Road Map Summary

Value to Wood

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Challenges and Opportunities for Wood Flooring Manufacturers

Wood flooring manufacturers face unprecedented challenges in maintaining and increasing their share of the large North American floor covering market. A team of researchers interviewed Canadian wood flooring manufacturers for their vision of the wood flooring industry and the innovation needed to support its continued health. The team then consulted key university and Forintek researchers to review the challenges facing the industry and to brainstorm for additional innovations. The information presented in this report is part of a larger work "Roadmap for the Canadian Value-added Industry" available from FPInnovations – Forintek Division.

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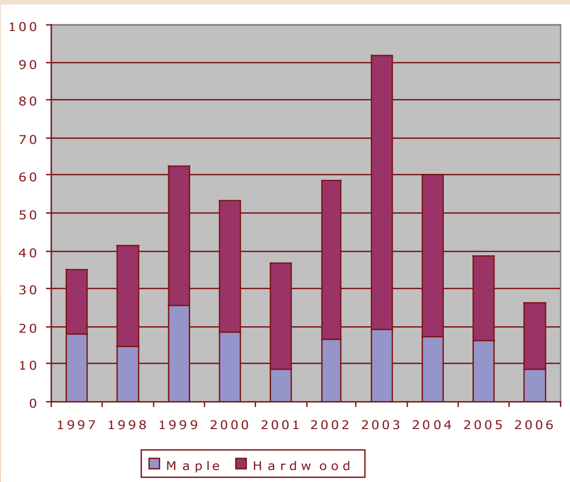
The Wood Flooring Industry At-a-Glance

- Canadian wood flooring shipments represented 8 to 10% of North American floor covering shipments (195 million m² in 2003).
- A high-value product compared to other types of floor covering, wood flooring sales represent approximately 4% of all floor covering sales on a surface basis. Canadian demand for carpet and flooring was estimated to be around 235 million m² in 2003.
- The market for wood flooring has been supported by low interest rates, a favourable North American demographic profile and increasing personal income levels that are boosting the remodelling and move-up markets. This positive situation could change with the current upheaval in the US economy.
- 18% of wood flooring consumed domestically (surface basis) is imported from foreign countries (90% of which comes from the US). The Canadian trade balance for wood coverings has been in a deficit position for the past 10 years.
- Canadian exports of wood flooring are profoundly affected by the strong Canadian dollar and increased presence of foreign products on the US market. The proportion of total US imports coming from Canada went from 30% to 3% between 2003 and 2006.
- Half of the wood flooring sold in the US is supplied by five companies: Armstrong (33.4%), Andersen Hardwood (6.4%), Mannington Mills (6.4%), Tarkett (6.1%) and Columbia Flooring (5.9%).
- Engineered wood flooring represented more than 40% of all US wood flooring sales in 2005.
- Rising material costs and sluggish profit margins have forced companies to develop pre-finished products that can be installed without glue, products using exotic species, etc. These value-added products have helped to push the average square foot value of wood flooring up to US $2.23 in 2005.
- Prices for laminate flooring have decreased from US $2.00 when it was introduced in 1997 to US $1.33 in 2005.



Canadian exports of hardwood and maple flooring (in $ millions) Source: Statistics Canada, 2007.

	US sales (million $US)	US sales (MMft²)	Average price ($US/ft²)
1993	799.0	478.9	1.67
1994	918.2	523.0	1.76
1995	958.3	549.0	1.75
1996	908.1	543.9	1.67
1997	1 233.1	712.2	1.73
1998	1 423.7	759.3	1.88
1999	1 614.6	871.7	1.85
2000	1 719.1	861.2	2.00
2001	1 824.7	867.7	2.10
2002	1 961.5	916.8	2.14
2003	2 155.6	962.5	2.24
2004	2 403.3	1 067.4	2.25
2005	2 595.1	1 162.8	2.23

Average price of solid wood flooring sold in the US ($/ft²). Source: Catalina Research. Wood Flooring, 2005.

US carpet & flooring	**1998**	**2003**	**2008**	**2013**
Shipments (in millions m²)	2 051	2 180	2 420	2 650
Demand (in millions m²)	2 137	2 430	2 770	3 100
Ceramic	4.4%	5.6%	6.3%	7.1%
Wood	3.2%	3.7%	4.3%	4.8%
Laminate	1.2%	2.9%	3.4%	4.0%
Other	1.5%	1.4%	1.4%	1.5%
Vinyl	16.8%	15.2%	13.9%	12.7%
Other	1.6%	1.6%	1.6%	1.5%
Carpets and rugs	71.2%	69.5%	69.0%	68.4%
Residential market	61.9%	64.8%	60.5%	60.0%
Non-residential market	31.4%	29.2%	33.8%	34.5%
Transportation & others market	6.6%	6.0%	5.8%	5.5%

US flooring markets forecast Source: Freedonia. World carpets and flooring, 2005.

Industry Vision and Driving Forces

Newly Emerging Economies

Foreign manufacturers of commodity products (e.g., lumber, particleboard, MDF, etc.) are increasingly exporting their products into markets traditionally supplied by Canadian industries. The emergence of these economies, coupled with a weak US dollar, forces Canadian manufacturers to target different market segments or offer additional service attributes to differentiate their products from those coming from countries with low-cost manufacturing.

According to wood flooring manufacturers…

- Manufacturers are currently having a tough time dealing with overseas and domestic competition in the US market and are turning to the Canadian market and waging a price war against each other as they try to stay in business. This results in the need for production costs to be minimized, quality standards to be maintained and new products to be continually developed to keep consumers interested in new flooring products.
- To remain in control of the domestic market, some local manufacturers have decided to import foreign finished product lines or invest in Chinese factories to produce flooring overseas.
- Chinese manufacturers are perceived to be an important threat by Canadian manufacturers. Some companies mentioned that Chinese flooring can be bought for a price lower than the cost of raw materials bought to make flooring in Canada. Although the success of product from China can be partially attributed to the fibre supply, it should be noted that a lot of the waste wood produced by flooring manufacturers is recuperated by the arts and crafts sector.
- Engineered wood flooring coming from China is also gaining market share.

Customer Focus
(consumers, homebuyers, designers, etc.)

Consumers are becoming more and more educated about the products they buy. Widespread access to the Internet makes it easy to obtain third-party information about various products and compare them quickly. Simultaneously, the current North American demographic profile is contributing to the emergence of a market segment that is looking for high-end customized products, and, more importantly, that has the ability to afford them.

According to wood flooring manufacturers…

- The flooring industry no longer sells just to distributors and local businesses—there is increasing interest for direct sales. As with most value-added products, competition relies on service and peripheral attributes. Some companies have their own installation crews to minimize installation costs and ensure proper installation.
- Branding is an important aspect of the flooring business as most Canadian companies use similar equipment, finishes, etc.
- Current product trends are calling for more character marks and exotics species such as Brazilian cherry (jatoba).
- To satisfy certain customer segments wood used in flooring must increasingly be certified by the Forest Stewardship Council (FSC). Some companies are looking at environmental certification to garner interest in their product.

Environmental, Health, Social and Governance Issues

Partly in reaction to the challenges posed by newly emerging economies, but also from legislative measures put in place in Western countries, the Canadian value-added industry is reconsidering its raw materials, components and practices to ensure that they are less harmful to the environment and that they pose a negligible risk to consumer health. Similarly, consumers are increasingly demanding that products imported from other countries respect human rights (outsourcing) and come from wood that is legally harvested.

According to wood flooring manufacturers…

- Domestic wood supply must increasingly be certified by the Forest Stewardship Council (FSC) to satisfy certain customer segments. Exotic species are not facing the same requirements despite suspicions of illegal logging.
- Wood flooring manufacturers see environmental regulations as obstacles to the industry's competitiveness. There are conservationist pressures on both domestic and exotic species and government regulations requiring expensive environmental controls.
- The increased demand for 'green' products whether based on green building or European Union standards are viewed as potential means to add value to wood flooring without making significant changes to the basic product.

Resource Issues
(supply and characterization)

Aside from the decision to change species for financial reasons, many appearance wood products' manufacturers are being forced to change their materials and grades mix because their historical raw material supply has changed in quality and/or price, thus influencing their ability to deliver the same products. This situation presents multiple challenges and opportunities.

According to wood flooring manufacturers…

- The availability and quality of the fibre supply is not considered to be a serious issue. Yet, like most other appearance product producers, manufacturers stated that hardwood NHLA grades are poorly suited to their needs.
- Current product trends for more character marks and exotics species such as Brazilian cherry (jatoba) may solve potential supply issues before they actually become issues. For instance, domestic wood supply must increasingly be certified by the Forest Stewardship Council (FSC) to satisfy certain customer segments. Exotic species are not facing the same requirements despite suspicions of illegal logging.
- There are domestic supply availability problems for MDF and plywood products. The Canadian production of engineered wood products used in flooring is limited to a couple of mills. Canadian flooring manufacturers are increasingly looking to Europe and China for potential suppliers of core panel materials.

Manufacturing and Cost Efficiencies

Cost reductions and increased efficiency are permanent drivers of innovation in the Canadian value-added wood products industry. Historically, improvements in this area focused on finding low-cost alternative materials as well as designing technology that could perform manufacturing operations faster, more precisely and at a lower cost than using manual labour. Similarly, improvements were continuously sought with regard to the actual operations performed in factories, i.e., scanning (optimization), sawing, gluing, laminating, sanding, finishing, assembly, etc. However, today's search for efficiency gains encompasses the whole spectrum of operations and material inputs used by a company (i.e., packaging and transportation).

According to wood flooring manufacturers…

- Flooring products are characterized by a relatively short product lifecycle forcing manufacturers to continuously innovate to remain competitive. Engineered wood flooring shows how innovation can contribute to the industry's competitiveness. New products need to be developed and tested, yet many new products are marketed without being tested.

- Floor design, product performance, fibre yield and labour costs are ways to achieve product differentiation and added value that most manufacturers endorse. In the end, differentiation will stem from each company's unique knowledge and abilities.

- The industry's viability will depend on technology improvements that will be made in the next decade. There is also a need for improved production management as most companies have similar plant layouts, equipment, etc.

- At the moment, Canadian manufacturers' technology investments are mostly geared towards automation and artificial vision systems. Companies attempt to keep their operations flexible enough to accommodate technological innovations.

- The National Wood Flooring Association (NWFA) provides their members with information on proven technology, yet most manufacturers do not have the time to look at these new technologies. Software for new technologies represents a needed area riddled with challenges and opportunities.

- Finishing products using nanotechnologies have interesting potential, but this technology is perceived as not yet being commercially applicable.

- Training is not an issue in the wood flooring industry. Labour will have to learn how to work with new technologies when they make their way into the industry.

- Just-in-time manufacturing presents important challenges in terms of distribution. Canadian manufacturers will need to revamp their distribution and marketing strategies to stay competitive.

Top Six Innovation Needs and Priorities of the Appearance Product Industry

- Increasing the industry's design and product development capacities
- Developing enhanced finishing products and methods
- Improving the industry's understanding of business models
- Providing the industry with relevant and up-to-date market intelligence
- Developing improved methods for sanding and surface preparation
- Resolving and capitalizing on environmental and social responsibility issues

Innovations for the Wood Flooring Industry

Incremental innovations are refinements or improvements to existing technologies, products and processes. **Breakthrough innovations** are totally new ways of thinking and doing. They represent significant departures from current processes, technologies, equipment and products used in the industry.

The lists below represent only some of the innovations identified in this project. Please consult the *Roadmap* for a more extensive listing of possible innovations.

Design and Product Development

Incremental Innovations

- Develop a standard for character marks (number of character marks/ft^2).
- Develop a Canadian alternative to the proprietary 'click' installation system.
- Determine relevant testing standards for underlays, sub-floors and fasteners.
- Research to improve finish properties through nanotechnologies.

Breakthrough Innovations

- Find ways to stabilize colour in flooring products. Innovation should cover changes in colour of finish (yellowing) and wood (rapid colour changes) both in processing and in service. Need better knowledge of the interaction between light and wood.
- Impart new characteristics [fire resistance, auto-repair (Nissan), etc.] to wood flooring through new finish products and application procedures. Use the automobile industry as a reference.
- Develop specialized flooring products made from multiple materials (e.g., engineered wood flooring with metal substrate).

Material Supply and Properties

Incremental Innovations

- Improve colour matching of fibre supply using near infrared spectroscopy and ion mobility spectroscopy.
- Study colour stability of species both in service and during processing.
- Identify grading standards and rules suited for specific value-added appearance products.
- Develop a grading method that allows the detection of defects and the assessment of colour.
- Identify sorting opportunities based on desirable character marks.

Breakthrough Innovations

- Evaluate the feasibility and benefits of buying wood bundles in which individual planks are scanned to facilitate optimization in secondary manufacturing. Product would necessarily require shared or compatible optimization software.
- New wood-based composites for decorative surfaces and substrates of engineered flooring.

Technology and Manufacturing

Incremental Innovations

- Implement a technology/product/process watch to monitor and report new developments.
- Optimize defect recognition and colour sorting systems for flooring products by increasing the resolution of scanning systems.
- Study optimization of sawing operations specific to flooring.
- Develop crack detection methods.
- Study the impact of smaller production lots on transportation logistics and identify more efficient transportation arrangements.

Breakthrough Innovations

- Automate finishing to match wood colour.
- Improved non-destructive assessment techniques for quality control purposes targeting integration in manufacturing processes—moisture, density and colour matching are primary concerns.
- Develop kerfless sawing using lasers or other devices.

Market Access / Intelligence / Competitors

Incremental Innovations

- Evaluate the impact of wood flooring on the mood and psychology of homeowners.
- Improve understanding of consumer buying behaviour (power is in their hands—not suppliers or retailers).
- Identify distribution channels for wood flooring products.
- Determine key markets for secondary products using character marks.
- Study the effectiveness of various communication channels targeting key specifiers.

Breakthrough Innovation

- Assess the market benefits and feasibility of environmental certification in wood flooring—products targeted to homebuilders, architects and designers.

Environment and Social Responsibility

Incremental Innovations

- Assist the Canadian value-added appearance products industry in the transition towards green building certified products. Undertake extension activities on green building standard requirements.
- Develop standards to present green building data for individual products.
- Develop tools to source green building compliant products.
- Improve knowledge of trends in corporate social responsibility as well as environmental, social and governance issues.

Skills and Training

Incremental Innovations

- Develop computer specialists that focus on automated scanning and defecting systems.
- Identify roadblocks to the implementation of wood product management in education programs.
- Develop short-course modules that meet industry needs and constraints.

Reference

Lavoie, P.J.P., D. Fell and F. Laytner. 2006. Roadmap for the Canadian Value-added Industry. Prepared by Forintek Canada Corp. for Natural Resources Canada - Canadian Forest Service. 179 pp.

Value to Wood Research Program Partners

As part of the *Value to Wood* program, funded by Natural Resources Canada, Forintek's Industry Advisors are providing technical services to value-added wood product manufacturers in all regions of Canada. Find out about upcoming workshops or seminars in your area by visiting us at www.valuetowood.ca or make a request for information on any technical issue related to wood product manufacturing via valuetowood.ca (Help Desk).

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