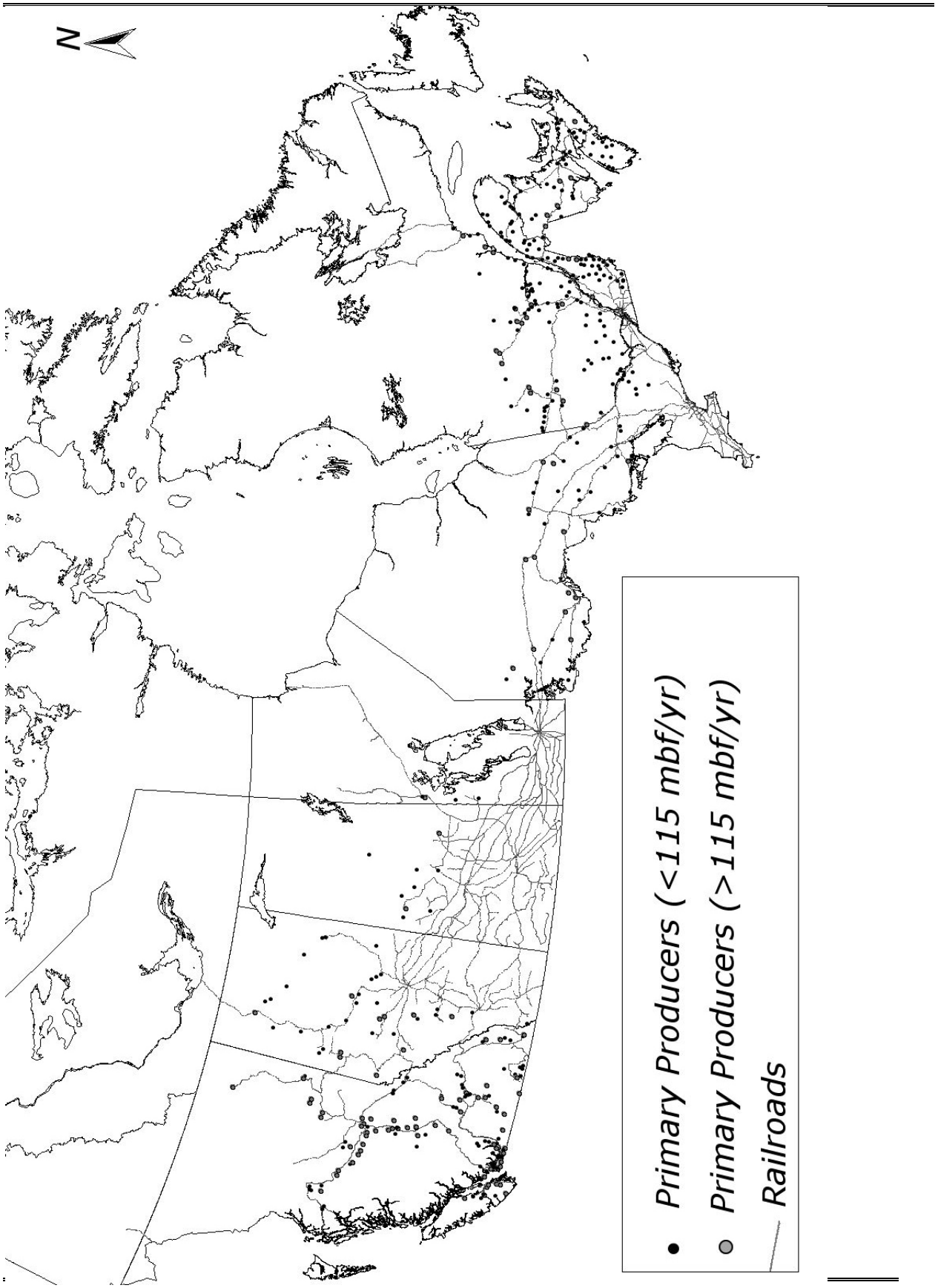

N
⊙ Finished Products Manufacturers
Railroads


N
Millwork Manufacturers
Railroads


N
Housing Manufacturers
Railroads


N
⊙ Eng. Building Products Manufacturers
Railroads


N
Other Manufacturers
(craft, specialty, miscellaneous, etc.)
Railroads


N
Primary Producers (<115 mbf/yr)
Primary Producers (>115 mbf/yr)
Railroads