

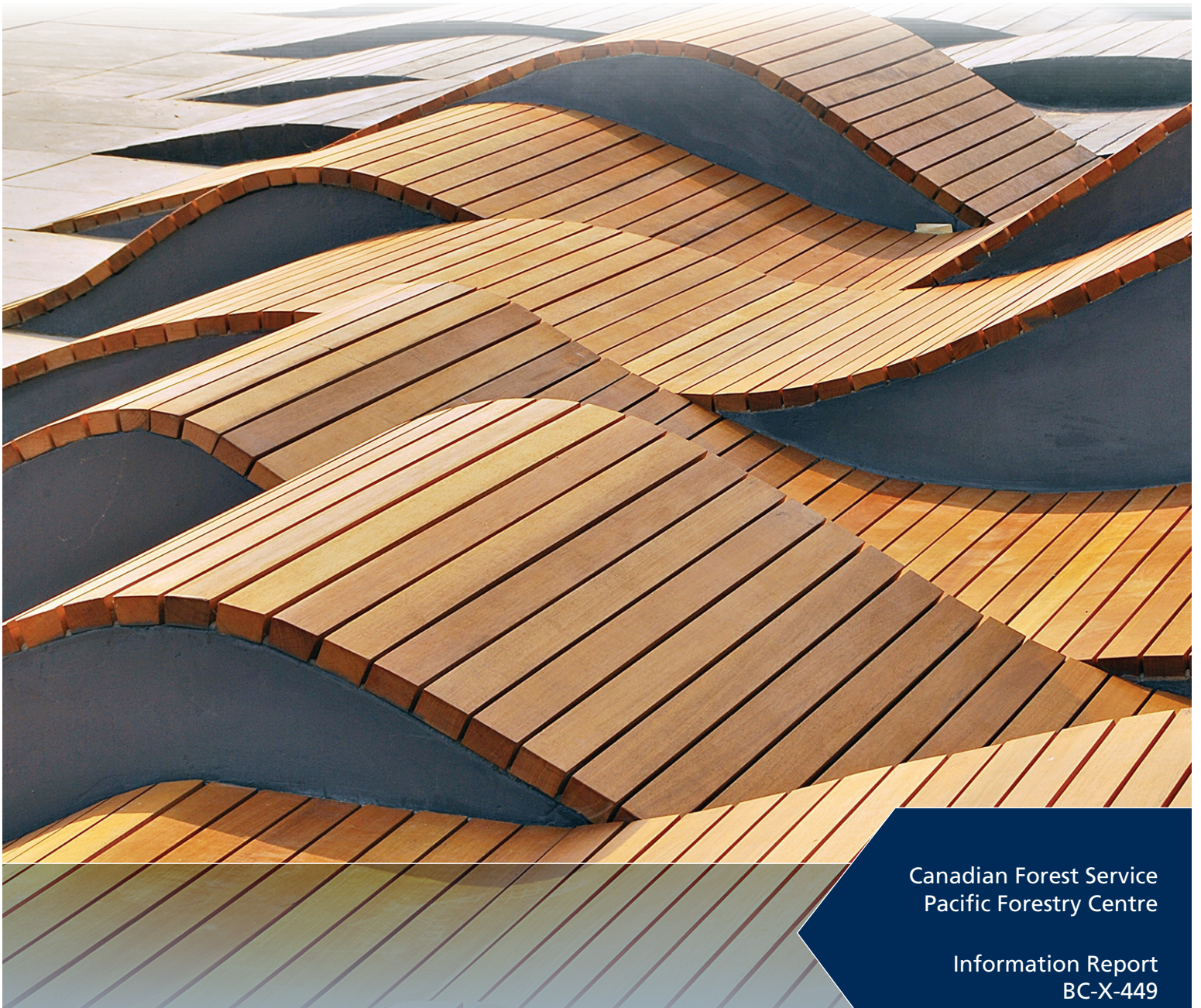


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Secondary manufacturing of solid wood products in Saskatchewan and Manitoba 2017: Structure and economic contribution

Lili Sun, Bryan E.C. Bogdanski, and Baojing Sun



Canadian Forest Service
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The Pacific Forestry Centre, Victoria, British Columbia

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Abstract

This report presents survey results for Saskatchewan (SK) and Manitoba (MB)'s secondary wood manufacturing industries in 2017. The survey is part of the Canadian Forest Service (CFS) survey program on secondary wood manufacturing products across Canada; it compiles operational, employment, production, marketing, and financial information on nine business types. Most firms were in the south of the provinces where the population and demand for those products is concentrated. We estimated that SK's secondary wood manufacturing industries employed 2,201 people and had sales of \$305 million. MB's secondary wood manufacturing industries were more than double the size of those in SK with 4,887 employees and \$714 million sales. For both SK and MB, the majority of sales were within the provinces. Markets for MB products were more diverse with 35% exported to the rest of Canada and 13% to the United States. Of the responding firms, 41% in MB and 19% in SK hoped to expand operations, although firms reported several barriers to expansion plans. Market issues were identified as the most pressing challenges facing the industry in both provinces.

Keywords: employment, forest industry, markets, policy, secondary manufacturing, value-added

Résumé

Ce rapport présente les résultats de l'enquête sur les industries de la fabrication secondaire du bois de la Saskatchewan et du Manitoba en 2017. L'enquête fait partie du programme des enquêtes du Service canadien des forêts (SCF) sur les produits de fabrication secondaire du bois au Canada; elle rassemble des données opérationnelles, d'emploi, de production, de commercialisation et financières sur neuf types d'entreprises. La plupart des entreprises se trouvaient dans le sud des provinces, où la population et la demande pour ces produits sont concentrées. Nous avons estimé que les industries de fabrication secondaire du bois de Saskatchewan employaient 2 201 personnes et avaient un chiffre d'affaires de 305 millions de dollars. Les industries de la fabrication secondaire du bois au Manitoba représentent plus du double de celles de la Saskatchewan. Elles comportent en effet 4 887 employés et affichent un chiffre d'affaires de 714 millions de dollars. En Saskatchewan et au Manitoba, la majorité des ventes ont été réalisées dans les frontières des provinces. Les marchés des produits du Manitoba étaient plus diversifiés, 35 % étant exportés vers le reste du Canada et 13 % vers les États-Unis. Parmi les entreprises qui ont répondu à l'enquête, 41 % au Manitoba et 19 % en Saskatchewan espéraient élargir la portée de leurs activités, bien qu'elles aient signalé plusieurs obstacles aux plans d'expansion. Les enjeux du marché ont été cités en tant que défis les plus urgents auxquels fait face l'industrie dans les deux provinces.

Mots-clés : emploi, industrie forestière, marchés, politique, fabrication secondaire, valeur ajoutée

Key Points

- This report summarizes the survey results of secondary manufacturing of wood products in Saskatchewan (SK) and Manitoba (MB) for the year 2017. The survey population included 174 firms in SK, with 31 respondents—a response rate of 18%—and 92 firms in MB with 21 participating firms for a response rate of 23%.
- The most common business type was cabinets (49% in SK, 41% in MB), followed by engineered wood products (18% in SK, 18% in MB), and millwork (10% in SK, 15% in MB).
- For 2017, we estimated that 173 SK businesses (excluding panelboard businesses) employed 2,201 people, had sales of \$305 million and used 0.6 million m³ of wood fibre. In MB, aggregate employment and sales were approximated to be 4,887 and \$714 million, respectively, and the sector was estimated to use 0.7 million m³ of wood fibre.
- The markets for SK products were highly concentrated locally at 85%, while the markets for MB's products were more diverse with 52% to local market, 35% to the rest of Canada, and 13% to the United States.
- The most commonly used wood fibre species were spruce in MB at 62% while jack pine (51%) and spruce (41%) were utilized in SK. The majority of wood fibre used in SK was obtained locally, while MB respondents mainly sourced their wood fibre from other provinces.
- Internet use was prevalent, with 78% of SK and 76% of MB respondents reporting some form of internet use for their businesses. Facebook was well adopted (41% in SK and 38% in MB), while use of other social media, such as LinkedIn, YouTube, etc. was in its initial stages; early adopters tended to be companies producing finished products, such as furniture, buildings, millwork and cabinets.
- Average capacity utilization was 76% in SK and 87% in MB. Of responding firms, 19% in SK and 41% in MB expected to expand in the near future, but market issues stood out as a strong potential constraint to industry growth.

1 Introduction

In 2018, the Canadian Forest Service conducted surveys of secondary wood manufacturing businesses across Canada to learn more about this subsector of the forest industry. This report summarizes the results of the surveys undertaken for Saskatchewan (SK) and Manitoba (MB). The surveys were conducted with the support of the Saskatchewan Ministry of Energy and Resources and Manitoba Sustainable Development. Considerable interest persists in promoting value-added processing as a means to maximize the value of fibre harvested. Secondary manufacturing of lumber and its by-products into intermediate and finished products is one important strategy to help diversify forestry-dependent economic regions and mitigate risks related to markets or natural disturbances. Secondary wood manufacturing in SK and MB is not often studied in depth, with only a couple of research reports having been conducted in each province in the 90's and early 2000's (Bohning and Rounds 1992; Patenaude and Bohning 1993; Bohning and Krayetski 1999; Bohning, Bell and Middlebro' 2002)¹. Current and detailed data on this industry is essential in helping communities and industry associations better understand the existing secondary manufacturing sector and perhaps devise viable strategies to support growth and diversification of the sector. Effective policy responses to sectoral challenges also require credible and up-to-date information.

This study follows the definitions of secondary manufacturing used in the earlier surveys of secondary wood manufacturers in BC and Alberta (Bogdanski and McBeath 2015, 2017). Secondary manufacturing is the further processing of primary wood or wood-based materials into semi-finished or finished products. The major business types (BTs) in the secondary manufacturing industry include:

- remanufactured products (Reman)
- engineered wood products (EWP)
- millwork
- cabinets
- furniture
- pallets and containers
- plywood and panelboards
- other wood products (OWP)

Appendix 1 contains a list of wood products within each BT. Our definition of a manufacturer excludes a number of activities,

¹ These reports were based on telephone surveys on secondary wood and paper manufacturing companies. The reports mainly provided directories of the companies but also briefly summarized information on number of firms, employment, quantity and type of wood or paper materials used, as well as firm size and location distribution. For SK, Patenaude and Bohning (1993) estimated that 131 firms engaged 1,694 employees in 1992; Bohning and Krayetski (1999) approximated that 252 firms provided employment for 2,218 people in 1998. For MB, Bohning and Rounds (1992) assessed that 293 firms employed 6,764 people in 1991; Bohning et al. (2002) estimated 328 firms employed 13,032 people in 2001.

including firms that work as contractors/builders, or custom one-off operations. The BTs for which this definition is particularly important are engineered wood products, cabinets, and millwork firms. For example, a firm that manufactures houses in a plant and then ships them out for final assembly falls within our definition of a manufacturer of engineered wood products, whereas a contractor or builder who constructs houses at a job site does not. Moreover, we classified plywood and panelboards BTs as either primary or secondary wood products industries, depending on jurisdiction. Saskatchewan's Ministry of Energy and Resources classifies plywood and panelboard BT as a primary industry in Saskatchewan, as they only produce oriented strand board (OSB) products, which involves a multi-stage production process within a single mill.

The research methods of this study are described in the next section. In section 3, we provide an overview of the current secondary wood manufacturing sector in Saskatchewan and Manitoba derived from the survey results while section 4 reports the detailed survey results. Finally, discussion and conclusions are presented in Section 5.

2 Research Methods

The inventory of Saskatchewan and Manitoba secondary wood manufacturing companies was compiled using Statistics Canada's Business Register (BR) database issued for November 2017 and a list of companies provided by Saskatchewan Ministry of Energy and Resources and Manitoba Sustainable Development. After adjusting for duplicate entries, out-of-scope, closed or misclassified companies, 174 firms in Saskatchewan and 92 firms in Manitoba were identified as secondary wood manufacturers for the 2017 survey year.

A multi-part questionnaire covering nine themes was developed based on previous surveys administered by the Canadian Forest Service for studies of the British Columbia and Alberta secondary manufacturing sector (Wilson et al. 2001; Stennes and Wilson 2008; Bogdanski and McBeath 2015, 2017). The first part sought basic information about the business followed by sections focused on wood use, operational costs, employment, capacity and expansion plans, constraints to expansion, use of electronic commerce and social media, end-use and destination markets, sales revenue, and products (see Appendix 2).

The questionnaire was mailed in late May 2018 to all potential firms identified, with follow-up several weeks later. Thirty-one firms returned the survey for a response rate of 18% in Saskatchewan and 21 firms for a response rate of 23% in Manitoba.

Table 1 summarizes the survey population and respondents by BT. Each respondent firm was classified into a BT according to its reported sales of specified product types; non-respondent firms were classified based on NAICS codes provided in the Business Register, communications with the company or indirectly through company webpages and industry directory information. Most firms were classified as cabinet firms or engineered wood products.

Table 1. Survey population and response rates

Business type	Saskatchewan			Manitoba		
	Population	Respondents	Response rate (%)	Population	Respondents	Response rate (%)
Cabinets	85	14	16%	38	6	16%
Engineered wood products	33	6	18%	17	8	47%
Furniture	16	2	13%	7	1	14%
Millwork	18	3	17%	14	2	14%
Other wood products	3	1	33%	2	1	50%
Pallets and containers	12	3	25%	6	1	17%
Remanufactured wood products	6	1	17%	8	2	25%
Subtotal	173	30	17%	92	21	23%
Panelboards	1	1	100%	0	0	N/A
Grand Total	174	31	18%	92	21	23%

Table 1 shows that the number of respondents was low for some BTs, which raised concerns about confidentiality. For example, because only one panelboard firm responded, we dropped the panelboard BT from the study. To provide important trend information as well as context for the survey results and supplementary information on the panelboard industry, we extended the survey data with publicly available data from Statistics Canada and Innovation, Science and Economic Development Canada. This information is contained in Appendix 3.

Data from completed surveys were stored in a secure database; we also checked survey results for errors and anomalies. Employment and sales data were acquired directly from non-participating firms through follow-up communication by phone from August to October 2018 and indirectly from news articles or company reports. Employment data were obtained for 135 (78%) firms in Saskatchewan and 78 (85%) firms in Manitoba.²

Non-response to the survey by businesses raised concern of biased results. Firms that did not participate may have been very different from firms that did respond, which could have caused biased results and false conclusions. For example, there could have been differences between owners' attitudes about completing surveys across different types of businesses. As a result, we conducted two statistical tests to check for non-response bias; more specifically, the bias of distribution of BTs and of firm sizes. The first test compared the frequency distribution of the responding firms across business types against the population distribution. This test found no difference at the 5% significance level for both provinces. Therefore, the survey respondent group provided a good representation of the distribution of BTs across the population, which further indicates that the results of the survey were not biased by the over-representation of one or more BTs. A second test compared the size distribution between respondent and non-respondent firms to determine possible firm size bias. For this test, we acquired supplementary employment data, covering 78% and 85 % of the estimated population in SK and MB, respectively. We found no difference between the two groups for Saskatchewan at the 5% level, but a significant difference was found between the two groups for MB. The MB

² In some cases, returned surveys had missing sales and employment data. For these records, the missing data were estimated using information from similar businesses.

survey sample was significantly over-represented by small size firms and under-represented by medium and large size firms in terms of employment numbers. Hence, as with any census survey that fails to collect information from all firms, some uncertainty remains and therefore caution should be exercised in interpreting the population estimates that we present in this report. Appendix 4 shows detailed results for tests of non-response bias.

3 Current State of the Sector

This section provides insights from the survey by describing the current state of the sector. It extrapolates the survey results to the total population, presenting estimates of population employment, sales, and wood use. Employee numbers were used to scale other variables of interest within each BT by developing coefficients per employee (see Table 2). This method of extrapolation started with the 2006 survey (Stennes and Wilson 2008). In cases where we were unable to obtain employment data for firms, we estimated employee numbers from sample medians of each BT.³

Table 2. Jobs and sales per unit roundwood equivalent and sales per full-time equivalent 2017 for SK and MB combined

Business type	FTEs per 1,000 m ³ of roundwood input	Sales per m ³	Sales per full-time equivalent (000s)
Cabinets and furniture	48.2	\$6,030	\$125
Engineered wood products	2.3	\$416	\$178
Millwork	78.2	\$10,996	\$141
Other wood products	1.1	\$296	\$280
Pallets and containers	0.9	\$137	\$145
Remanufactured wood products	1.1	\$235	\$208
All BTs	5.7	\$816	\$144

³ Extrapolation was done using medians rather than means because the distribution for sales and employment was skewed toward a few large firms. Under these conditions, using means to scale up sample results would have overestimated the true population parameters.

3.1 Sales, Jobs, and Wood Use

For 2017, aggregate employment and sales figures for the SK sector (excluding the panelboard BT) were estimated to be 2,201 and \$305 million, respectively. The sector (excluding panelboard BT) used approximately 0.6 million m³ of wood fibre. For MB, aggregate employment and sales (excluding the panelboards BT) were estimated at 4,887 and \$714 million, respectively, and the sector used approximately 0.7 million m³ of wood fibre.

Table 2 shows employment and gross sales per unit of roundwood equivalent (wood fibre use such as log, lumber, panelboards, etc. was converted into roundwood equivalents) and gross sales relative to employment, as measured by full-time equivalent (FTE). In the case of employment, the cabinet and furniture, and millwork BTs generated the most FTEs per 1,000 m³ of wood fibre by a wide margin. However, these business types also had among the lower value of sales per FTE. Correspondingly, other wood products, remanufactured wood products, and engineered wood product BTs had the highest sales per FTE but the lowest employment per 1000 m³. The other wood products BT had the highest sales per employee.

3.2 Regional Distribution of Businesses

Figure 1 showed the location of secondary wood manufacturers, and the total number of firms within each BT in each province in 2017. Most firms were in the south of the provinces where the population and demand for those products was concentrated.

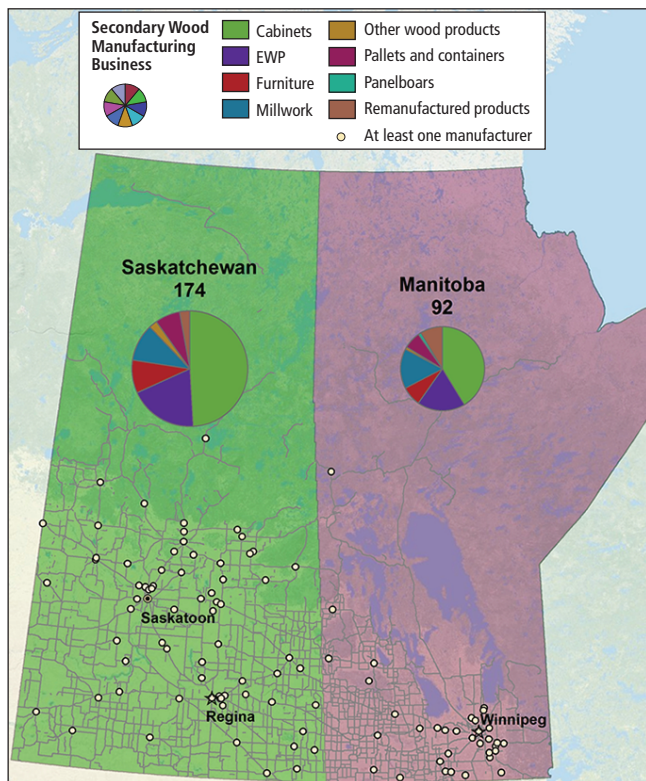


Figure 1. Location of SK and MB secondary wood manufacturers in 2017 and number of firms within each business type.

Millwork, cabinet, furniture and engineered wood product business types were located around the commercial hubs of Saskatoon, Regina and Winnipeg and were within reach of United States via major transportation hubs. The pallet and container operations were located throughout the south to serve the key manufacturers and the transportation hubs. The BTs producing commodities (i.e., remanufacturing and other wood products) or using more wood inputs (i.e., plywood and panelboards) were closer to their wood fibre inputs, typically sourced from primary production mills.

4 Survey Results

In this section, detailed results are provided for employment, sales revenues, products and services offered, raw material use, operating costs, end-use and destination markets, capacity utilization, and expansion plans. These results exclude information from panelboard producers for both provinces.

4.1 Employment

Companies with employee numbers provided by the survey or on the phone were included in this part of the analysis. In SK, the average firm had 13 employees, while the median was four. In MB, the average number of employees was 54 with the median at 12. Firms were classified into three groups according to the employee number. Figure 2 shows that 74% of the firms were small with one to fifteen employees; 17% of the firms were of medium size with 16 to 50 employees; and 9% were firms with greater than 50 employees. Over 60% of the medium and large firms were in Manitoba.

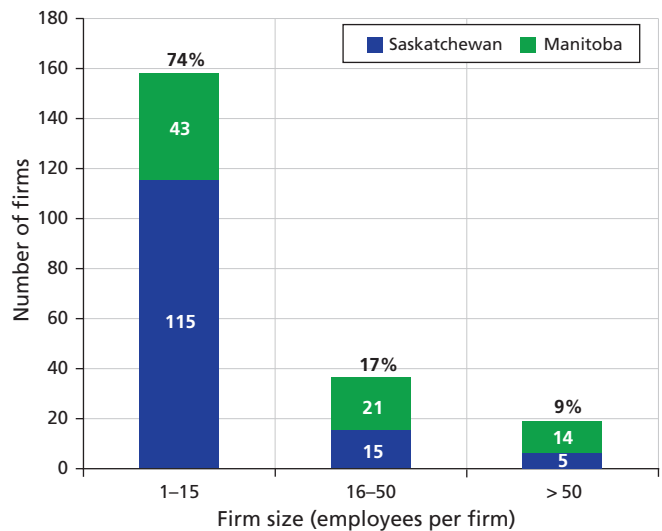


Figure 2. Distribution of secondary wood manufacturing firms by size and province ($n_{SK} = 135$, $n_{MB} = 78$).

Figure 3 further shows the number of employees by firm size and province. Although large firms (> 50 employees) only made up 9% of all firms, they accounted for 71% of employment in the sector in both provinces and while 74% of firms were small, they employed only 13% of the sector's employees. Medium sized firms accounted for 16% of the sector's employment. Regionally, Manitoba accounted for 73% of reported employment.

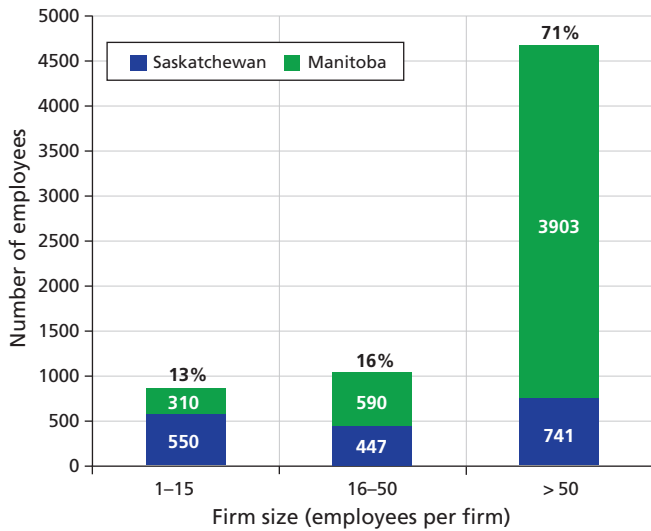


Figure 3. Number of employees in secondary wood manufacturing by firm size and province ($n_{SK} = 135$, $n_{MB} = 78$).

Figure 4 shows the distribution of employees across BTs. The cabinet BT accounted for the highest employment of the sector in both SK and MB, at 48% and 51%, respectively. The engineered wood product BT was the next largest employer type in each province, at 35% and 17%, respectively. Millwork and furniture BTs were significant in MB representing 17%, and 10% of the sector's employment, respectively.

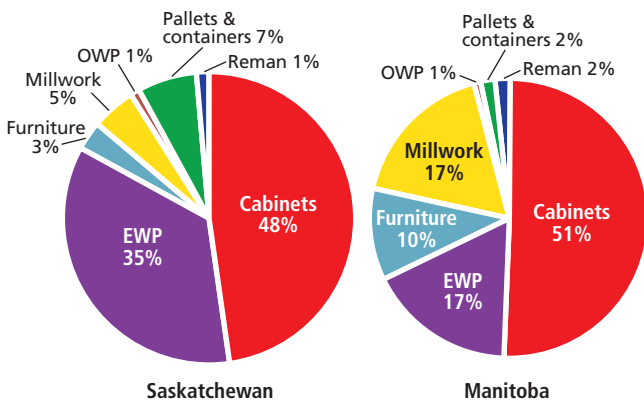


Figure 4. Number of employees in secondary wood manufacturing by firm size and province ($n_{SK} = 135$, $n_{MB} = 78$).

Figure 5 and Figure 6 illustrate the relative size of firms in each BT based on number of employees. Small firms dominated in SK in all BTs; however, small firms were less dominant in MB. Also in

MB, large firms were more widespread in the engineered wood product BT, while medium sized firms were more common in millwork and other wood product BTs.

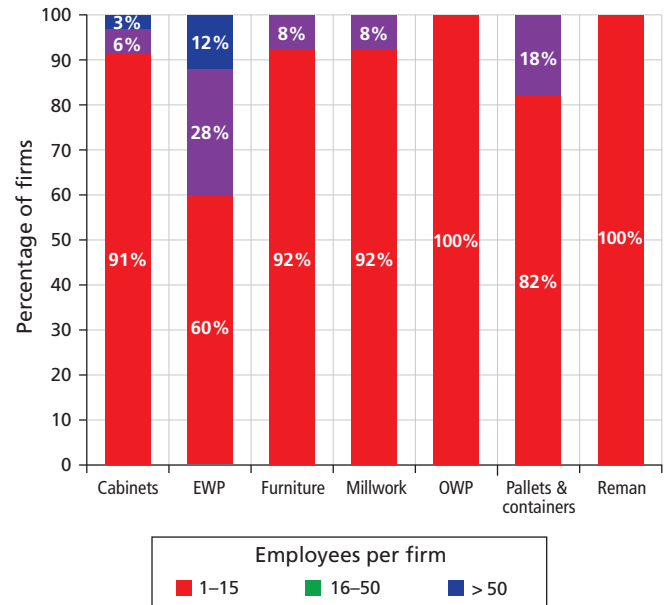


Figure 5. Firm size distribution of secondary wood manufacturing firms by business type in Saskatchewan ($n = 135$).

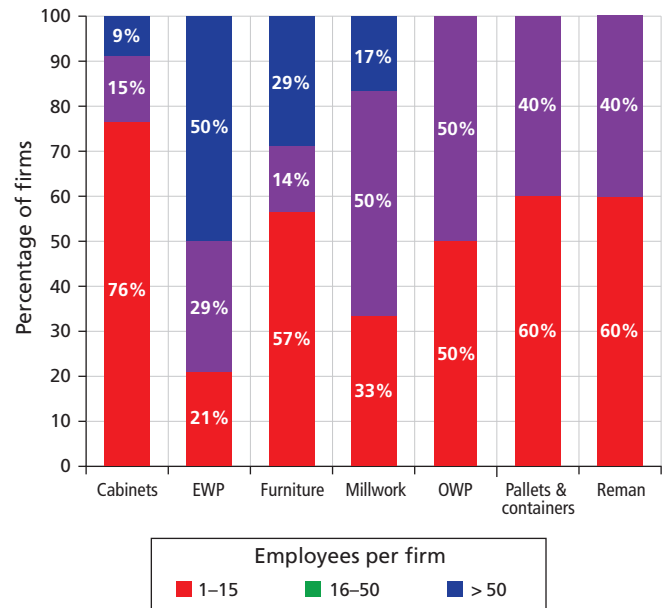


Figure 6. Firm size distribution of secondary wood manufacturing firms by business type in Manitoba ($n = 78$).

4.2 Sales

Forty-seven companies in SK and thirty companies in MB provided gross sales revenue for 2017, either by direct response to the survey or on the phone. In SK, the average sales revenue was \$1.8 million and median sales revenue was \$0.5 million. In

MB, the average sales revenue was \$7.8 million and median sales revenue was \$1.7 million. The majority of respondents generated modest sales, with 50% of firms selling less than \$1 million in 2017. In both provinces only 6% had sales greater than \$12 million. For further analysis, the business types were aggregated into three business groups to maintain confidentiality: Engineered wood products; cabinets, furniture and millwork (CFM); and all other wood products (OWP, which include the pallets and containers, remanufactured wood product and other wood product BTs). Figure 7 shows the sales revenue distribution across these three business groups. The engineered wood product business group generated the largest share of SK revenues at 49% of the total, followed by the cabinets, furniture and millwork business group at 43%. In MB, the cabinets, furniture and millwork business group produced the largest share of revenue at 47% followed by engineered wood products at 39%.

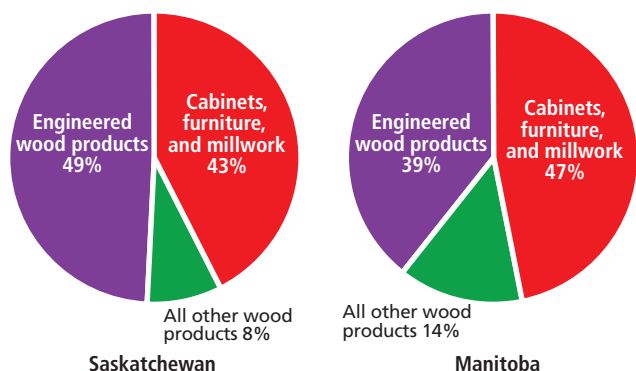


Figure 7. Revenue distribution of secondary wood manufacturing firms by business group ($n_{SK}=47$, $n_{MB}=30$).

Figure 8 further shows that low-sales firms (<\$1 million in revenue) were common in SK, with the greatest share of low-sales firms operating in the cabinets, furniture and millwork business group. Medium-sales firms were more frequent within the engineered wood product business group. There were hardly any large-sales firms (>\$12 million) in SK compared to MB, which had a significant number of them.

Respondents were asked to provide sales from 2016 as well as expected sales in 2018. Percentage change in sales revenue

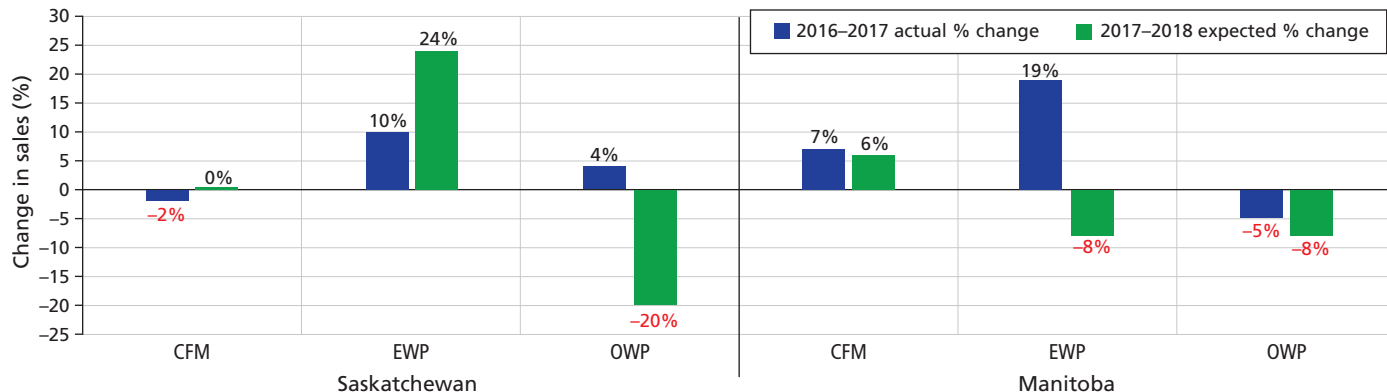


Figure 9. Percentage change in sales revenue in relation to the 2017 sales ($n_{SK}=23$, $n_{MB}=19$).

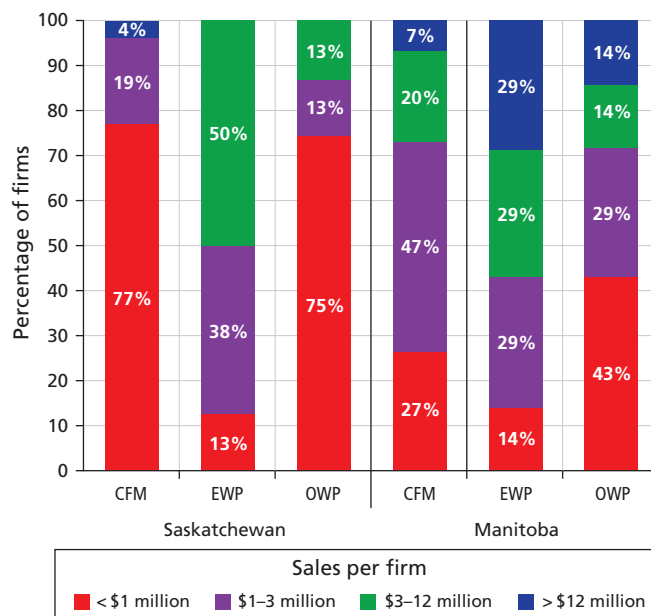


Figure 8. Revenue class distribution of secondary wood manufacturing firms by business group ($n_{SK}=47$, $n_{MB}=30$).

compared to 2017 was calculated among respondents who provided all three years' sales. Figure 9 shows the change in nominal sales by business group in relation to 2017.⁴ In SK, sales increased by 6% in total from 2016 to 2017, with 11 (48%) of firms reporting an increase in revenue and 10 (43%) firms reporting a decrease. On average, all SK business groups experienced an increase in sales over this period except the cabinets, furniture and millwork business group, which reported a mild decrease of 2%. The overall outlook for 2018 was positive, with an expected increase in sales revenues of 15% above 2017 revenues. The all other wood products business group was the only one that expected decreased sales revenue at -20% in 2018. In MB, sales increased by 10% in total from 2016 to 2017 with 12 firms indicating an increase in revenue and 7 firms reporting a decrease. All MB business groups experienced an increase in sales on average over this period except the all other wood products business group, which reported a 5% decrease. The overall outlook for all business groups for 2018 was negative at -2% compared to 2017.

4 Constructed as the % change in total sales for each business type.

4.3 End-use Markets and Services

This section summarizes the end-use markets that secondary manufacturers produced products for and services that they provided and purchased. Table 3 shows the percentage of respondents in each business group that manufactured for particular end-use markets.

The majority of companies in both SK and MB manufactured products for new residential buildings and remodeling. Engineered wood products were balanced between the residential, commercial and industrial end-use markets in both provinces in terms of the percentage of firms in these end markets. In MB, most firms in the cabinets, furniture, and millwork business group mainly

targeted new residential and remodeling, but in SK, the end market for this business group was more diverse. The all other wood products group primarily produced for industrial end-users in MB, but focused on other end uses in SK.

Respondents were asked whether they bought or sold custom services, and the types of services acquired or provided. Custom services were classified as manufacturing (i.e. resawing, planing, kiln drying and other) and non-manufacturing (i.e. marketing, distribution, logistics and other). Table 4 and Figure 10 summarize the results.

Table 3. Percentage of respondents, by business group, that manufactured products for select end-use markets ($n_{SK}=25$, $n_{MB}=21$)

	Business group	New residential	Remodeling	Multiple-unit housing	Industrial buildings	Industrial uses	Commercial buildings	Other
SK	Cabinets, furniture and millwork	63	63	69	31	19	63	6
	Engineered wood products	60	60	60	60	40	60	60
	All other wood products	0	0	0	0	25	0	75
	All BTs	52	52	56	32	24	52	28
MB	Cabinets, furniture and millwork	67	67	11	22	0	44	22
	Engineered wood products	63	63	50	63	25	63	38
	All other wood products	25	25	25	25	75	25	25
	All BTs	57	57	29	38	24	48	29

Table 4. Percentage of respondents buying or selling custom services in 2017 ($n_{SK}=25$, $n_{MB}=21$)

Region	Purchase custom service (%)	Sell custom service (%)	Sell manufacturing services (%)	Sell non-manufacturing services (%)
Saskatchewan	58	37	89	22
Manitoba	55	43	100	25
Combined	56	40	94	24

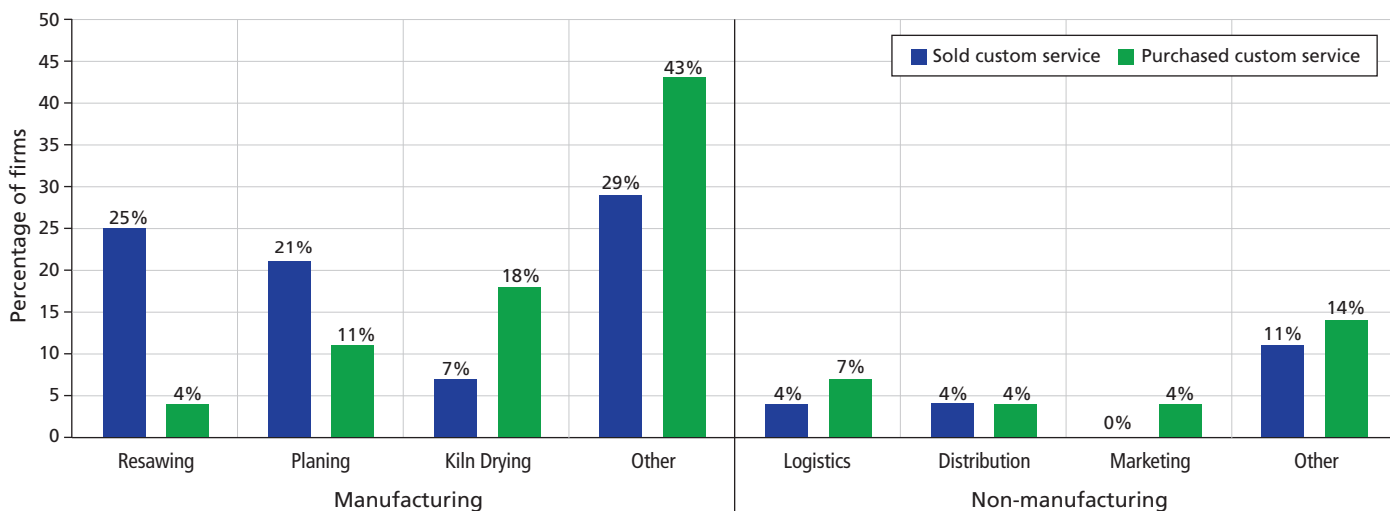


Figure 10. Percentage of respondents selling or purchasing custom services ($n=23$).

Thirty-seven and forty-three percent of SK and MB respondents, respectively, provided custom services while 58% of SK and 55% of MB respondents purchased custom services from other businesses. Of the businesses in SK that offered services, 89% provided manufacturing services, 22% delivered non-manufacturing services, and 11% provided both. In MB, manufacturing services were sold by all businesses that offered custom services and 25% of these businesses also provided non-manufacturing services. Only 2% of respondents planned to expand into new business areas.

As shown in Figure 10, resawing and other manufacturing services were the main amenities offered. Kiln drying and other types of manufacturing were the key services purchased. Other manufacturing services listed in the respondents' comments included treating, finishing, custom doors/cabinets, and mouldings.

4.4 Cost Structure

Respondents were asked to list the proportion of their operating expenses attributable to wood costs, labour, interest payments, depreciation, and other production costs. Wood costs were the largest cost component in SK at 47% of operating expenses on average and labour followed at 34%. Thus, labour and fibre accounted for approximately 80% of the total manufacturing costs for secondary wood manufacturers. MB had a similar breakdown with wood and labour costs at 46% and 31%, respectively. The "other" category varied across BTs and was reported by respondents to include overhead, maintenance, transportation, and utilities.

Figure 11 highlights the distribution across the four cost categories by business groups in SK and MB, respectively. Wood cost was the most significant expense component for all BTs in both provinces except for the cabinets, furniture and millwork group where labour was the greatest cost. Depreciation and interest were generally a small part of the cost structure.

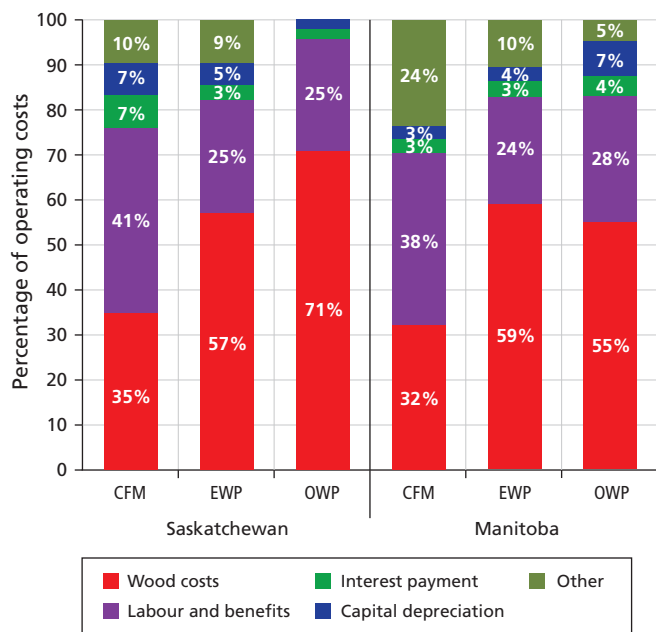


Figure 11. Distribution of operating costs across business group ($n_{SK}=20$, $n_{MB}=19$).

4.5 Wood Material Utilization and Species

Firms were asked to estimate their total wood fibre use in 2017 by species and form (e.g., logs, lumber, panelboards, and other wood products). These responses were then converted into roundwood equivalents (RWE), measured in cubic metres, to facilitate comparison across business groups and types of wood inputs.⁵ SK survey respondents ($n=23$) used about 0.2 million m³ of RWE. Of this total, 68% was in the form of logs with lumber as the second largest input at 25%. About 7% of wood fibre used was in the form of plywood, veneer, oriented strand, and MDF boards. In MB, the survey respondents ($n=18$) consumed 0.3 million m³ of RWE consisting of 79% lumber, 13% logs and 8% of plywood. Figure 12 further shows the distribution of different forms of wood fibre used by business groups in the two provinces. In SK, logs were a common wood material input for engineered wood products specifically used for treated posts and rails. Lumber was the most frequent wood material consumed by the all other wood products group. Plywood, OSB and MDF was used by the cabinets, furniture and millwork business group. In MB, lumber was the dominant material in all business groups.

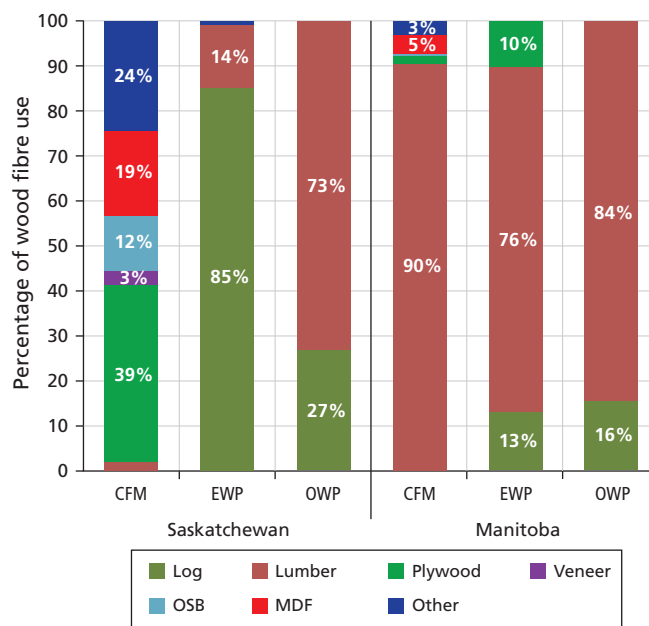


Figure 12. Distribution of wood fibre use by form and by business group ($n_{SK}=23$, $n_{MB}=18$).

Figure 13 shows the volume of wood fibre used by tree species. Jack pine and spruce made up most of the volume consumed in SK at 51% and 41%, respectively. Spruce comprised most of the volume used in MB at 62%, with the remainder of the wood distributed relatively evenly across a variety of other species.

Figure 14 shows species use by business group. The cabinet, furniture and millwork business group in both provinces utilized predominantly hardwoods. The remaining business groups used mainly spruce except the all other wood products business group in SK which mostly consumed jack pine.

⁵ Conversion factors are based on Nielson et al. 1985.

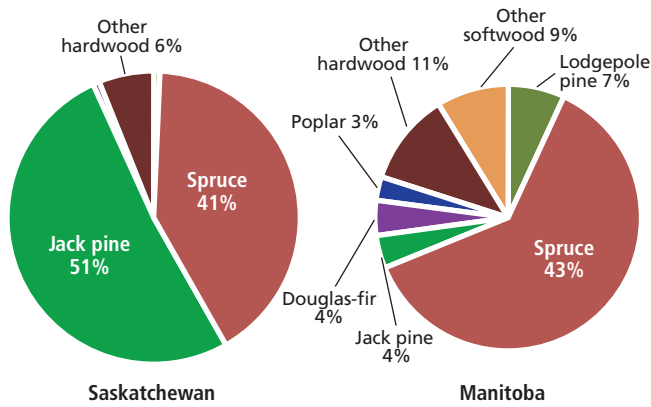


Figure 13. Distribution of wood fibre use by species ($n_{SK}=14$, $n_{MB}=16$).

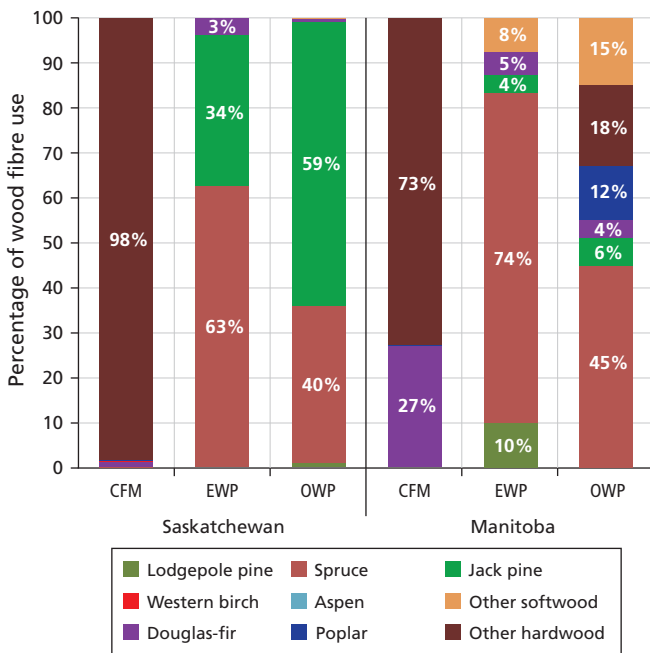


Figure 14. Wood fibre use by species and by business group ($n_{SK}=14$, $n_{MB}=16$).

Figure 15 shows the breakdown of wood volume by source. Most of the wood used by SK firms originated within the province, either from the open market (53%) or harvested directly from crown land under a harvest license (31%), or trade with other companies (2%). The remaining volume was obtained from other provinces (13%) and outside Canada (1%). Most of the wood (73%) utilized by MB firms was sourced from other provinces. The rest of the wood volume was procured from outside of Canada (12%), within Manitoba by open market (12%), harvest licenses (2%), and trade with other companies (1%).

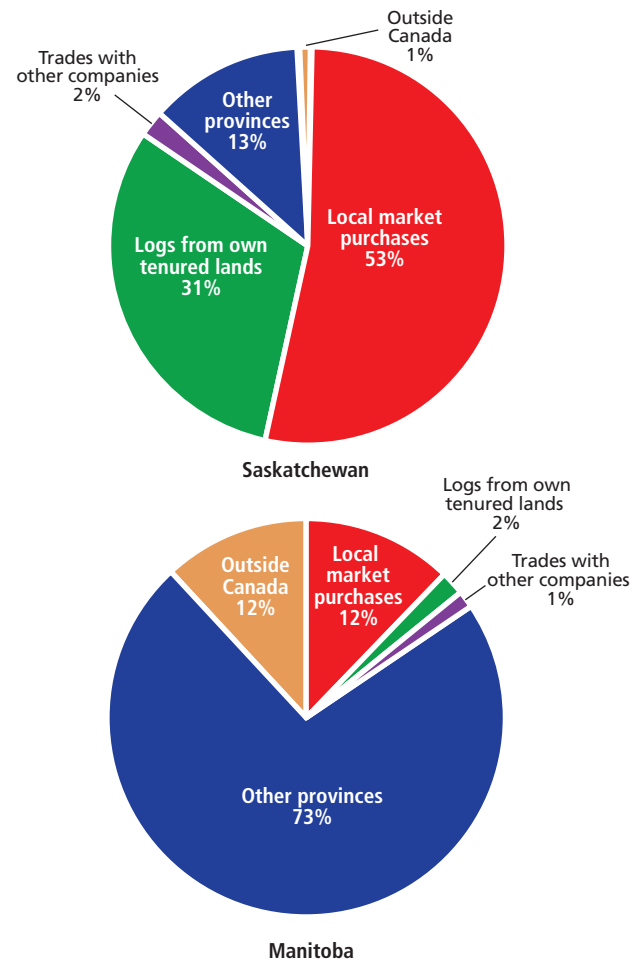


Figure 15. Sources of wood fibre by province ($n_{SK}=25$, $n_{MB}=20$).

4.6 Destination Markets

To understand market specialization and highlight possible opportunities for market diversification and growth, we asked respondents to list the destination markets in which they sold their products. The markets for SK's products were highly concentrated within SK at 85% of total sales revenue, while the markets for MB's products were more diversified (Figure 16). The rest of Canada accounted for 35% of sales revenue in MB, which was distributed across Eastern Canada (20%), the other Prairie provinces (13%), and British Columbia (2%). About 13% of 2017 sales in Manitoba were to markets in the United States, with nearly two-thirds of these sales to the US South and the rest to the US West and Midwest. No overseas sales were reported for either province.

All business groups were mainly selling to local markets in SK (Figure 17). The markets were more diversified in MB, especially for the cabinets, furniture and millwork business group with only 22% of sales within the province. The largest destination market was Eastern Canada at 31% of sales revenue, but the US (23%), other Prairie provinces (17%), and Ontario (8%) were also important markets for this business group.

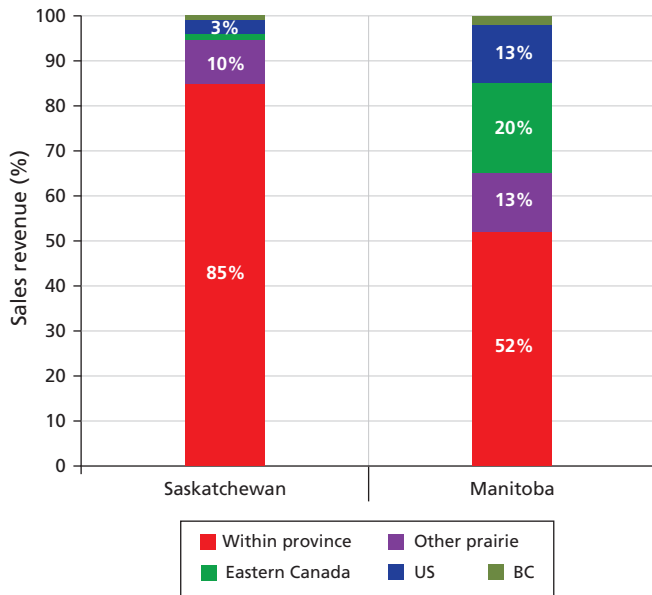


Figure 16. Distribution of sales revenues by destination market for Saskatchewan and Manitoba secondary manufacturers ($n_{SK}=26$, $n_{MB}=19$).

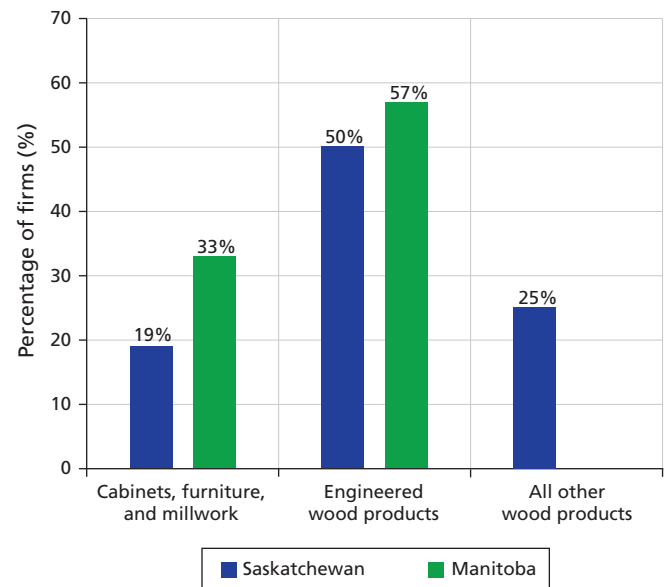


Figure 18. Percentage of firms planning to expand to new markets ($n_{SK}=26$, $n_{MB}=20$).

4.7 Use of the Internet

To gauge the use of electronic business practices, survey respondents were asked if they utilized the internet in some way to support their business. The survey responses were arranged into three groups that represented the firms' use of the internet: (1) management, (2) e-commerce, and (3) marketing (Table 5).

Seventy-eight and seventy-six percent of SK and MB respondents, respectively, used the internet to acquire manufacturing knowledge and information, and 22% of SK and 24% of MB respondents employed it to access LinkedIn, a social media tool suited to finding employment and employees. LinkedIn was also used to some degree by the cabinets, furniture and millwork business group in both provinces. In SK, 33% of respondents utilized the internet to purchase inputs, whereas only 19% used it to sell their products. In MB, 43% of respondents purchased inputs online and 10% sold products online. The cabinets, furniture and millwork business group in both provinces had the highest share of firms that sell their products via the internet.

Seventy-eight and eighty-six percent of SK and MB respondents, respectively, had a website, which was by far the most common use of the internet. Social media use was similar across provinces, with 44% of SK and 38% of MB respondents employing some form of social media. Facebook was the most popular, utilized by 41% of SK and 38% of MB respondents. The cabinets, furniture and millwork business group, which tends to sell finished consumer products, was more likely to use these electronic marketing tools, perhaps seeing them as an effective marketing channel to final consumers.

4.8 Capacity Utilization

Table 6 shows that all business groups were operating below production capacity. The average capacity utilization level was 76%

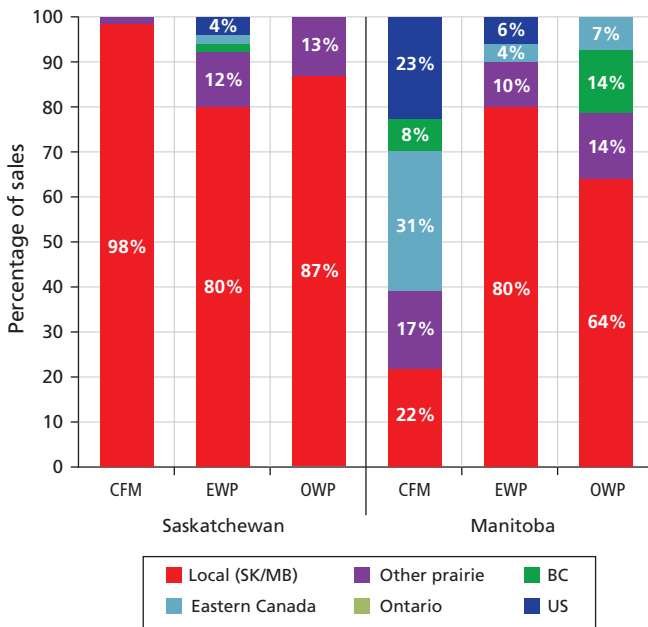


Figure 17. Distribution of sales revenues by destination market for each business group ($n_{SK}=26$, $n_{MB}=29$).

Twenty-seven and thirty-five percent of respondents in SK and MB, respectively, planned to expand sales to new markets (Figure 18). In both provinces, the engineered wood products business group was the most interested in expansion to new markets. In general, respondents were particularly eager to expand into other provinces within Canada and to the US market. The engineered wood products business group in MB also indicated some interest in Europe and Latin America.

Table 5. Percentage of firms using the internet for management, e-commerce, or marketing by business group ($n_{SK}=27$, $n_{MB}=21$)

Business type	Management		E-commerce		Marketing						
	Knowledge/ Info	Linked-In	Purchase	Sell	Website	Facebook	YouTube	Twitter	Pinterest	Instagram	
SK	CFM	82%	18%	29%	29%	82%	41%	0%	0%	12%	18%
	EWP	67%	33%	50%	0%	83%	50%	0%	0%	0%	0%
	OWP	75%	25%	25%	0%	50%	25%	0%	25%	0%	0%
	Total	78%	22%	33%	19%	78%	41%	0%	4%	7%	11%
MB	CFM	78%	33%	67%	22%	89%	44%	33%	33%	22%	33%
	EWP	63%	25%	13%	0%	88%	38%	0%	25%	0%	13%
	OWP	100%	0%	50%	0%	75%	25%	0%	0%	0%	0%
	Total	76%	24%	43%	10%	86%	38%	14%	24%	10%	19%

in SK, and 87% in MB. In both provinces, capacity utilization was highest for the cabinets, furniture and millwork business group. Nineteen percent of SK and forty-one percent of MB respondents expected to increase production capacity between 2018 and 2020 (Table 7). Of the firms that planned to expand, the average expected capacity expansion was 14% in SK and 23% in MB.

Table 6. Capacity utilization by business type ($n_{SK}=25$, $n_{MB}=19$)

Business type	Saskatchewan (%)	Manitoba (%)
CFM	80	92
EWP	68	82
OWP	68	84
All business groups	76	87

Table 7. Planned capacity expansion during 2018–2020 ($n_{SK}=13$, $n_{MB}=13$)

Business type	Proportion of firms expecting to expand (%)		Average expansion (%)	
	SK	MB	SK	MB
CFM	18	50	8	29
EWP	0	29	20	19
OWP	33	40	23	15
All business groups	19	41	14	23

4.9 Constraints to Expansion

Our survey included questions on six factors that may constrain a firm’s ability or expectation to expand: (1) wood supply; (2) labour; (3) markets; (4) financing; (5) management capacity; and (6) transportation and distribution. Firms were asked to rate each of these factors on a scale of 1 to 5 (i.e., from not at all constraining to extremely constraining). Figure 19 shows the distribution of ratings of the six factors in SK and MB. In both provinces, markets and labour had the highest scale ratings. Forty-eight and thirty-seven percent of SK and MB respondents, respectively, rated markets as 4 or 5; 37% of SK ranked labour as 4 and 42% of MB respondents ranked it as 5.

Survey respondents also rated the importance of a variety of subcategories within these six factors, providing some insight into the specific issues that may limit expansion. Table 8 provides the

mean score for each constraint and its subcategories. Markets were ranked as the most limiting factor in both SK and MB at 3.4 and 3.1, respectively.

Table 8. Constraints to expansion: mean constraint scores ($n_{SK}=22$, $n_{MB}=19$)

Detailed constraint	SK	MB
Markets	3.4	3.1
Softwood Lumber Agreement	2.0	2.7
Market diversification	1.9	2.5
Product diversification	2.0	2.3
Market/Product research	1.6	2.3
Foreign regulations	1.6	2.3
Labour	2.9	2.9
Experience	2.6	3.0
Cost	2.7	2.9
Training/Skills	2.6	2.8
Flexibility	2.1	2.5
Finance	2.4	2.5
Cost	1.9	2.2
Availability	1.8	2.0
Flexibility	1.8	2.0
Repayment schedule length	1.7	2.0
Management	2.3	2.1
Increasing labour efficiency	3.1	2.8
Reducing manufacturing costs	2.8	2.7
Improving raw material recovery	2.2	2.3
Implementing lean/just-in-time manufacturing techniques	2.2	2.2
Improving product quality	2.1	2.2
Wood supply	1.9	2.1
Price	2.8	3.0
Price volatility	2.6	2.8
Quality/Grade	2.3	2.7
Volume	2.0	2.4
Transportation	1.7	1.8
Costs	2.5	2.8
Access	1.9	2.5
Logistics	2.1	2.4
Frequency	2.0	2.1

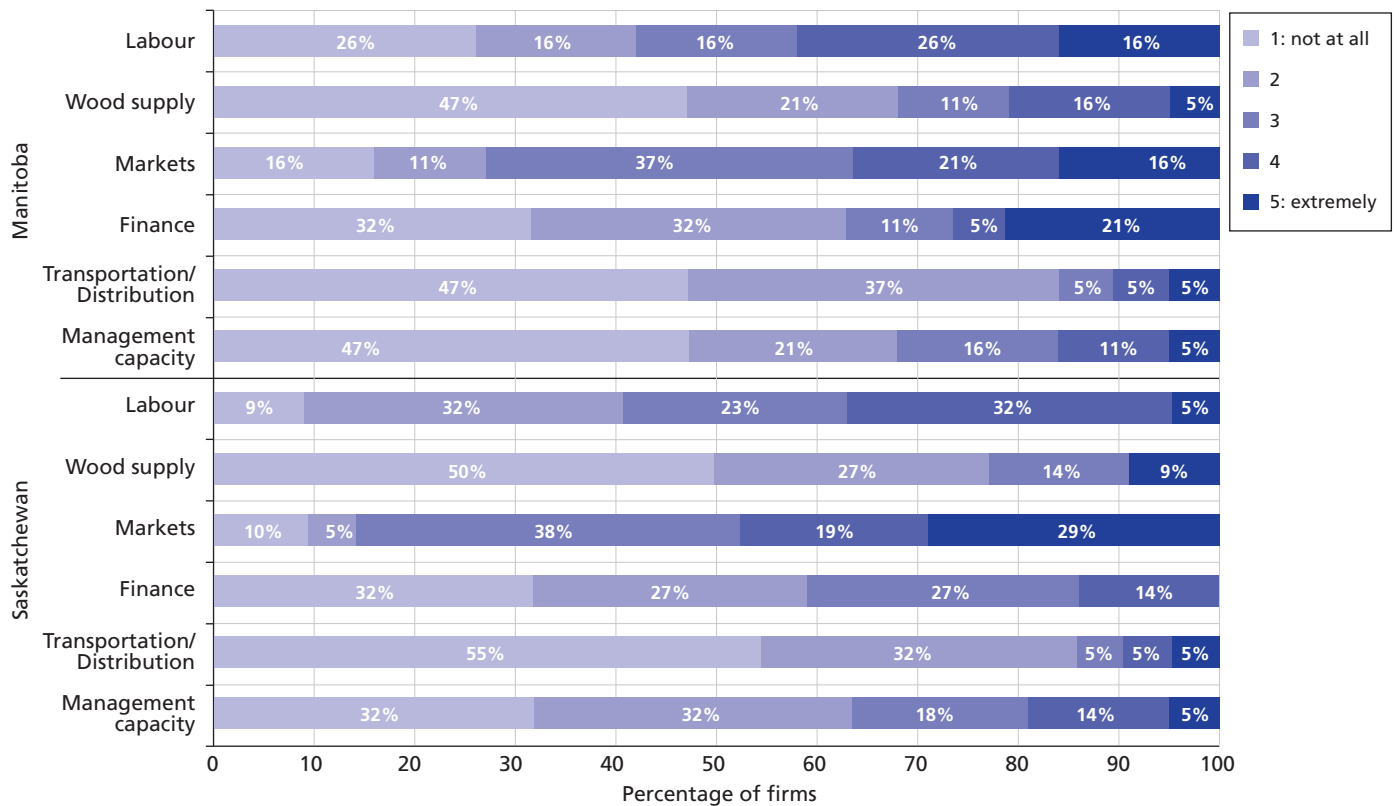


Figure 19. General constraints to expansion in SK and MB: distribution of ratings ($n_{SK}=22$, $n_{MB}=19$).

Figure 20 and 21 further present the general constraints to expansion by business group. All business groups scored markets above 2.7 out of 5, except the all other wood product business group in SK, which rated it 2.0. The engineered wood product and the cabinet, millwork and furniture business groups scored markets the highest constraint in both provinces. The detailed breakdown of the market constraints showed that the US-Canada softwood lumber dispute was a concern. Market diversification and product diversification was perceived as a moderately important issue.

Firms across all business groups in both provinces rated labour as the second greatest constraint to growth (2.9). Labour was the number one concern for the cabinet, furniture and millwork business group and the all other wood product business group in MB. In the detailed responses, we found that firms were concerned not only about the cost of labour but also about the level of experience as well as employee training and skills.

Finance was rated as the third most limiting factor in both SK and MB. Details in subcategories showed that cost was the major concern for businesses. Management capacity was the fourth most important restriction in both provinces, with the inability to increase labour efficiency being the top management constraint subcategory.

Wood supply ranked, on average, as the fifth most important constraint across business groups but was the number one concern for all other wood products in SK (3.8); this constraint also posed a significant issue for the engineered wood product (3.0) and all other wood product BTs (3.0) in MB. Transportation was the least important limitation, but was the second most important constraint for all other wood products in MB (3.3) and the fourth most significant barrier for the engineered wood product BT in SK (2.7).

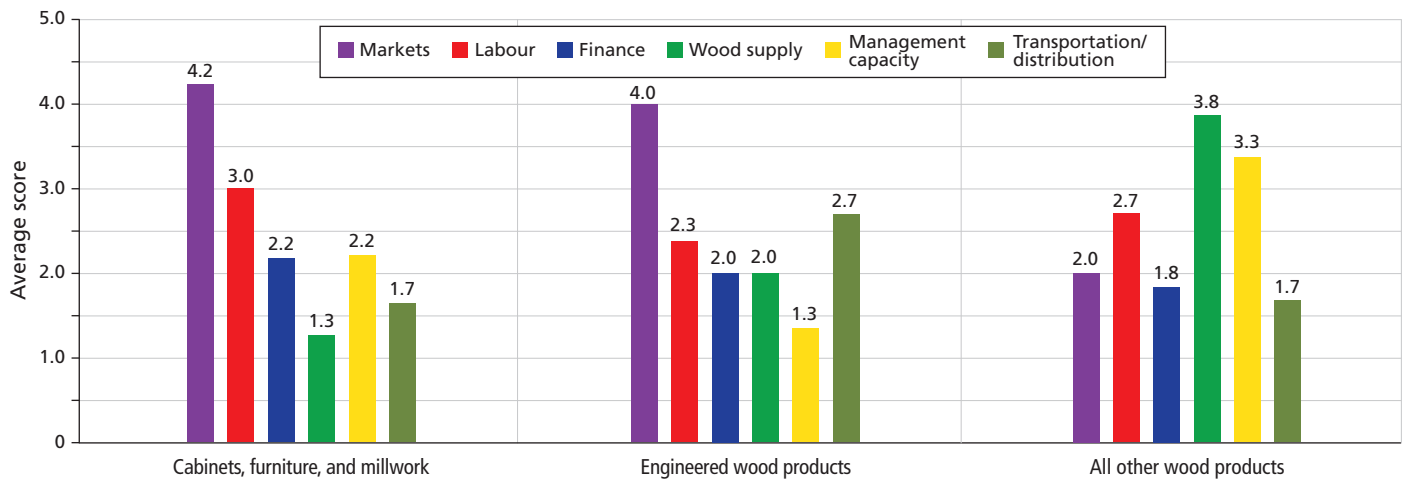


Figure 20. Constraints to expansion by business group in SK (1=least constraining and 5=most constraining).

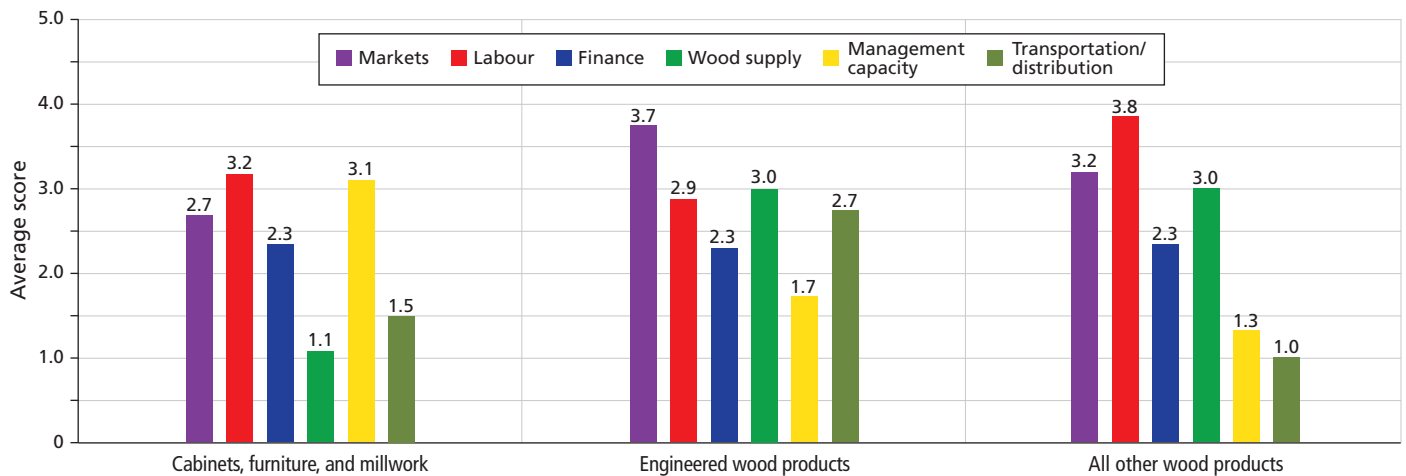


Figure 21. Constraints to expansion by business group in MB (1=least constraining and 5=most constraining).

5 Discussion and Conclusion

This report presents survey results for the secondary wood manufacturing industries in Saskatchewan and Manitoba in 2017. These were the first comprehensive surveys of the sector in these two provinces and were part of the Canadian Forest Service survey program on the secondary wood manufacturing products sector across Canada. Most firms were in the south of the provinces where the population and demand for those products are concentrated. We estimated that SK's secondary wood manufacturing industries employed 2,201 people and had sales of \$305 million in 2017. MB's secondary wood manufacturing industries were nearly double the size of SK's, with 4,887 people employed and \$714 million in sales.

Some noticeable sector differences between the two provinces were revealed by the survey results. Manitoba had more large size firms in terms of both number of employees and sales. It

also had more diverse markets for their products besides their domestic market, with 35% of sales to the rest of Canada and 13% to the United States. The auxiliary information based on the data from Statistics Canada (Figure A5-6) further showed that the secondary wood manufacturing accounted for the majority of wood product manufacturing sales in MB, but primary manufacturing carried more weight in SK. Manitoba's position in the centre of North America gives it an advantage as a key part of the mid-continent trade corridor. Its well-developed railway and truck transportation systems have the capacity of operating interprovincial and internationally. Winnipeg is the only city in Western Canada besides Vancouver that is on the main line for both the Canadian Pacific and Canadian National Railway, and that has three rail links to the United States. In addition, about 900 trucks cross the Manitoba-US border every day on average.⁶

6 <https://www.gov.mb.ca/jec/mbadvantage/market.html>.

All these factors have contributed to Manitoba's advantageous position to access a bigger market, especially for more finished products such as cabinets, millwork and furniture.

Another interesting discovery from the survey results was that Manitoba sourced the majority of its wood fibre used in the sector from other provinces. This indicates a disassociation of the primary wood sector and a successful secondary wood manufacturing sector within a jurisdiction. However, this result needs to be interpreted with caution as a few large companies in MB dominated the results and as mentioned earlier, Manitoba has geographic and transformational advantages, which may not be true for other sub-regions.

Markets and labour were the top two concerns constraining growth in both provinces and are areas where public policy actions could be considered. Policy actions that focus on developing new markets through increased market awareness or lowering market access barriers may help secondary wood manufacturers. For example, CFS research in British Columbia found that some firms opened up specialized wood marketing businesses or co-operated with other firms (forming business clusters) to share marketing costs and knowledge of new markets (Bogdanski and McBeath 2015). These types of efforts could be supported, especially with an eye to expanding US market opportunities. In addition, enhanced efforts to support labour skills development and labour mobility might help support this sector and other manufacturing areas in SK and MB.

References

- Bogdanski, B.E., & McBeath, A. (2015). Secondary manufacturing of solid wood products in British Columbia 2012: Structure, economic contribution, and changes since 1990. Victoria, B.C.: Natural Resources Canada, Pacific Forestry Centre. Information Report BC-X-436. Retrieved from <http://cfs.nrcan.gc.ca/pubwarehouse/pdfs/35951.pdf> (Accessed October 2018).
- Bogdanski, B.E.C.; McBeath, A. 2017. Secondary manufacturing of solid wood products in Alberta 2013/2014: structure and economic contribution. Natural Resources Canada, Pacific Forestry Centre, Victoria, B.C. Information Report B.C.-X-447. <http://cfs.nrcan.gc.ca/entrepotpubl/pdfs/39812.pdf> (Accessed October 2018).
- Bohning, A.A.; Rounds, A.C. 1992. Directory of Secondary Wood-Using Industries in Manitoba 1991. Forestry Canada, Winnipeg, Manitoba and Canada - Manitoba Partnership Agreement in Forestry. http://publications.gc.ca/site/archiv-ee-archived.html?url=http://publications.gc.ca/collections/collection_2017/rncan-nrcan/Fo42-91-87-1991-eng.pdf (Accessed Jan 2019).
- Bohning, R.A.; Krayetski, B.W. 1999. Directory of secondary wood-using industries in Saskatchewan. Canadian Forestry Service, Northern Forestry Centre, Edmonton, Alberta. <http://cfs.nrcan.gc.ca/pubwarehouse/pdfs/11615.pdf> (Accessed Jan 2019).
- Bohning, R.A.; Bell, J.L.; Middlebro', W.G.A. 2002. Directory of secondary wood-using industries in Manitoba 2001. Natural Resources Canada, Canadian Forest Service, Northern Forestry Centre, Edmonton, Alberta. <https://cfs.nrcan.gc.ca/publications?id=20351> (Accessed Jan 2019).
- Nielson, R.; Dobie, J.; Wright, D. 1985. Conversion factors for the forest products industry in Western Canada. Forintek Canada Corp., Vancouver, B.C. Special Publication No. SP-24R.
- Patenaude, P.; Bohning, R.A. 1993. Directory of secondary wood-using industries in Saskatchewan 1992. Forestry Canada, Prince Albert, Saskatchewan and Canada-Saskatchewan Partnership Agreement in Forestry. http://cfs.nrcan.gc.ca/bookstore_pdfs/19635.pdf (Accessed Jan 2019).
- Statistics Canada. 2018a. Principal statistics for manufacturing industries, by North American Industry Classification System (NAICS), annually, Table: 16-10-0054-01, 16-10-0038-01, 16-10-0117-01. (Accessed October 2018). <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1610005401;https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1610003801#timeframe;https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1610011701#timeframe>
- Statistics Canada. 2018b. Sales for manufacturing industries by industry and province, monthly, Table: 16-10-0048-01. <https://www150.statcan.gc.ca/t1/tbl1/fr/tv.action?pid=1610004801> (Accessed October 2018).
- Stennes, B.; Wilson, B. 2008. Secondary manufacturing of solid wood products in British Columbia 2006: structure, economic contribution and changes since 1990. Natural Resources Canada, Pacific Forestry Centre, Victoria, B.C. Information Report BC-X-416. <http://www.cfs.nrcan.gc.ca/pubwarehouse/pdfs/28385.pdf> (Accessed October 2018).

Appendices

Appendix 1: Listing of products within each business type

Remanufactured Products

- Lumber specialties
- Sawmill specialties
- Custom processing
- Fencing
- Cutstock
- Siding
- Decking

Engineered Wood Products

- Laminated beams
- Trusses
- Treated wood
- Laminated veneer lumber
- Cross-laminated timber

Engineered Wood Products: Buildings

- Log homes
- Prefab buildings

Millwork

- Doors
- Architectural woodwork
- Windows
- Turned wood
- Moulding
- Stairs
- Flooring

Cabinets

- Kitchen cabinets
- Cabinet doors
- Vanity cabinets
- Countertops

Furniture

- Household
- Commercial and institutional
- Ready-to-assemble (RTA)
- Patio

Pallets and Containers

- Pallets
- Boxes, bins, and crates
- Shipping materials

Panelboards

- Plywood
- Oriented strandboard
- Particleboard
- Medium-density fibreboard

Other Wood Products

- Poles and posts
- Wood novelties
- Veneer
- Woodcrafts
- Instruments
- Fuelwood pellets
- Oil and gas drill rig mats

Appendix 2: 2017 Saskatchewan secondary wood manufacturing survey (similar survey used for Manitoba)

Survey purpose

This survey collects manufacturing and related information on the Saskatchewan secondary wood manufacturing sector. Natural Resources Canada has been doing similar surveys since 1990 in BC and this is the first for Saskatchewan. This information provided allows for an accurate information base used to describe the structure, performance and needs of the secondary manufacturing sector. This will be a key source of information on the sector that will be used by policy makers in Saskatchewan, and we hope will be useful for forest industry associations. This data is used for statistical analyses and to produce published reports and presentations on the state of the industry in Saskatchewan.

1. Please give the location of where the mill site is located, if different from mailing address.

Complete a separate questionnaire for each of your mill sites, if more than one. Please contact us if you have questions. We define a mill as a specific facility or area where manufacturing occurs such as a shop, planer mill etc.

Address (number and street)	
Town/City	Postal Code

2. In what year did the mill begin operations? _____

- 3a. What is the legal status of your business?

- Sole proprietorship
- Partnership
- Corporation
- Other _____

- 3b. Is this business owned by Indigenous people?

- Yes, wholly owned
- Yes, partially owned
- No

- 4a. Please select the activity that accounted for the majority of your **2017** manufacturing sales revenue. Please select **one** only.

- Remanufactured products (finger joint, lumber specialties, fencing, panels, rig mats)
- Engineered wood products (glulam, LVL, I-joists, laminated posts/beams, trusses, prefab buildings, log homes, treated wood)
- Millwork (doors, windows, architectural and custom woodwork, turned wood products, mouldings)
- Cabinets (kitchen/vanity cabinets, cabinet doors, countertops)
- Furniture (household, ready-to-assemble, commercial, institutional and patio)
- Pallets and containers (pallets, boxes, bins, crates)
- Plywood & Panelboards (excluding/net of veneer production)
- Other (please specify) _____

4b. Does a majority of your sales revenue come from construction/building at the job site or involve making one-off products (such as cabinets or furniture) for individual customers?

- Yes
- No
- Don't know/unsure

Wood Use

5a. Please provide the estimated volume of raw wood materials used by your mill in 2017.

Note: m³=cubic meters; mbf=thousand board feet; msf= 1000 square feet 3/8" basis; odt=oven-dried metric tonnes

Type of Raw Wood Material	Volume	Units of Measure
Logs		<input type="checkbox"/> m ³ <input type="checkbox"/> mbf <input type="checkbox"/> other _____
Lumber		<input type="checkbox"/> m ³ <input type="checkbox"/> mbf <input type="checkbox"/> other _____
Plywood		<input type="checkbox"/> m ³ <input type="checkbox"/> msf <input type="checkbox"/> other _____
Veneer		<input type="checkbox"/> m ³ <input type="checkbox"/> msf <input type="checkbox"/> other _____
Oriented Strand Board (OSB)		<input type="checkbox"/> m ³ <input type="checkbox"/> msf <input type="checkbox"/> other _____
Medium-density fibreboard (MDF)		<input type="checkbox"/> m ³ <input type="checkbox"/> msf <input type="checkbox"/> other _____
Wood residues		<input type="checkbox"/> m ³ <input type="checkbox"/> odt <input type="checkbox"/> other _____
Other wood material (please specify):		
		<input type="checkbox"/> m ³ <input type="checkbox"/> mbf <input type="checkbox"/> msf <input type="checkbox"/> other _____
		<input type="checkbox"/> m ³ <input type="checkbox"/> mbf <input type="checkbox"/> msf <input type="checkbox"/> other _____

5b. Please provide the sources of raw wood material used by your mill in 2017 (provide best estimate):

Source of Wood Supply	%
Saskatchewan market purchases	
Logs from own tenured lands	
Other wood materials from own primary mills	
Log/lumber trades with other companies	
Canadian purchases outside of Saskatchewan	
Imports from outside Canada	
Total= 100%	

5c. If you sourced wood material from outside Saskatchewan in 2017, please indicate where you sourced these raw materials from. Please check all that apply.

Other prairie provinces	<input type="checkbox"/>	Europe	<input type="checkbox"/>
British Columbia	<input type="checkbox"/>	Japan	<input type="checkbox"/>
Ontario	<input type="checkbox"/>	China	<input type="checkbox"/>
Eastern Canada	<input type="checkbox"/>	Korea	<input type="checkbox"/>
US West	<input type="checkbox"/>	Other Asia	<input type="checkbox"/>
US South	<input type="checkbox"/>	Latin America	<input type="checkbox"/>
US Midwest	<input type="checkbox"/>	Africa	<input type="checkbox"/>
US Northeast		Australia/New Zealand	<input type="checkbox"/>

6. Please provide an estimate of the wood species used by your mill by **percentage** of total volume in **2017**.

Softwood	Lodgepole pine	
	Spruce	
	Douglas-fir	
	Jack pine	
	Other softwoods (please specify):	
Hardwoods	Aspen	
	Western birch	
	Poplar	
	Other hardwoods (please specify):	
	Total volume of wood fibre used	100%

Operations

7. Please provide the percentage breakdown of operating costs for your mill in **2017**. (Provide your best estimate.)

Main Operating Costs	%
Wood Costs	
Labour and Benefits	
Interest	
Depreciation	
Other (please specify):	
	Total of operating costs
	100%

Employment

8a. Please provide the average number of full-time equivalent employees working at this mill in **2017**. A full-time equivalent is 220 or more days worked in the year.

Production (manufacturing) staff	
Non-production staff	
Total	

8b. Of the total number of full-time equivalent employees reported in question 8a, how many are Indigenous people?

Manufacturing Capacity and Expansion

Manufacturing capacity refers to the maximum volume of products that your mill is designed to produce for a one-year period.

9a. Approximately what percentage of manufacturing capacity was the plant operating at in 2017? _____%

9b. On average how many 8- to 10-hour shifts were running in 2017?

- 1
- 2
- More than 2

9c. What percentage of your manufacturing capacity is used to provide custom manufacturing services to other businesses?

_____ % Unknown/unsure

9d. Does your business plan to expand manufacturing capacity over the three-year period 2018–2020?

- Yes
- No
- Don't know

If you responded yes, please continue to question 9e otherwise go to question 10a.

9e. By what percentage does your business plan to expand capacity over the three-year period of 2018–2020?

_____ %

Constraints to Expansion

10a. For each item below, please indicate the extent to which they represent a constraint to expand your business with 1 being not at all constraining and 5 being extremely constraining.

General constraints to expansion	1	2	3	4	5
Wood Supply	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Labour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Markets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Finance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Management Capacity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transportation/Distribution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10b. For each general constraint category below, please indicate the extent to which each specific factor represents a constraint to expand your business with 1 being not at all constraining and 5 being extremely constraining.

i. Wood supply specific constraints	1	2	3	4	5
Volume	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Price	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quality/Grade	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Price Volatility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ii. Labour specific constraints	1	2	3	4	5
Training/Skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flexibility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iii. Markets specific constraints	1	2	3	4	5
Softwood Lumber Agreement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Product Diversification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Market Diversification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Market/Product Research	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foreign Regulations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iv. Financing specific constraints	1	2	3	4	5
Availability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flexibility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Repayment Schedule Length	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
v. Management capacity specific constraints	1	2	3	4	5
Improving Product Quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reducing Manufacturing Costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increasing Labour Efficiency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improving Raw Material Recovery	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Implementing Lean/Just-in Time Manufacturing Techniques	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
vi. Transportation & distribution specific constraints	1	2	3	4	5
Costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Logistics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Frequency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Electronic Commerce and Social Media

11a. Does your company use social media (See list in 11b, below)?

- Yes
- No
- Don't know

11b. If yes, which social media sites does your company use? Please check all that apply.

- Facebook
- Twitter
- Pinterest
- Instagram
- Linked-in
- YouTube
- Snapchat
- Other (please specify) _____

11c. If no, does your company plan to use a social media site?

- Yes
- No
- Don't know

11d. Does your company have a website?

- Yes
- No
- Don't know

11e. If yes, what is your website name? _____

11f. Does your company search the web for manufacturing knowledge/information?

- Yes
- No
- Don't know

11g. Does your company currently engage in e-commerce?

- Yes
- No
- Don't know

11h. If no, what are the key issues for not expanding e-commerce? Check all that apply.

- Too costly
- Too much time required
- Do not have required skills
- No business need
- Other (please specify) _____

If you answered no to 11g please go to question 12a, otherwise continue to 11i.

11i. Does your company sell products or services through the web?

- Yes
- No
- Don't know

11j. Does your company purchase or search the web for inputs?

- Yes
- No
- Don't know

11k. Is your company planning to expand its use of e-commerce?

- Yes
- No
- Don't know

11l. If no, what are the key issues for not adopting e-commerce? Check all that apply.

- Too costly
- Too much time required
- Do not have required skills
- No business need
- Other (please specify) _____

11m. If yes, what type of e-commerce expansion are you planning?

- New web design
- Sales
- Purchases
- Other (please specify) _____

Markets

12a. What was the percentage breakdown of sales and revenues from the following markets in 2017?

Saskatchewan	
Other Prairie	
British Columbia	
Eastern Canada	
US West	
US South	
US Midwest	
US Northeast	
Europe	
Japan	
China	
Korea	
Other Asia	
Latin America	
Africa	
Australia/New Zealand	
Total sales	100%

12b. What end markets do you target for your products? (Mark all that apply.)

- New residential
- Remodeling
- Multiple-unit housing
- Industrial buildings
- Industrial uses
- Commercial buildings
- Other _____

12c. Does your company plan to expand sales to new markets?

- Yes
- No
- Don't know

12d. If yes, please indicate new market areas (provinces/states/countries/regions) of interest. Mark all that apply.

- Other Prairie
- British Columbia
- Eastern Canada
- US West
- US South
- US Midwest
- US Northeast
- Europe
- Japan
- China
- Korea
- Other Asia
- Latin America
- Africa
- Australia/New Zealand
- Other (please specify) _____

12e. Please identify how you plan to access **new** markets (check all that apply).

- Own effort
- Partnering with other manufacturers
- Selling to wholesaler/distributors
- Working with existing Saskatchewan wood industry associations
- Other _____
- Don't know/unsure

12f. Please identify resources your company considers important to develop and evaluate **new** markets (check all that apply)

- Timely market intelligence
- Evaluation of new products and market opportunities
- Coordinated presence on international market development missions and at trade shows
- In-market support from wood industry associations
- Other _____
- Don't know/unsure

Sales Revenue

13a. Please indicate this mill's **2017** gross revenue (to the nearest dollar). **(Free On Board at mill – C\$)**.

Gross 2017 revenue: _____

13b. Please indicate this mill's **2016** gross revenue (to the nearest dollar). **(Free On Board at mill – C\$)**.

Gross 2016 revenue: _____

13c. Please estimate the **expected 2018** gross revenue (to the nearest dollar). **(Free On Board at mill – C\$)**.

Expected gross 2018 revenue: _____

13d. Please indicate the **percentage** of your mill's 2017 gross revenue that was attributed to custom **manufacturing services** such as planning or kiln drying services and **non-manufacturing services** such as marketing or distribution services.

Percentage of 2017 revenue: _____

Products

14a. Please list up to **4** of the top grossing products manufactured at this mill and indicate approximate percentage of **2017** total sales revenue reported in question 14a.

Main products	% of 2017 sales
All others products	
Total	100%

14b. Does your company plan to expand its product offering?

- Yes
- No
- Don't know

14c. If yes, what new products do you plan to offer?

Possible new products

Services

15a. Do you sell custom services?

- Yes
- No
- Don't know

15b. If yes, please indicate which custom services you provide. Please check all that apply.

Manufacturing Services		Non-manufacturing Services	
Planing	<input type="checkbox"/>	Marketing	<input type="checkbox"/>
Kiln Drying	<input type="checkbox"/>	Distribution	<input type="checkbox"/>
Resawing	<input type="checkbox"/>	Logistics	<input type="checkbox"/>
Other (specify): _____	<input type="checkbox"/>	Other (specify): _____	<input type="checkbox"/>

15c. In relation to your mill, where are the businesses you provide services to generally located?

- within 50 km
- within 51 to 100 km
- greater than 100 km

15d. Do you currently plan to expand into new businesses services?

- Yes
- No
- Don't know

15e. If yes, please indicate which services you plan to offer? Please check all that apply.

Manufacturing Services		Non-manufacturing Services	
Planing	<input type="checkbox"/>	Marketing	<input type="checkbox"/>
Kiln Drying	<input type="checkbox"/>	Distribution	<input type="checkbox"/>
Resawing	<input type="checkbox"/>	Logistics	<input type="checkbox"/>
Other (specify): _____	<input type="checkbox"/>	Other (specify): _____	<input type="checkbox"/>

15f. Do you currently purchase services from other businesses?

- Yes
- No
- Don't know

15g. If yes, please indicate which services you currently purchase? Please check all that apply.

Manufacturing Services		Non-manufacturing Services	
Planing	<input type="checkbox"/>	Marketing	<input type="checkbox"/>
Kiln Drying	<input type="checkbox"/>	Distribution	<input type="checkbox"/>
Resawing	<input type="checkbox"/>	Logistics	<input type="checkbox"/>
Other (specify): _____	<input type="checkbox"/>	Other (specify): _____	<input type="checkbox"/>

15h. And if yes, what percentage of the volume of logs or lumber used by your business in 2017 did you have custom processed by another business?

_____ % Unknown/unsure

15i. In relation to your mill, where are the businesses you purchase services from generally located?

- within 50 km
- within 51 to 100 km
- greater than 100 km

Company and product directory and survey reports

If enough companies participate, we hope to publish a directory of Saskatchewan companies that produce secondary wood manufacturing products. This electronic directory will be made freely available through the on-line bookstore of the Canadian Forest Service (<http://cfs.nrcan.gc.ca/publications/>). The directory will include company name, contact information, and a list of principle products. We welcome you to be included in this directory. We also publish a report that summarizes the findings from the analysis of the data produced from this survey. This report is also made freely available on the on-line bookstore. If you would like to participate in the directory or directly receive either the directory or survey report, please indicate below.

Would you want to be included in the Saskatchewan secondary wood product manufacturers' directory?

- Yes
- No

Would you like to receive a digital copy of the company/product directory?

- Yes
- No

Would you like to receive a digital copy of the final survey report?

- Yes
- No

Contact Person (name of person to contact about this questionnaire):

First name: _____

Last name: _____

Title: _____

Email: _____

Telephone number () _____ Fax number () _____

How long did you spend to collect the data and complete the survey? _____ hours _____ minutes

We invite your comments. Please be assured we read all comments with the intent of improving the survey.

Remember, all questionnaire responses are confidential. Thank you for your time.

Appendix 3: Auxiliary information on the Saskatchewan and Manitoba secondary wood product sector

Secondary wood manufacturing industries, as defined in our study, largely fall within five industrial groups of the North American Industry Classification System (NAICS) used by Statistic Canada:

- 3212 – Veneer, Plywood and Engineered Wood Product Manufacturing;
- 3219 – Other Wood Product Manufacturing;
- 337110 – Wood Kitchen Cabinet and Counter Top Manufacturing;
- 337123 – Other Wood Household Furniture Manufacturing; and
- 337213 – Wood Office Furniture, including Custom Architectural Woodwork, Manufacturing.

The business type “remanufactures” falls under several NAICS groups:

- 3211 – Sawmills and Wood Preservers (Siding and Dressed Lumber);
- 321919 – Other Millwork (Planed Lumber);
- 321999 – All Other Miscellaneous Wood Product Manufacturing (Fencing).

Also, businesses making products such as wood fuel pellets or horticultural products that are under our “other” business category, fall under NAICS 321999 (i.e., All Other Miscellaneous Wood Product Manufacturing). Table A1 lists the NAICS codes and names corresponding to the business groupings of secondary forest products used in this study.

Table A1. Correspondence between business types used in this study and North American Industrial Classification System (NAICS) 6-digit groups

NAICS code	NAICS description	Corresponding business type in this study
321114	Wood preservation	Other wood products
321211	Hardwood veneer and plywood mills	Panelboards
321212	Softwood veneer and plywood mills	Panelboards
321215	Structural wood product manufacturing	Engineered wood products
321216	Particle board and fibreboard mills	Panelboards
321217	Waferboard mills	Panelboards
321911	Wood window and door manufacturing	Millwork
321919	Other millwork	Millwork/remanufacturing
321920	Wood container and pallet manufacturing	Pallet and containers
321991	Manufactured (mobile) home manufacturing	Engineered wood products
321992	Prefabricated wood building manufacturing	Engineered wood products
321999	All other miscellaneous wood product manufacturing	Other wood products/remanufacturing
337110	Wood kitchen cabinet and counter top manufacturing	Cabinets
337121	Upholstered household furniture manufacturing	Furniture
337123	Other wood household furniture manufacturing	Furniture
337213	Wood office furniture, including custom architectural woodwork, manufacturing	Furniture/millwork

Statistics Canada’s Annual Survey of Manufacturing and Logging Industries provides information on each province’s forest sector industries and includes information on revenues, employee numbers, number of firms, and costs. Because of confidentiality laws, information is often suppressed, preventing a detailed disaggregation of the industry to separate out non-wood and wood material industries, such as with furniture manufacturing and related industries (NAICS 337), or data are not available for each year; however, the available data can still provide a good understanding of historical and recent trends.

Although panelboard mills are technically classified as secondary manufacturing mills because of the large average size of mills and the scale of the industry, they are sometimes treated as a primary industry, which is the case in SK. In this study, we excluded these mills from the survey analysis. Here we provided a cursory overview of the industry trends and current state using data available from Statistics Canada and Innovation, Science and Economic Development Canada.

Between 1990 and 2016, the industry grew considerably with employment and revenues peaking in the mid-2000s. After a significant decline during the United States housing slump beginning in 2007 and the subsequent financial crisis of 2008–2009, the industry was slowly growing over the past few years with sales around \$350 million in SK, \$150 million in MB; and employment 700 in SK, 600 in MB in 2016 (Figure A1, A2).

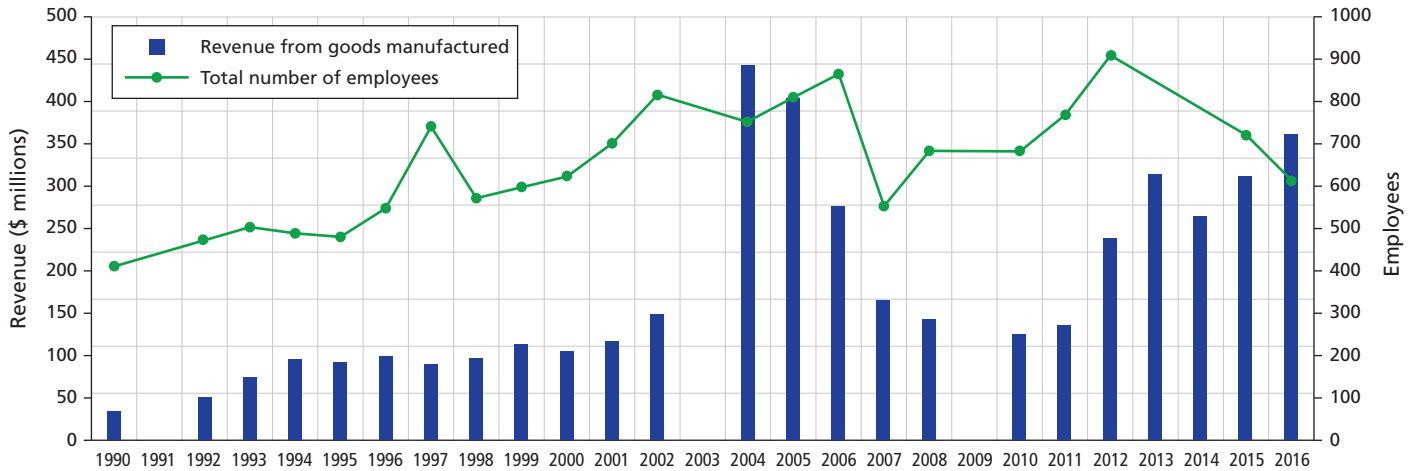


Figure A1. Manufacturing sales revenue and total number of employees for Saskatchewan panelboard industry, 1990–2016 (NAICS 3212; source: Statistics Canada 2018a).

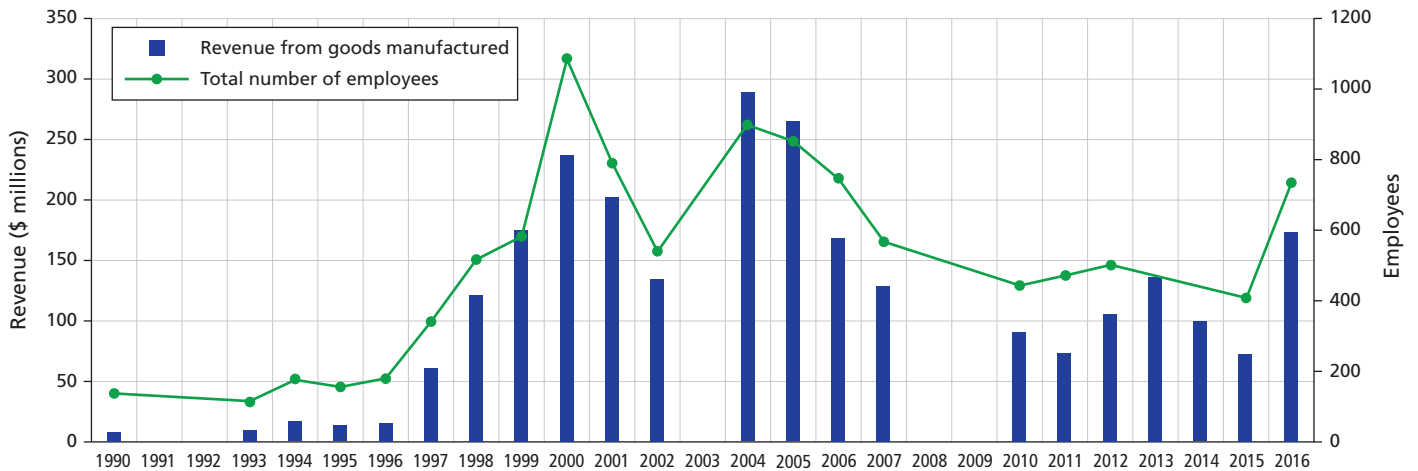


Figure A2. Manufacturing sales revenue and total number of employees for Manitoba panelboard industry, 1990–2016 (NAICS 3212; source: Statistics Canada 2018a).

In 2017, SK and MB exports of panelboard products reached \$240 and \$136 million, respectively (Figure A3, A4). Nearly all of the exports of the particleboard, fibreboard, and plywood were to the United States, with the provinces' panel industry fueled by demand for waferboard (orientated strand board) in United States housing construction. Both provinces' exports of fibreboard and plywood were minimal. Imports of fibreboard and plywood had been growing with China as the dominant supplier, although some fibreboard was sourced from Europe. With increasing imports and declining exports, the provinces' balance of trade was slightly negative for fibreboard and plywood.

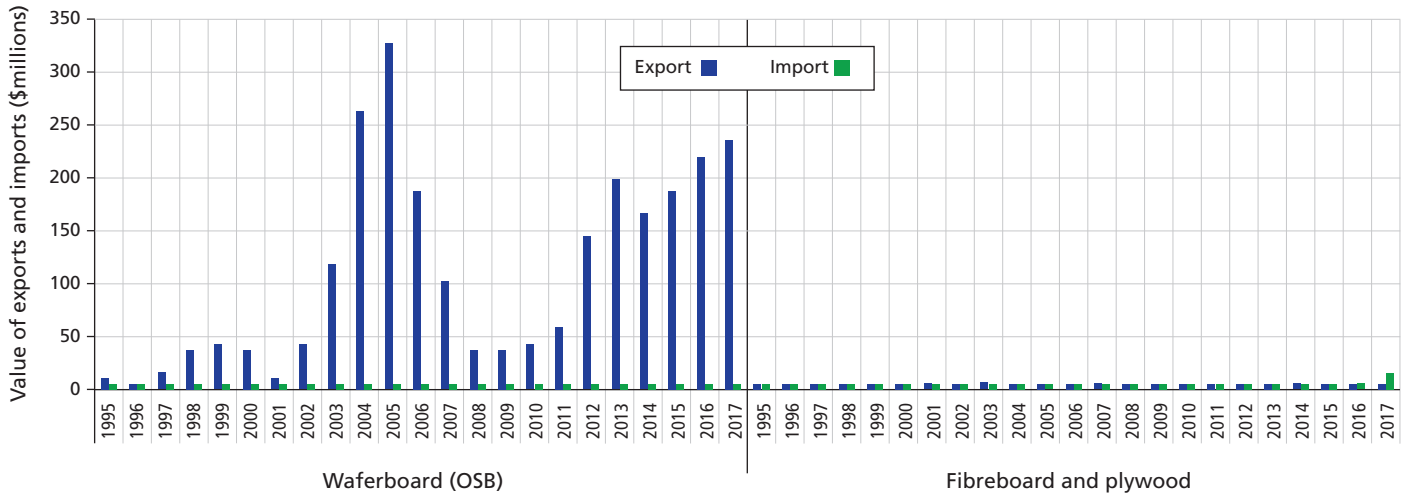


Figure A3. Saskatchewan Value of exports and imports of waferboard (oriented strand board), fibreboard, and plywood, 1995–2017. Note: Wafer board (OSB) – HS 4410; Fibreboard and Plywood – HS 4411 and 4412. Source: Trade Data Online.

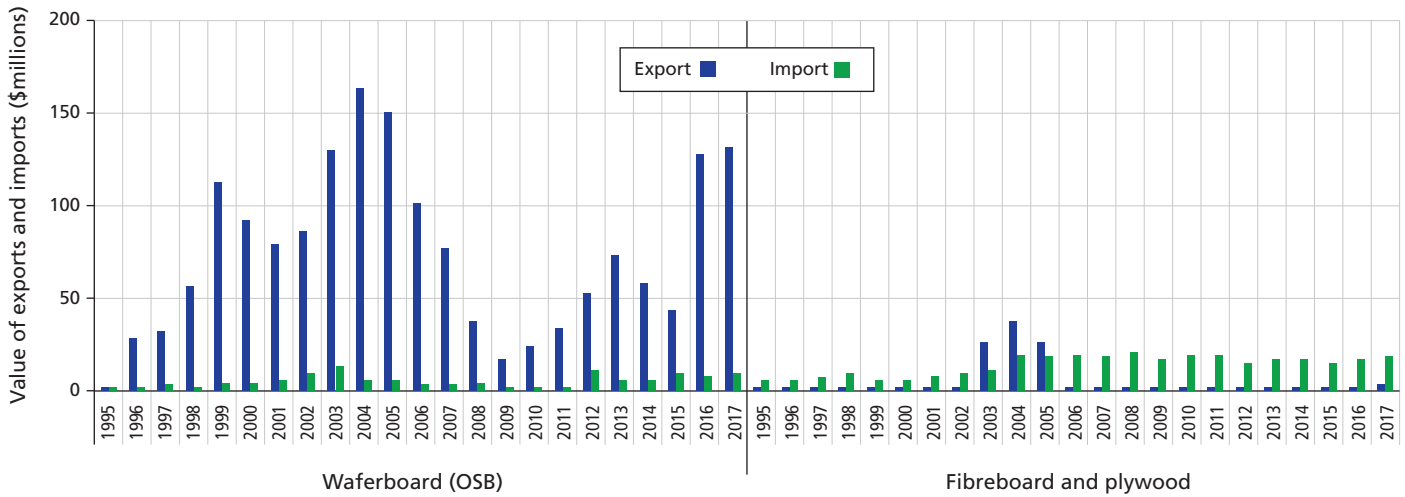


Figure A4. Manitoba value of exports and imports of waferboard (oriented strand board), fibreboard, and plywood, 1995–2017. Note: Wafer board (OSB) – HS 4410; Fibreboard and Plywood – HS 4411 and 4412. Source: Trade Data Online.

Figure A5 and A6 show the relative importance of the secondary wood manufacturing sector in comparison to other wood product and paper manufacturing sector for SK and MB, respectively. Though significant data were suppressed to meet the confidentiality requirements of the Statistics Act from 2002 to 2016, we could still see a trend of minimal growth of the secondary wood manufacturing (NAICS 3219, 3371, 3372) sector in SK. Panelboard manufacturing grew considerably since 1992 surpassing the sawmill manufacturing sector since early 2000 at a magnitude of over three times greater than the sawmilling sector in 2017. In MB, the secondary wood manufacturing sector was the largest forest industry grouping even after excluding panelboards. Real manufacturing sales measured in 2016 dollars for secondary wood manufacturing (NAICS 3219, 3371, 3372) grew 41% from \$534 million in 1992 to over \$752 million in 2017, with peak sales occurring in 2002 (\$1.2 billion). Sales in panelboard manufacturing in 2017 were 13 times of the sales in 1993. In comparison, over similar periods, real manufacturing sales decreased 36% and 32% for pulp and paper (1995–2015), and sawmilling (1995–2017), respectively.

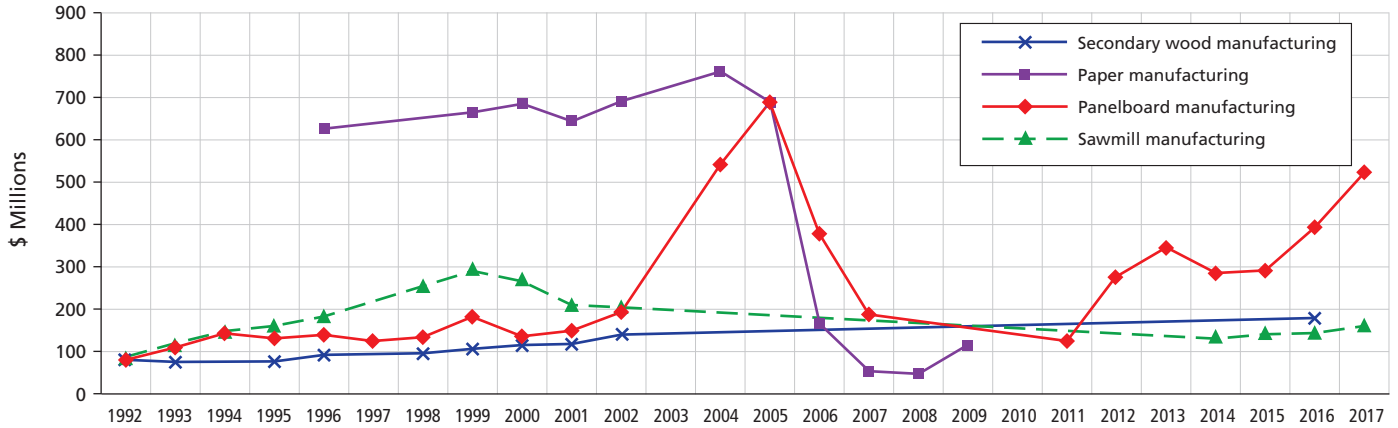


Figure A5. Real sales from manufacturing (2016 constant dollars) in SK, 1992–2017. Note: Data unavailable for some years. Engineering wood product components was included in “panelboard manufacturing” and not all furniture was included in “secondary wood manufacturing” was wood furniture (source: Statistics Canada 2018b).

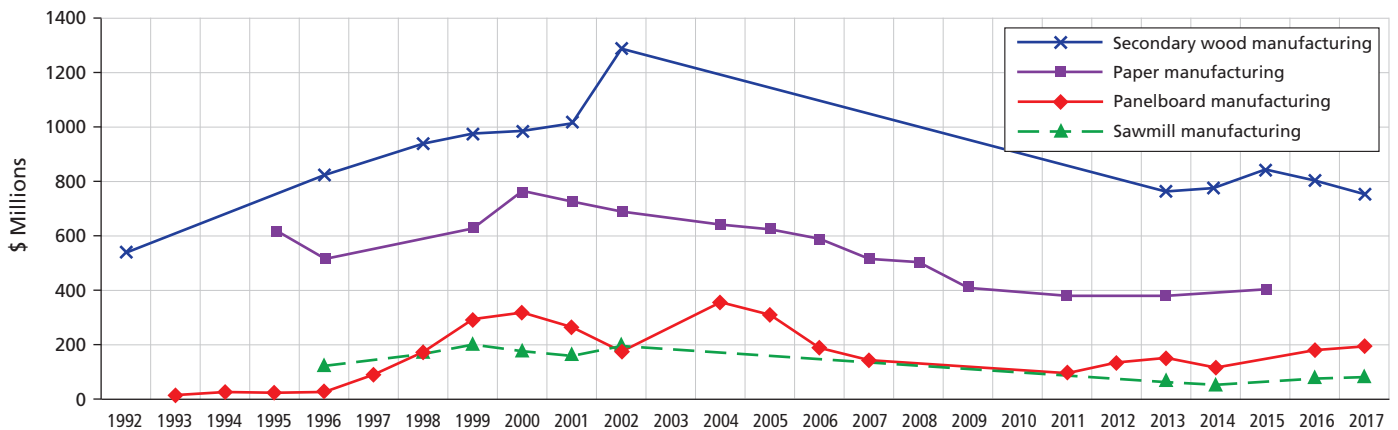


Figure A6. Real sales from manufacturing (2016 constant dollars) in MB, 1992–2017. Note: Data unavailable for some years. Engineering wood product components was included in “panelboard manufacturing” and not all furniture was included in “secondary wood manufacturing” was wood furniture (source: Statistics Canada 2018b).

Table A2 shows the correspondence between business types used in the survey report and the harmonized system of traded products used internationally. Using this relationship, trade balance data of secondary wood products in SK and MB is illustrated in Figure A7 and A8.

Table A2. Harmonized system for traded products code, description, and correspondence to business types used in this study

Business type used in study	HS code	Product description
Other	HS 440131	Sawdust, wood waste and scrap w/ or not agglomerated in logs, briquettes, pellets: wood pellet
Other	HS 440310	Wooden telephone poles, fence posts, other wood in rough – painted, stained or treated
Other	HS 4404	Hoopwood, split poles, piles, pickets and stake
Other	HS 440690	Cross-ties (sleepers) railway/tramway – wood – impregnated
Panelboard	HS 4408	Veneer/plywood sheets (thickness < 6 mm)
Millwork	HS 4409	Wood (lumber) continuously shaped
Panelboard	HS 4410	Particle board of wood or other ligneous material
Panelboard	HS 4411	Fibreboard
Panelboard	HS 4412	Plywood (plies <6 mm thick) and veneered or laminated panel
Other	HS 4413	Densified wood – in blocks, plates, strips or profile shape
Other	HS 4414	Wooden frames
Pallets and containers	HS 4415	Cases, boxes, crates, drums, pallets, load boards and similar packing articles of wood
Other	HS 4417	Tools (bodies and handles), broom/brush bodies, footwear parts of wood
Millwork	HS 4418	Windows, doors, shingles and shakes, panels and other builders, joiners and carpentry of wood
Other	HS 4419	Tableware and kitchenware of wood
Other	HS 4420	Wood statuettes, ornaments, caskets, cases; wood marquetry and inlaid wood
Other	HS 4421	Other articles of wood
Furniture	HS 940161	Seats with wooden frames – upholstered
Furniture	HS 940169	Seats with wooden frames – not upholstered
Furniture	HS 940330	Wooden furniture for office use
Furniture	HS 940340	Wooden furniture for kitchen use
Furniture	HS 940350	Wooden furniture for bedroom use
Furniture	HS 940360	Wooden furniture for other use
Buildings – engineered wood products	HS 940600	Prefabricated buildings ("industrialized buildings")

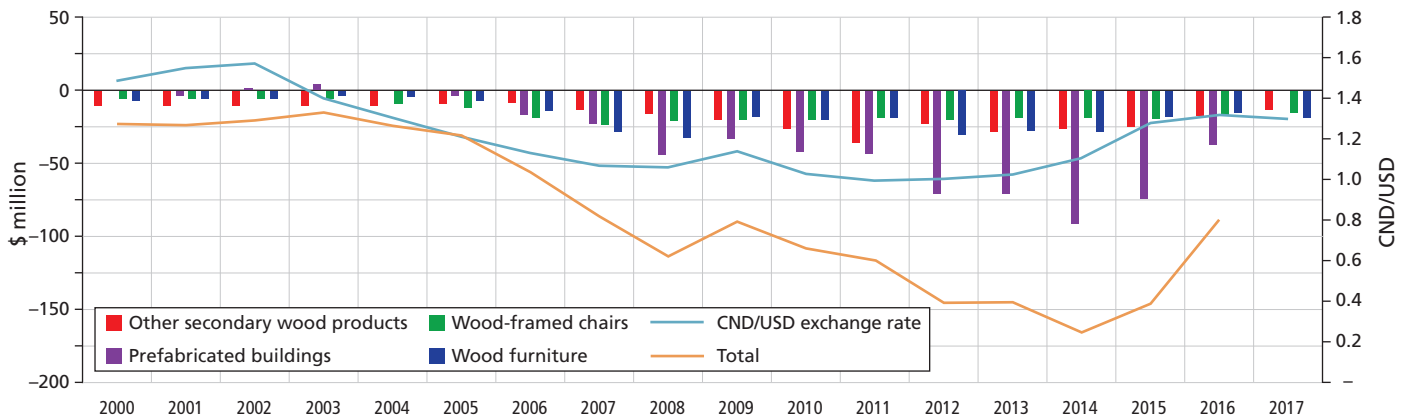


Figure A7. Trade Balance for select industry aggregates in SK (source: Trade Data Online: <http://www.ic.gc.ca/eic/site/tdo-dcd.nsf/eng/Home>). Note: Wood furniture aggregate (HS 940330, 940340, 940350, 940360); Prefabricated building (HS 940600); Wood framed chairs (HS 940161, 940169); Other secondary wood products (HS 4404, 4409, 4413, 4414, 4415, 4417, 4418, 4419, 4420, 4421, 440310, 440690).

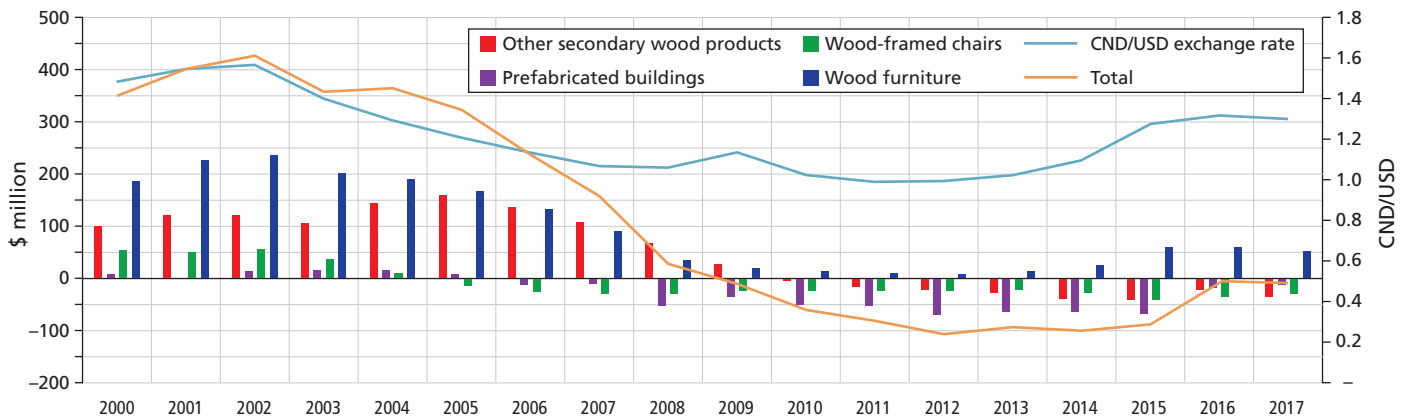


Figure A8. Trade Balance for select industry aggregates in MB (source: Trade Data Online: <http://www.ic.gc.ca/eic/site/tdo-dcd.nsf/eng/Home>). Note: Wood furniture aggregate (HS 940330, 940340, 940350, 940360); Prefabricated building (HS 940600); Wood framed chairs (HS 940161, 940169); Other secondary wood products (HS 4404, 4409, 4413, 4414, 4415, 4417, 4418, 4419, 4420, 4421, 440310, 440690).

SK was a net importer through the years (2000-2017). The trade balance in 2017 was \$88 million. The prefabricated buildings industry, which falls under product code HS 940600 covering wood, steel, aluminum, and inflatable buildings and industry code NAICS 321992, went from importing \$9 million in 2000 to \$40 million in 2017. Over the same period, the exports declined from \$9 million in 2000 to \$4 million in 2017.

MB moved from being a net exporter in 2000, turning direction in 2009 to becoming a net importer at the time of this report. Looking into the detailed data, beginning in 2004, exports of furniture products began to fall from peak values of \$281 million in 2002 to \$103 million in 2017. Over this same period, MB's imports of furniture products increased from around \$33 million to \$49 million. Decreased export demand and increased import competition were likely behind this trend. In addition, the other secondary wood product group, which covers a few product codes (HS 4404, 4409, 4413, 4414, 4415, 4417, 4418, 4419, 4420, 4421, 440310, 440690), moved from being a net export product group to a net import product group in 2010. Although it is difficult to determine which factors contributed to these fluctuations, the overall export and import trends tracked the changing US–Canadian dollar exchange rate, suggesting a loss of competitiveness related to the strengthening Canadian dollar.

Appendix 4: Non-response bias tests

1. Chi-squared test for goodness-of-fit between population and sample distributions for Saskatchewan

Business type	Population	Observed (o)	Expected (e)	$o - e$ (d)	(d) ²	(d) ² /e
Cabinets	85	14	15.3	-1.3	1.7	0.1
Engineered wood products	33	6	5.9	0.1	0.0	0.0
Furniture	16	2	2.9	-0.9	0.8	0.3
Millwork	18	3	3.2	-0.2	0.1	0.0
Other wood products	3	1	0.5	0.5	0.2	0.4
Pallets and containers	12	3	2.2	0.8	0.7	0.3
Remanufactured products	6	1	1.1	-0.1	0.0	0.0
Plywood and panelboards	1	1	0.2	0.8	0.7	3.7
Total	174	31	31.3	-0.3	4.1	4.9

Chi-square value is 4.9, which is less than the chi-square statistic for 8 degrees of freedom at 5% level of significance (15.5). We did not reject the hypothesis that the two distributions were the same.

2. Chi-squared test for goodness-of-fit between population and sample distributions for Manitoba

Business type	Population	Observed (o)	Expected (e)	$o - e$ (d)	(d) ²	(d) ² /e
Cabinets	38	6	8.7	-2.7	7.5	0.9
Engineered wood products	17	7	3.9	3.1	9.5	2.4
Furniture	7	1	1.6	-0.6	0.4	0.2
Millwork	14	2	3.2	-1.2	1.5	0.5
Other wood products	1	1	0.2	0.8	0.6	2.6
Pallets and containers	6	1	1.4	-0.4	0.1	0.1
Remanufactured products	8	3	1.8	1.2	1.3	0.7
Plywood and panelboards	1	0	0.2	-0.2	0.1	0.2
Total	92	21	21.2	-0.2	21.1	7.6

Chi-square value is 7.6, which is less than the chi-square statistic for 8 degrees of freedom at 5% level of significance (15.5). We did not reject the hypothesis that business type distributions between population and survey sample were the same.

3. Chi-squared test for goodness-of-fit between survey respondents and non-respondents on company employment size for Saskatchewan

Company size	Responded to survey	Did not respond (o)	Expected (e)	$o - e$ (d)	(d) ²	(d) ² /e
1-15	21	94	83	10.8	115.6	1.4
16-50	4	11	16	-4.9	23.6	1.5
> 50	3	6	12	-5.9	34.7	2.9
Total	28	111	111	0.0	173.9	5.8

Chi-square value is 5.8, which is less than the chi-square statistic for 2 degree of freedom at 5% (5.991) level of significance. We did not reject the hypothesis that company employment size distributions between the two groups were the same.

4. Chi-squared test for goodness-of-fit between survey respondents and non-respondents on company employment size for Manitoba

Company size	Responded to survey	Did not respond (o)	Expected (e)	$o - e$ (d)	(d) ²	(d) ² /e
1-15	5	38	14	24.4	596.8	44.0
16-50	10	11	27	-16.1	260.6	9.6
> 50	6	8	16	-8.3	68.7	4.2
Total	21	57	57	0.0	926.0	57.8

Chi-square value is 57.8, which is more than the chi-square statistic for 2 degree of freedom at 5% (5.991) level of significance. We rejected the hypothesis that the two distributions were the same.

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