

# Road Map Summary



Value  
to  
Wood

RMS - 06/08  
March 2008

## ***Challenges and Opportunities for Upholstered and Wood Household, and Institutional Furniture Manufacturers***

This report focuses on three furniture manufacturing sectors, other than office furniture, that use wood. They are upholstered household furniture, other wood household furniture and institutional furniture (such as for restaurants, churches, schools, etc.). A team of researchers interviewed Canadian household and institutional furniture manufacturers for their vision of their 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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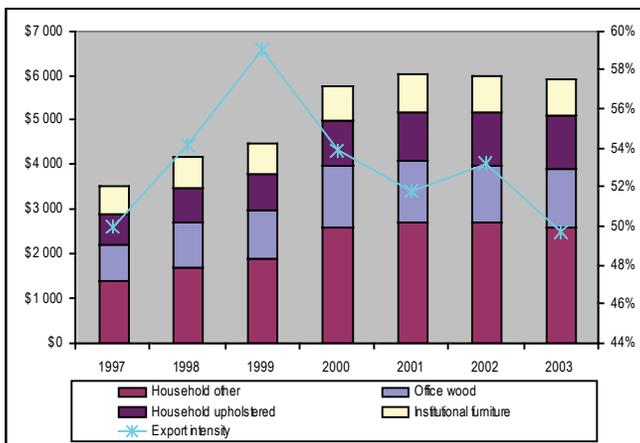


Natural Resources  
Canada

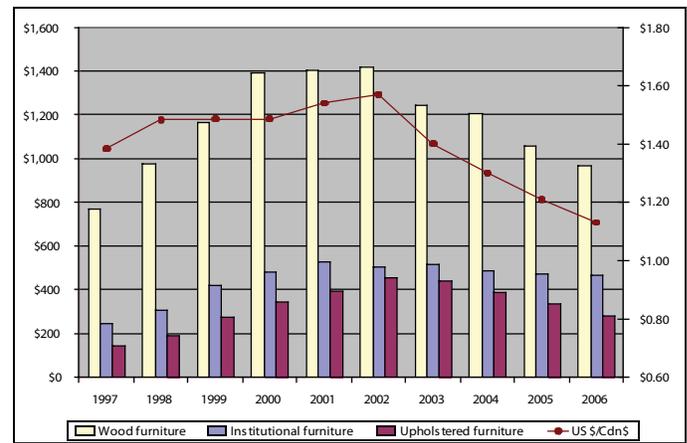
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## The Upholstered and Wood Household, and Institutional Furniture Industries At-a-Glance

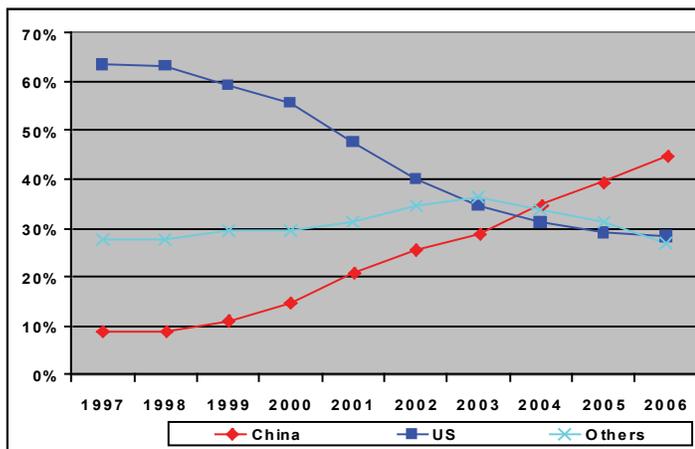
- In 2003, Canadian household and institutional furniture shipments were \$5 billion, with wood furniture accounting for \$2.6 billion.
- Most Canadian furniture is produced in Ontario (50%) and Quebec (30%).
- Slightly more than half of this furniture production is exported — 98% of upholstered furniture, 92% of wood furniture and 90% of institutional furniture being exported to the US in 2006.
- Exports to the US dropped about 30% between 2002 and 2006 as a result of a combination of increased offshore competition and the weak US dollar.
- Emerging economies (most notably China) are also gaining Canadian market share. Imported furniture represented a third of all furniture bought in Canada in 2003. Close to 45% of all Canadian furniture imports came from China, while another 30% was imported from the US.



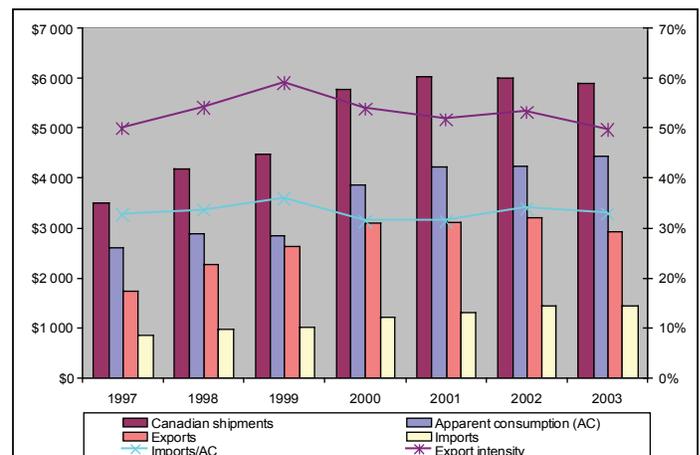
Canadian shipments of wood furniture (in \$ millions) Source: Industry Canada, 2007.



Canadian furniture exports to the US (in \$ millions) Source: Industry Canada and Bank of Canada, 2007.



Origin of Canadian imports for upholstered and other wood household and institutional furniture. Source: Industry Canada, 2007.



Apparent consumption of furniture in Canada and industry export intensity. Source: Industry Canada, 2007.

# Industry Vision and Driving Forces

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## 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 manufacturing costs.

## According to manufacturers...

- Canadian furniture manufacturers have experienced reduced profits and lost market opportunities attributable to a weak US dollar and a North American market flooded with Chinese products. However, as much of the raw materials come from the US there are also savings.
- To compete with the Chinese, some US manufacturers have opened up factories in China. Although it is to a certain extent a natural reaction, this may have adverse effects on the North American industry since it is plausible that Chinese entrepreneurs may soon start buying closed factories in North America either for production or storage purposes. This is an important threat to the furniture industry. A critical manufacturing mass must be maintained in Canada, especially if China is to eventually become an export market.
- Chinese competition is currently only in low to medium price point markets. Many Canadian manufacturers are responding to this new presence by turning to the high-end market and improving their service, i.e., offering fast delivery times and customization opportunities. This partly explains the upholstered furniture industry's recent relative success. Surviving Canadian companies have found niche markets and are no longer direct competitors.
- Furniture manufacturers are continuously striving to reduce product development cycle times as this can be an effective weapon against Asian manufacturers. Quick product cycle times (i.e., product development and manufacturing) can help companies fill in for failed Asian orders. It is also generally seen as a way to demonstrate some of the benefits of onshore sourcing.
- Foreign competition forces Canadian furniture manufacturers to forge alliances with local hardwood industries and furniture component manufacturers. In many cases, outsourcing components in foreign countries translates into quality and service problems. Conscious efforts must be made to retain a critical furniture manufacturing mass in Canada as it is possible that Chinese producers may eventually be interested in settling on North American soil (i.e., auto industry).

## 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 manufacturers...

- The furniture industry is currently looking at green products and multi-material products. The availability of green materials and the lack of industry knowledge of product interactions are serious obstacles to the development of these kinds of products.
- Adhesives are an issue given current trends towards the elimination of formaldehyde. MDF and particleboard made with low (or no) urea adhesives and water-based PVCs should eventually become mainstream products. Adhesives used to assemble products may go this route too.

## 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 manufacturers...

- There are a limited number of species that are usable for high-end furniture. Alternative species such as soft maple and oak have been looked at due to a tight birch supply. Certain companies have started to use ash, maple and cherry from the US and Canada. Freight to bring in raw materials is reported to be difficult to secure. Some manufacturers are concerned with insect damage to the hardwood forest (i.e., ash borer and Asian long-horned beetle).
- Hardwood grades are perceived to be sliding as a result of a sawmill-user disconnect. Improved linkages among harvesting, primary and secondary transformation, i.e., harvesting wood with the final product in mind, sorting wood prior to milling and optimizing logs according to their value, would contribute to solving some of the grading issues faced by manufacturers. Partnerships with sawmills should be further investigated.
- Many frame shops for upholstered furniture continue to use hardwood framing despite the fact that it makes economic sense to use composite panels.
- Current supply of wood veneer is stable.
- Some furniture manufacturers struggle with panel supply resulting from mill closures because alternative suppliers are locked into long-term supply agreements. Quality is also an issue as manufacturers cope with board consistencies that vary widely from supplier to supplier. The supply of particleboard, hardwood plywood and MDF may dwindle further as the shift towards formaldehyde-free products continues.
- Lightweight honeycomb core panels that are used in Europe will eventually reach the North American market and will further impact the suppliers of traditional panel products for furniture.

## 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 manufacturers...

- Focusing on the high-end market means that older homeowners are targeted first and foremost. Younger homeowners can rarely afford to buy furniture made in Canada. In any case, these consumers have different tastes and may not want customized/high-end furniture.
- There is a trend towards direct sales despite the fact that most buyers still need to see the furniture prior to buying it. E-commerce via large retailers' websites (with EDI system) may appeal to younger furniture buyers. Niche markets/products and alternative distribution channels are critical to this industry's survival.
- Furniture manufacturers have little to no consumer knowledge because most of their products are distributed by large retailers (high volume/low margin) who do not share market information with their suppliers. This is a key obstacle to determining niche markets. Many manufacturers are thinking about increasing their direct sales or establishing storefronts in an effort to mitigate this important knowledge gap.
- Design and product development are key and must be ongoing. Current Canadian furniture design consists of companies imitating products in given product categories (also known as 'Polaroid' or 'reactive design'). Innovative design is generally considered too high a risk for most companies; thus, many companies do not have design and product development divisions. Furniture shows are where most companies gather the design ideas they try to incorporate into existing designs. Design is to a large extent driven by the desires of large buyers.

## 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).

### According to manufacturers...

- Component standardisation, modularity, just-in-time manufacturing and mass customization are some of the philosophies commonly used to achieve short product development cycles.
- Furniture finish is a critical element of the end product. Many manufacturers think of finishing as what actually 'makes the sale'. In that sense it might be profitable for them to work in closer collaboration with kitchen cabinet manufacturers as they also put a lot of emphasis on finishing.
- HVLP (high volume, low pressure) spray guns provide superior benefits in finishing furniture and could be of interest for Canadian manufacturers of high-end furniture products. Water-based finishes look to be the next big step in finishing, but it is currently difficult to achieve consistent quality with this technology/product.
- Packaging costs represents 6 to 7% of final cost of furniture (paid by the consumer). Ten percent of staff working at the plant and 80% of all complaints are related to packaging. Packaging is generally inefficient and inventories tend to be too high.
- The furniture industry should be advertised as an attractive work sector. It needs more engineers and more qualified managers. There is also room to improve the operators' level of technical knowledge. Canadian training needs are being developed by WMC and Woodlinks.
- Few cabinet makers fully complete their training as many of them are offered jobs before finishing their program. Employees that are skilled in drafting and CNC are easy to recruit. Wood knowledge is generally low. Training is often done by the last person on the job. This results in a situation in which not all knowledge is passed on due to time, communication and even job security issues.



## 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 Upholstered and Wood Household and Institutional Furniture

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**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.

### Market Access / Intelligence / Competitors

#### Incremental Innovations

- Evaluate the importance of service attributes in furniture value (selling price).
- Explore retailing opportunities through non-furniture channels.
- Develop marketing approaches that are targeted to key demographic segments (e.g., women as decision-makers).
- Improve understanding of consumer buying behaviour (power is in their hands — not suppliers or retailers).
- Demographic and geographical analysis of highest potential niche markets for design specific products (e.g., customized finished products for echo boomers in Japan).

#### Breakthrough Innovations

- Implement a system allowing furniture manufacturers to have access to up-to-date market intelligence on furniture, production, trends, etc. on demand. This information would certainly play a critical role in planning business development strategies (short- and long-term).
- Develop furniture based on functionality and user needs (e.g., ergonomics).
- Analyze the benefits linked to company identity and the criteria to achieve successful branding (retail - direct sales).

## Material Supply and Properties

### Incremental Innovations

- Develop the use of alternative species (tamarack, balsam fir and balsam poplar) in household furniture.
- Investigate the optimization of #2 and #3 Common for specific products.
- Develop a grading system that corresponds to the needs of furniture manufacturers, i.e., one clear face without length requirements (wood used in furniture is usually fingerjointed).
- Reduce costs related to wrapping and packaging furniture.
- Develop panels tailored to the needs of furniture manufacturers.

### Breakthrough Innovations

- Reduce tabletop costs, handling difficulties and transportation costs by identifying a way to produce honeycomb and foam core boards with minimal production and equipment changes.
- Explore the possibility to recycle wood dust to make particleboard panels (500,000 tonnes/year of dust are produced in Quebec alone).
- Explore the possibility of having sawmills scanning and bar-coding planks contained in wood bundles for their clients. Furniture manufacturers could then truly match product order and material constraints (hardwood supply at any given time). Sawmill and furniture manufacturers would likely have to share the same optimization software.

## Environment and Social Responsibility

### Incremental Innovations

- Investigate design for assembly/disassembly and recycling (green building).
- Develop a guidance document to facilitate the use of green components.
- Develop standards to present green building data for individual products.
- Develop tools to source green building friendly products.
- Improve knowledge of trends in corporate social responsibility as well as environmental, social and governance issues.

### Breakthrough Innovation

- Assist the Canadian forest products industry in the transition towards green building certification and the development of green building compliant building materials.

## Technology and Manufacturing

### Incremental Innovations

- Provide unbiased 3<sup>rd</sup> party information on the performance and properties of cutting tools and other machines used in manufacturing (e.g., machine speeds and materials). Current sources of information come from equipment manufacturers.
- Evaluate adhesive technologies used in other industries to identify stronger and more durable glues to prevent cabinet doors from coming apart. These glues might already be in use in the aircraft industry.
- Develop means to obtain consistent finishes/paints on profiled components.
- Develop low temperature powder coatings with a longer shelf life to reduce the costs of powder coating processes.
- Implement lean manufacturing with a focus on increased productivity, safety and waste minimization.

### Breakthrough Innovations

- Develop the use of laser technology to cut furniture components.
- Automate finish application using ‘automated arm’. The device ‘teaches’ a robot how to replicate the human operation of spraying a furniture component.
- Eliminate wiping in staining process.
- Document the influence of wood species and machine parameters on sanding quality and sander belt life.
- Improve understanding of the relationship between surface preparation and finish quality.

## Design and Product Development

### Incremental Innovations

- Use available wood supply to the fullest and showcase character marks.
- Develop dark laminating papers that have scratch resistance equivalent to lighter papers.
- Research the use of mixed material:
  - Differential shrinkage and movement;
  - Gluing and fastening;
  - Choosing the right material for a specific component.
- Investigate design platforms/systems that integrate the entire product development process. The system should reduce the product development cycle.
- Develop a methodology to monitor stylistic trends and product specifications that may affect Canadian manufacturers. Information collected would be a key input to market pull product development.



### Breakthrough Innovations

- Design furniture that appeals to all senses (touch, smell, etc.).
- Make mass-customization of furniture possible using a product configurator that is user-friendly, i.e., asks a series of questions and proposes furniture component combinations (modular).
- Identify potential for the integration of technology in furniture (home cinema, personalized ergonomic adjustments with fingerprint ID, etc.).
- Identify ways to integrate low-grade wood in product design.
- Develop furniture that does not use screws (puzzle, Lego, etc.).

### Skills and Training

#### Incremental Innovations

- PC-based distance education is needed for workers. Potential topics include (but are not restricted to): wood as a material, equipment currently available, typical processes in furniture manufacturing, markets, management, etc.
- Design a method to retain/log 'lessons learned' in the company as labour turns over. Process should be evolving and form a manufacturing manual.
- Implement a training program and extension strategy for finishing and basic woodworking.

### 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



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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](http://www.valuetowood.ca) or make a request for information on any technical issue related to wood product manufacturing via [valuetowood.ca](http://valuetowood.ca) (Help Desk).

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