Wood Manufacturing Council

Advanced Wood Processing Skills and Technology Roadmap

Phase 1 Report

Version 1.0

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A project of the Wood Manufacturing Council
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Wood Manufacturing Council

Advanced Wood Processing Skills and Technology Roadmap

Phase 1 Report

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Wood Manufacturing Council

Advanced Wood Processing Skills and Technology Roadmap
Phase 1 Report

This document outlines the results from Phase 1 of a Skills and Technology Roadmap for the Canadian Advanced Wood Processing Industry. The document sets out the recommended projects for the Skills and Technology Roadmap and discusses a strategy to proceed to Phase 2. The development process for Phase 1 of this Skills and Technology Roadmap took place from Spring 2008 into the Fall of 2008. The development of this STRM was facilitated by Centre for Public Management Inc. of Ottawa, Ontario.

1.0 Introduction to the Skills and Technology Roadmap

A successful Skills and Technology Roadmap (STRM) will clearly capture the linkage between future market needs, the necessary industry response, and the technologies that an industry needs to develop or perfect. The objective of this STRM is to identify a set of high priority technical projects that will assist the advanced wood processing industry to meet future market demands. It is also intended to establish collaborative arrangements between industry members to develop these technologies and introduce them to the industry and its market. These technologies will be critical to move the industry forward and ensure that Canada's advanced wood manufacturers can continue to adapt quickly to market demands and trends.

This STRM is also intended to provide the Wood Manufacturing Council (WMC) with knowledge about technology and technology-related skills gaps within the industry. This will assist the WMC in developing new programs to build the capacity needed so the industry can deliver and work with these critical technologies. Ultimately, this will ensure that Canada's advanced wood manufacturing industry has a well-prepared workforce to keep ahead of the rapid changes in the industry. Furthermore, the STRM will assist the WMC in levering its existing knowledge about technology and skills gaps into a market-driven plan to tackle specific technologies and grow the skills needed to utilize those technologies.

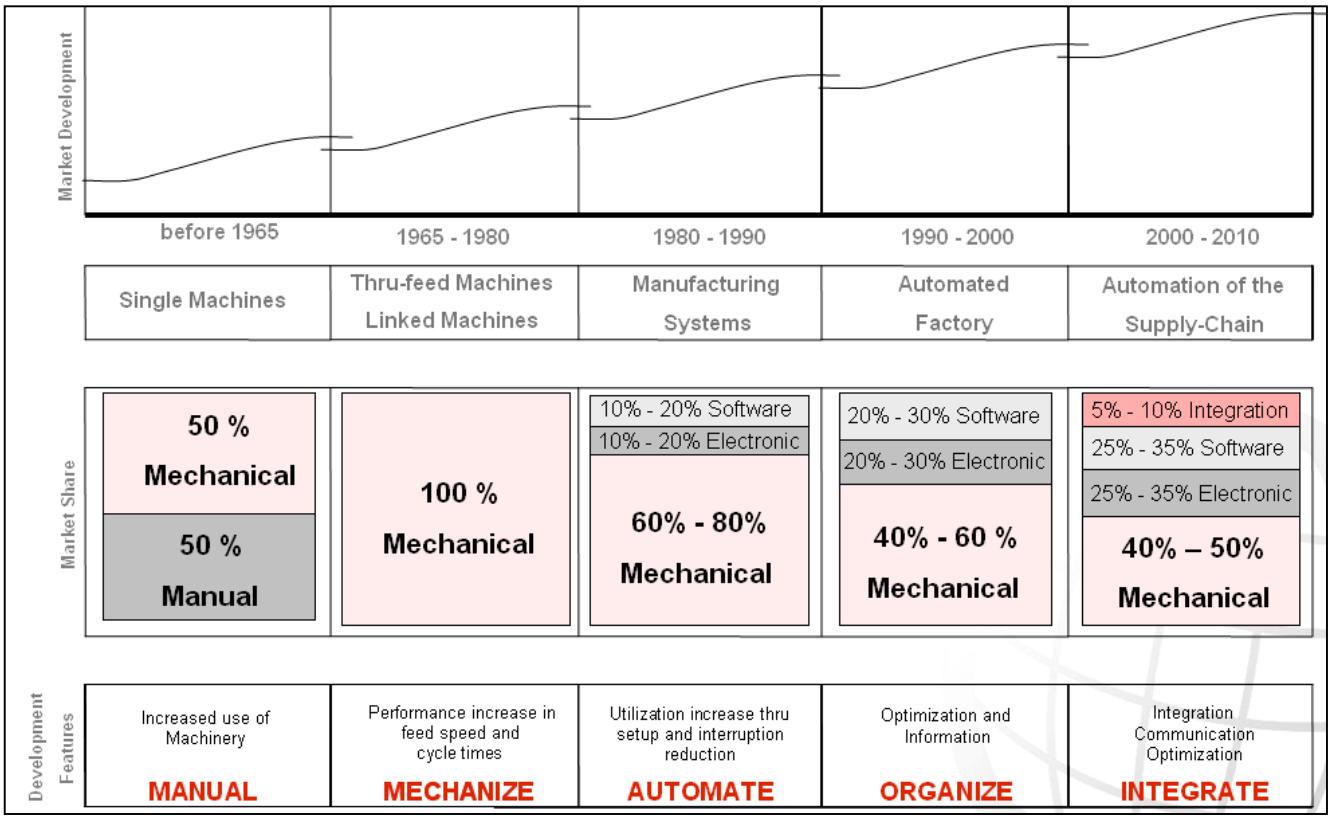
2.0 The Skills and Technology Roadmap Process

The STRM development process involved a series of meetings attended by representatives from the advanced wood manufacturing industry, academic institutions, and associations. The initial meeting was a Visioning Session where the discussion focused on the challenges faced by the industry as it moves forward. A list of participants at the Visioning Session is included as Appendix A. Two subsequent meetings were held by an Expert Working Group, which focused on the future market opportunities and technology solutions that could address those market opportunities. A list of participants at the Expert Working Group meetings is included as Appendix B, and the dates of each meeting in the STRM development process are included as Appendix C.

Following the first Expert Working Group meeting, other industry members were asked to provide additional views to complement the output from the Expert Working Group meeting. In total, six additional industry participants provided their comments via a telephone conversation or through email correspondence. A list of these individuals in included as Appendix D.

3.0 Technology Migration within the Industry

As a first step in the STRM development process, participants were presented with a briefing of research undertaken that provided a history and a current state of the industry. The presentation discussed the technology migration of the industry as well as the current situation and trends. The technology migration of the industry was presented graphically using the following graphic.



Source: Sepp Gmeiner, Lignum Consulting

The above graphic provided input to a discussion about the technology migration of the industry past 2010. Some participants suggested that the mechanical element might continue to decrease. Others suggested that software and integration will play a larger part in the operations within the industry. One participant suggested that there may be a new subgroup of "control systems" emerging that would drive the mechanical systems, and continuously get faster as new technologies were developed.

There was discussion on how the percentages presented in the graphic might not change that much, but instead, more companies would optimize their operations with existing technologies. Many companies currently have the most up-to-date "machines" but need to better organize and integrate them into its operations in order to remain competitive. This includes an integration of operations from order entry to manufacturing, and then to distribution. There was also a general consensus that although the technology is available, the industry does not have the expertise to utilize

the technology, and that this will be one of the industry's main challenges over the next decade.

A number of participants stated that both Conestoga and UBC offer good wood-working programs, and that each school produces very good students. The people coming from these programs are very skilled and motivated to make great products. However, the industry is not able to take full advantage of their skills because the necessary technologies are not in place for them to utilize.

The idea of segments of the supply chain being developed elsewhere was also brought up. The suggestion was that Canadian manufacturers could rely on suppliers to focus on low-value parts and processes, and instead focus on and improve its core competencies. This would allow Canadian manufacturers to place more of a focus on value-added processes and products. The thought was that manufacturers need to grow with suppliers. However, due to Canada's geographic supply chain problems, sometimes Canadian manufacturers have to rely of suppliers from the United States.

A participant indicated that Germany and Italy are international leaders in adopting and utilizing wood manufacturing technologies. In Canada, the industry segment in Quebec seems to be the leader in adopting new technology. As one participant stated, "They are willing to try different things." There was a general consensus that the industry needed to "catch up" to the leaders, and that a good start may be to duplicate what initiatives the industry has undertaken in Germany and Italy.

There was also discussion about how the perception among the industry regarding adopting new technologies has to change. Although many of the technological pieces exist to streamline processes, Canadian industry has not fully utilized them. One participant suggested that they need to change the perception within industry to stress that technology is affordable and beneficial.

4.0 Human Resources Issues Facing the Industry

Throughout the STRM development process there was discussion of how there seems to be a need to shift the emphasis of the skills needed in the industry from shop-room skills to computer-based skills. Overall, the industry needs people that can fully utilize the technology available, and can help integrate the manufacturing process "from order

entry to distribution." However, these people still need to understand the basic trades involved in advanced wood manufacturing.

Participants believed that not being able to attract people to the industry has been a problem for years. They believe that there is a perception among young people that the industry is "sun-setting" or not modern, and this has resulted in problems trying to attract people. The industry needs to change people's perceptions to illustrate how complex the industry is, and focus on its high-tech component. One participant also stated that it was difficult to attract people with the necessary skills because the wages in the industry are too low compared to those in other industries with high-tech components.

Another concern brought up by participants is that there are not enough mentors within companies to help develop young people. Participants stated that one of the most effective ways to bring people into the organization and train them is to partner them with a mentor. This allows new people to learn on the job and helps them get acquainted and comfortable with shop floor processes. One participant stated that, when he looks to bring in a new person, he does not focus as much on technical skills, but instead looks for someone with a good attitude and then tries to partner them with a mentor. However, the lack of mentors within the industry has limited the ability of companies to train people this way.

One participant stated that they have looked internationally to try and bring people into their organization. However, they ran into a lot of difficulty with the immigration process. They found it was difficult to bring skilled people into Canada from European countries.

A representative from the WMC presented information on the WoodLinks program. The program is intended to build the basics and attitudes related to wood-working among grade 11 and 12 students. The WMC is hoping that industry will play bigger part in the program and take advantage of the skills these students are developing, perhaps by hiring them for evenings, weekends, or as summer students.

5.0 Future Market Pressures and Opportunities

The industry is facing many obstacles related to the buying patterns of society. There were concerns expressed over the "Wal-Mart-ization" of society, and that a change in the Canadian culture is needed. The advanced wood manufacturing industry needs a

society that appreciates a quality product. There was also the idea brought forward that the industry needs to brand itself. To do that, the industry members will need to clearly define the message that the branding will be conveying.

When attempting to define the markets that the industry services, the participants provided the attributes of "good, better, and best." Good products involve mass manufacturing, better products have customization, and best products are top quality products.

The markets can be further broken down into Business-to-Business (B2B) and Businesses-to-Consumer (B2C). Also, customized bundling of products for customers has increased. However, bundling for B2B sales will look significantly different than bundling for B2C sales.

When asked what the market pressures will be in 5 years the participants provided the following responses:

- The industry has to offer value as customers will be looking to buy "brand names";
- Some industries brand themselves as "green", maybe wood manufacturing should as well;
- Buying factors include price, availability, design, and packaging;
- Companies need to spend more time on marketing to B2C than B2B, as it is the consumers that will drive the market;
- The industry needs to sell the perception of a better life and better value among consumers;
- Need to establish a brand and create awareness among consumers;
- Need to appeal to changing demographics (e.g. baby boomers' needs); and
- The competitive presence of IKEA and its contemporary style and design.

A list of expected future market opportunities were derived from these market pressures. The participants were presented with the list of expected future market opportunities and were asked to comment or add to it if needed. Participants felt that the list provided a fairly accurate depiction of the future market opportunities within the industry. The list of future market opportunities is as follows:

- Value to the customer (described as price vs. quality vs. style);
- Increase in "green" products and/or processes;
- Faster availability;
- More efficient assembly and packaging;

- Customized bundling with services;
- Offering more customization options for customers;
- New product features tailored for specific demographics;
- New functionality (including electrical and mechanical); and
- New ways for customers to browse and learn about product offerings.

The discussion then focused on examining how technology could help address these future market opportunities. The results of this discussion are presented in the next section.

6.0 Main Technology Areas

The discussion of how technology could help the Canadian advanced wood processing industry take advantage of the future market opportunities outlined in the previous section focused on four main technological areas. These areas included 1) "green" (or environmentally friendly products and/or processes), 2) integrated supply chain, 3) assembly and packaging, and 4) customization. The following subsections provide a brief summary of the discussion of each of these areas. They provide descriptions of some of the barriers, perceptions, and currently available technologies related to each of these four areas.

6.1 Green Products and Processes

Some participants indicated that there is an increased pressure within manufacturing industries to reduce packaging in order to reduce waste. There is an increasing expectation that companies are responsible for the removal of waste associated with packaging. One participant brought up the example of waste removal in New York City, where each distributor is now responsible for removing the waste it brings into the city. Although reducing packaging may be important for companies as they move forward, it was concluded that, at this time, there is no inherent technological solution.

A concern brought up by several participants involves the types of formaldehydes used by mills as adhesives. These formaldehydes can be considered an environmental contaminant and can cause negative health effects after prolonged exposure. There are

different adhesives that could be used as a replacement. However, these other adhesives are more costly, and using those other adhesives would increase operating costs because of higher chemical expenses. There was an identified technology solution to this problem: finding a more affordable adhesive. One participant stated that there are chemical companies located in California that are working on new adhesives.

Participants stated that the industry has suffered from some negative public perceptions. First, as a result of the increase in environmental awareness among the public, the wood manufacturing industry has the perception that it "hurts trees." There is also an international perception that Canada is not very good at sustaining its forests. It was identified that the solution to changing these perceptions involves a branding strategy that changes the industry's messaging to consumers. The solution does not include an inherent technological component.

Another "green" problem discussed during the meeting was related to producing less waste and getting a higher yield from boards. One participant stated that the problem might be to determine what to do with the waste. It may be difficult to re-use the waste because, as another participant stated, some customers do not want cut-offs from primary boards. Furthermore, it would be costly to order varying board sizes based on the requirements of specific products. This is because the mills producing the boards sell each standard board size at high volumes. Manufacturers would face purchasing boards at varying lengths and would not receive volume discounts. Most of the participants agreed that there indeed seemed to be a technology solution related to optimizing the yield of the boards. One participant stated that there is software technology available that could help with this problem.

6.2 Integrated Supply Chain

Generally, it seems that Canadian wood manufacturers require an investment in infrastructure to more effectively automate and integrate the supply chain into their operations. This would help make their products "built to order" and more readily available.

Participants stated that Europe has a much more advanced and optimized supply chain than what exists here in Canada. European manufacturers use the same types of

machinery as those in Canada. However, manufacturers in Europe have taken advantage of the electronic components within the machines and network them, while Canadian companies largely have not. The main reason Canadian manufacturers have not invested in automation and integration is that they lack people with the appropriate expertise to implement and maintain these systems. There are also a number of cultural and economic differences between the industry in Europe and in Canada. Specifically, there are higher wages in Europe, so it is more practical to employ people to work on implementing and maintaining these systems to achieve maximum productivity from machinery. European companies also seem to be more patient in that they are satisfied with an expected return on investment occurring after 5 years, while North American companies seem to demand a return on investment after about 2 years.

Many of the participants mentioned that this problem is a “catch-22” for manufacturers. These companies may be willing to invest in the technology; however, they do not have people with the appropriate skills in place to fully utilize the technology. Furthermore, if they do invest in the technology, they would have to determine what to do with older longstanding employees who may not be comfortable working with computers but know the manufacturing processes very well.

Overall, it seems that a technical solution to more effectively automate and integrate operations within the supply chain is available. However, it requires manufacturers to invest in the technology, provide sufficient resources to fully utilize the technology, and remain committed throughout implementation.

6.3 Assembly and Packaging

There was a very brief discussion about assembly and packaging, and how to make the processes involved more efficient. Overall, there has been little investment made by Canadian companies in automation related to assembly and packaging. One participant stated that there exists a scanning technology that uses radio frequency (RF) tags to ensure that all necessary parts are included in a bundle before packaging. This technology can link directly into the supply chain. Similar to integrating operations into the supply chain, implementing this technology requires an investment and commitment from several companies in the supply chain.

6.4 Customization

Many participants stated that consumers will be expecting the opportunity to allow them to customize products. The challenge for manufacturers is to fulfill these customized orders in a timely manner. Participants stated that this would require more flexible manufacturing processes. Specifically, manufacturers would need flexible machines that allow them to fulfill customized orders. These machines would need to be highly automated to enable low setup times so that orders could be processed quickly. This would require automation software that receives data from the order processing stage.

It seems that there are two technology solutions to this challenge of fulfilling customized orders. First, manufacturers require flexible machines with lower setup times. The second solution involves automation software with defined data requirements.

7.0 Technology Challenges

From the above discussion of the four main technology areas, a number of technology challenges were identified that would assist in addressing the future market opportunities discussed earlier in Section 5.0. Four segments of the advanced wood processing industry were examined during the STRM development process: furniture, cabinetry, windows, and modular manufactured housing. The technology challenges for each of the future market opportunities for each segment are outlined in the tables below. For some of these challenges, the technological solution already exists, but requires a management decision to implement the solution.

7.1 Furniture Segment

The following table outlines the technology challenges that, if addressed, will assist in addressing the future market opportunities in the furniture segment.

Expected Future Market Opportunity	Technology Challenges
Value to the customer (described as price vs. quality vs. style)	1. IT logistics technology to enable more efficient bundling 2. Just-in-time / lean manufacturing machinery and processing 3. Data handling technology, from order entry to manufacturing input 4. Standardized product equipment
Increase in “green” products and/or processes	1. Cost-effective alternative adhesives (not formaldehyde) 2. Optimize the yield from boards to minimize waste
Faster availability	1. Just-in-time machinery and processing (involves a management decision to implement) 2. IT based order processing
More efficient assembly and packaging	1. RF scanning tags that link to the supply chain
Customized bundling with services	No technology challenges identified
Offering more customization options for customers	1. Flexible machines with low setup times 2. Automation software with defined data requirements
New product features tailored for specific demographics	
New functionality (including electrical and mechanical)	
New ways for customers to browse and learn about product offerings	1. Internet based technology (need to integrate it into product offerings)

7.2 Cabinetry Segment

The following table outlines the technology challenges that, if addressed, will assist in addressing the future market opportunities in the cabinetry segment.

Expected Future Market Opportunity	Technology Challenges
Value to the customer (described as price vs. quality vs. style)	1. IT logistics technology to enable more efficient bundling 2. Just-in-time / lean manufacturing machinery and processing 3. Data handling technology from order entry to manufacturing input 4. Standardized product equipment
Increase in “green” products and/or processes	1. Cost-effective alternative adhesives (not formaldehyde) 2. Optimize the yield from boards to minimize waste
Faster availability	1. Just-in-time machinery and processing 2. IT based order processing (involves a management decision to implement)
More efficient assembly and packaging	1. RF scanning tags that link to the supply chain
Customized bundling with services	No technology challenges identified
Offering more customization options for customers	1. Flexible machines with low setup times 2. Automation software with defined data requirements
New product features tailored for specific demographics	
New functionality (including electrical and mechanical)	
New way for customers to browse and learn about product offerings	1. Internet based technology exists (need to integrate it into product offerings)

7.3 Windows Segment

The following table outlines the technology challenges that, if addressed, will assist in addressing the future market opportunities in the windows segment.

Expected Future Market Opportunity	Technology Challenges
Value to the customer (described as price vs. quality vs. style)	1. Technology to assist in offering new functionality in product offerings 2. Just-in-time / lean manufacturing machinery and processing 3. New internal and external finishes to increase product durability 4. Technology to assist products to meet national or state regulations 5. Technology to assist in incorporating drainage methods into products (machinery for assembly and design) 6. Harvesting technology to assist in cutting and handling different and abundant species of wood.
Increase in “green” products and/or processes	1. Cost-effective alternative solvents 2. Optimize the yield from boards resulting in less waste 3. Technology to assist in product engineering of energy efficient products
Faster availability	1. Just-in-time machinery and processing
More efficient assembly and packaging	1. More mechanized assembly
Customized bundling with services	No technology challenges identified
Offering more customization options for customers	No technology challenges (requires a business choice)
New product features tailored for specific demographics	
New functionality (including electrical and mechanical)	
New way for customers to browse and learn about product offerings	1. Internet based technology exists (need to integrate it into product offerings)

7.4 Modular Manufactured Housing Segment

The following table outlines the technology challenges that, if addressed, will assist in addressing the future market opportunities in the modular manufactured housing segment.

Expected Future Market Opportunity	Technology Challenges
Value to the customer (described as price vs. quality vs. style)	1. IT logistics technology to enable more efficient production 2. Just-in-time / lean manufacturing machinery and processing 3. Data handling technology from order entry to manufacturing input 4. Technology to assist in offering new functionality in product offering 5. Standardized product equipment 6. Technologies to assist in developing housing designs to address typical suburban and small lot subdivisions 7. Technologies to assist in addressing design constraints arising from transportation regulations (load height, width etc.), carrier limits (e.g. B.C. Ferries) 8. Technologies to assist in addressing site design/land use/bylaw challenges in renewing/redeveloping older “mobile home parks or manufactured housing communities” with modern homes
Increase in “green” products and/or processes	1. Cost-effective alternative solvents (not formaldehyde) 2. Optimize the yield from boards to minimize waste 3. Technology to assist in product engineering of energy efficient products 4. Technology to assist in using recycled products in the production process
Faster availability	No technology challenges identified
More efficient assembly and packaging	1. More mechanized assembly

Expected Future Market Opportunity	Technology Challenges
Customized bundling with services	No technology challenges identified (requires a business choice)
Offering more customization options for customers	1. Technology to assist in efficiently enhancing customization for volume manufacturers (currently incorporated by some smaller builders) 2. Flexible machines with low setup times 3. Automation software with defined data requirements
New product features tailored for specific demographics	
New functionality (including electrical and mechanical)	
New ways for customers to browse and learn about product offerings.	1. Internet based technology (need to integrate it into product offerings)

7.5 Analysis of Technology Challenges

There are many commonalities in the technology challenges across the four segments that were examined during the STRM development process. In fact, participants identified the exact same technology challenges for the furniture and cabinetry segments.

Many of the technology challenges identified involve systems integration and automation from order entry to manufacturing input, and into the supply chain. As discussed by the participants, this would require a major investment and commitment from manufacturers.

Furthermore, all of the segments have some similar technology challenges related to "green" issues. These challenges involve finding cost-effective alternatives to the traditionally used adhesives and solvents. There is also a need to optimize the yield from boards to minimize cut-off waste.

All the segments examined seem to be facing the same technology challenge related to making product information available to potential customer online. The technology is available to offer this service but it has not been utilized by many companies.

8.0 Technology Roadmap Projects

From the technology challenges discussed in the previous section, the following five technical projects were considered the most critical to the industry as it moves forward.

1. Just-in-time/lean manufacturing machinery and processing

This technology can streamline operations and reduce costs. It was identified as being critical to the **furniture**, **cabinetry**, and **windows and doors** segments. The technology and machinery for lean manufacturing currently exists. However, it can be costly to purchase and implement, and it requires a commitment from senior management at each individual part of the supply chain. The technology development for this project is at the "plant level", where lean manufacturing machinery will have to be integrated into each plant's current machinery and processes. A list of potential collaborators who could develop this technology solution is included in the table below.

Industry Segment	Potential Collaborators
Furniture	FP Innovations, Lignum, EMC, Dirk Nielsen, MDA, SCM, Leitz, University of British Columbia, BG Furniture
Cabinetry	FP Innovations, Lignum, EMC, MDA, SCM, Leitz, University of British Columbia
Windows and doors	FP Innovations, Lignum, EMC, MDA, SCM, Leitz, University of British Columbia, Taurus Craco (Weinig), WDMA-BC

2. Data handling technology from order entry to manufacturing input

This technology was identified as being critical to the **furniture**, **cabinetry**, and **manufactured housing** segments. Furthermore, this technology is very closely related to the lean manufacturing technology. The data-handling technology would also streamline operations and reduce costs by quickly enabling machines and operators know what manufacturing processes need to be performed. Also, efficient

data handling technology will allow for greater customization options for the customer. Similar to lean manufacturing, data handling technology already exists. However, it is also costly and requires a commitment from senior management at the plant level. A list of potential collaborators who could develop this technology solution is presented in the table below.

Industry Segment	Potential Collaborators
Furniture	20-20, Lignum, Lloyd Love, NRC (UBC Lab), Homag, Microvellum, CNC Automation, Planit Solutions
Cabinetry	20-20, Lignum, Homag, Microvellum, CNC Automation, Artcraft Kitchens, Cefla, Value, Planit Solutions
Manufactured Housing	Homag, MHI Canada, Viceroy Homes, Prestige Homes, Quality Engineered Homes, Guildcrest

3. Cost effective alternative chemicals

This technology was identified as being critical to the **furniture** segment. The technology would assist in responding to the increasing market pressure for "green" or environmentally friendly products. Currently, most chemicals used – which include adhesives, solvents and finishes – have some toxic ingredients, and alternative formulations need to be developed to eliminate their use. Furthermore, this technology would be useful in the event that future regulations are imposed in Canada banning the use of those ingredients, some of which has already taken place in some European countries. Currently, there are more environmentally friendly alternatives on the market. However, these are typically many times the cost of currently used chemical products. A list of potential collaborators in the furniture industry who could develop this technology solution is presented below.

- Jowat,
- Nacan,
- HP Fuller;
- Franklin, and
- Ashland.

4. Technology to assist in product engineering of energy efficient products

This technology was identified as being critical to **the windows and doors** segment. This technology is needed largely to meet proposed increasingly strict criteria related to thermal standards, which are expected to be implemented in 2013. This project requires research into many technology areas that could assist in developing more energy efficient windows and doors, such as new materials or alternative solvents. Furthermore, the market will likely continue to demand more energy efficient windows and doors over time, irrespective of regulatory or standards changes. A list of potential collaborators who could develop this technology solution is presented below.

- BC Door,
- Parwood,
- Golden Windows,
- Tradewood,
- Loewen,
- Western Profiles,
- KML,
- Porte Lemieux,
- Bonneville,
- Dynamic,
- National Research Council,
- Natural Resources Canada,
- FP Innovations,
- European companies,
- CCMC.

5. Technology to assist in efficiently enhancing customization for volume manufacturers.

This technology was identified as being critical to the **manufactured housing** segment, where there is an increased pressure from consumers to offer customization. However, customization in the manufactured housing industry can greatly increase costs. To allow more customization, there needs to be better communication between product engineering and manufacturing. This technology project would require research into how the design and manufacturing processes

can be further streamlined and enable greater customization. A list of potential collaborators who could develop this technology solution is presented below.

- Homag,
- Barrcana,
- Britco,
- Mattamy Homes,
- University of British Columbia,
- Pioneer Log Homes,
- Confederation,
- Viceroy Homes,
- True North.

9.0 Skills Development Projects

The following paragraphs present skills development projects that would assist the industry in implementing and utilizing the technology solution discussed in the previous section.

It is noteworthy that the skills development opportunities that link to the earlier-identified technologies focus on more intermediate- and senior-level individuals in the industry.

1. Seminar on lean manufacturing for senior managers and owners

As discussed earlier, lean manufacturing is required to further streamline operations and reduce costs. Its implementation requires a commitment from plant owners and senior managers to implement the technology. Currently, in many plants there exists a mindset where the old processes are sufficient and that new technologies are not needed. To fully implement lean manufacturing, a change in culture within the plant is required and that change needs to be promoted from the highest levels of management. However, in many instances the model of lean manufacturing needs to be "sold" to these owners.

A multiple-day seminar for senior managers and owners related to lean manufacturing would be beneficial to causing the needed change. The seminar would provide information on what machinery is available, the benefits related to lean manufacturing, and how best to implement the new technology in their own plants. Furthermore, it could allow owners to meet representatives from other plants who have implemented lean manufacturing machinery and processes to share

success stories. The seminar could be offered once a year and would be aimed primarily at promoting process improvements at the plant level.

2. **More focus on electrical and mechanical aspects of the manufacturing process**

   As plants introduce more lean manufacturing and data handling technologies, there will be a greater need for individuals who are able to work with the electrical and mechanical components of the manufacturing process. This includes a greater understanding of troubleshooting the electrical components of the machinery and understanding how it relates to the mechanical components. However, these individuals will still need to have a thorough understanding of the traditional wood manufacturing processes.

10.0 Strategy for Launching Phase 2 of the Skills and Technology Roadmap

The success of this Advanced Wood Processing STRM initiative depends on the transition from this planning stage – Phase 1 – to the successful undertaking of the above projects in Phase 2. Given its involvement to date, it could be expected that WMC is well positioned to play a lead role in enabling Phase 2. WMC could develop a strategy for itself to play a role that leverages its existing expertise in helping its stakeholders address industry-wide issues, and build on its past successes.

The steps to launch Phase 2 would be:

- Engage the identified collaborators in participating in the technology projects. This will require an organization such as the WMC to develop a clear communications strategy to approach and enlist collaborators.
- The WMC would develop a strategy for addressing the “skills” components identified above.
- The collaborators for each project will need to clearly define the objectives, expectations, workplan, and milestones for their project. Each project will need to have its own “project management” node that will encourage momentum, collaboration, information sharing and accountability for progress. The WMC’s

strategy could include an enabling mechanism/resource to help in the orderly advancement of these technology development projects.

Each technology project then proceeds with its own schedule and expectation. Whichever organization undertakes to coordinate and facilitate the progress of the overall STRM would also undertake to represent the interests of Canadian advanced wood processors to ensure that their needs are met.

Appendix A: Visioning Session Participants

Richard Bruckeder, Value Woodworking LP

Michael Pfeifer, Raywal Kitchens

Horst Peterman, Homag Canada

Gene Veening, Royce/Ayr Cutting Tools Inc.

Doug Reid, BC Saw and Tool

Kevin Tratt, Blum Canada

Peter Mate, Planit Solutions

Doug Den Engelsman, Craftwood

Frank Laytner, FP Innovations – Forintek

Blair Tullis, Wood Industry Coverings – W.I. Media Inc.

Sepp Gmeiner, Lignum Consulting

Ian Manson, Ministry of Natural Resources, Government of Ontario

Trevor Sandwell, Wood Manufacturing Council

Bob Porter, Wood Manufacturing Council

Michelle Côté, Industry Canada

Appendix B: Working Group Session Participants

Christian Vollmers, Homag Canada

Tim Scholman, Microvellum Canada

Giulio Bordignon, 20-20 Technologies

Richard Bruckeder, Value Woodworking LP

Michael Pfeifer, Raywal Kitchens

Horst Peterman, Homag Canada

Gene Veening, Royce/Ayr Cutting Tools Inc.

Doug Reid, BC Saw and Tool

Kevin Tratt, Blum Canada

Peter Mate, Planit Solutions

Doug Den Engelsman, Craftwood

Frank Laytner, FP Innovations – Forintek

Sepp Gmeiner, Lignum Consulting

Ian Manson, Ministry of Natural Resources, Government of Ontario

Richard Lipman, Wood Manufacturing Council

Bob Porter, Wood Manufacturing Council

Trevor Sandwell, Wood Manufacturing Council

Richard Bluteau, SCM Group

Fatema Chhil, Wood Manufacturing Council

Sandra Nigro, Modular Manufactured Housing Association of Alberta and Saskatchewan

Laurelyn Nielsen, BG Furniture Co. Ltd.

Al Clarke, Leitz Tooling Systems

Appendix C: STRM Development Meeting Dates

Visioning Session
Westin Bristol Place Hotel
Toronto, Ontario
February 27, 2008

Expert Working Group
Westin Bristol Place Hotel
Toronto, Ontario
April 18, 2008
October 2, 2008

Appendix D: Additional Contributors

Gordon Seier, Western Profiles

Knut Holmsen, Marvin Windows

Rhonda Bretcher, Loewen Windows

Yvon Williams, Manufactured Housing Association of Atlantic Canada

Rick Higgs, Manufactured Housing Association of British Columbia

Sandra Nigro, Modular Manufactured Housing Association of Alberta and Saskatchewan

Wood Manufacturing Council

Advanced Wood Processing Skills and Technology Roadmap

Phase 1 Report – Annex

This annex summarizes the results from Phase 1 of a Skills and Technology Roadmap initiative for the Canadian Advanced Wood Processing Industry. The Annex sets out the technology projects and skills development project identified in Phase 1 of the TRM.

Advanced Wood Processing Technology Projects

Technology Development at the Plant Level
Just-in-time/lean manufacturing machinery and processing This technology can streamline operations and reduce costs. It was identified as being critical to the **furniture**, **cabinetry**, and **windows and doors** segments. The technology and machinery for lean manufacturing currently exists. However, it can be costly to purchase and implement, and it requires a commitment from senior management at each individual part of the supply chain. The technology development for this project is at the "plant level", where lean manufacturing machinery will have to be integrated into each plant's current machinery and processes.
Data handling technology from order entry to manufacturing input This technology was identified as being critical to the **furniture**, **cabinetry**, and **manufactured housing** segments. Furthermore, this technology is very closely related to the lean manufacturing technology. The data-handling technology would also streamline operations and reduce costs by quickly enabling machines and operators know what manufacturing processes need to be performed. Also, efficient data handling technology will allow for greater customization options for the customer. Similar to lean manufacturing, data handling technology already exists. However, it is also costly and requires a commitment from senior management at the plant level.
Technology to assist in efficiently enhancing customization for volume manufacturers. This technology was identified as being critical to the **manufactured housing** segment, where there is an increased pressure from consumers to offer customization. However,

customization in the manufactured housing industry can greatly increase costs. To allow more customization, there needs to be better communication between product engineering and manufacturing. This technology project would require research into how the design and manufacturing processes can be further streamlined and enable greater customization.

Technology Development that Requires R&D

Cost effective alternative chemicals

This technology was identified as being critical to the **furniture** segment. The technology would assist in responding to the increasing market pressure for "green" or environmentally friendly products. Currently, most chemicals used – which include adhesives, solvents and finishes – have some toxic ingredients, and alternative formulations need to be developed to eliminate their use. Furthermore, this technology would be useful in the event that future regulations are imposed in Canada banning the use of those ingredients, some of which has already taken place in some European countries. Currently, there are more environmentally friendly alternatives on the market. However, these are typically many times the cost of currently used chemical products.

Technology to assist in product engineering of energy efficient products

This technology was identified as being critical to **the windows and doors** segment. This technology is needed largely to meet proposed increasingly strict criteria related to thermal standards, which are expected to be implemented in 2013. This project requires research into many technology areas that could assist in developing more energy efficient windows and doors, such as new materials or alternative solvents. Furthermore, the market will likely continue to demand more energy efficient windows and doors over time, irrespective of regulatory or standards changes.

Skills Development Projects

Seminar on lean manufacturing for senior managers and owners

As discussed earlier, lean manufacturing is required to further streamline operations and reduce costs. Its implementation requires a commitment from plant owners and senior managers to implement the technology. Currently, in many plants there exists a mindset where the old processes are sufficient and that new technologies are not needed. To fully implement lean manufacturing, a change in culture within the plant is required and

that change needs to be promoted from the highest levels of management. However, in many instances the model of lean manufacturing needs to be "sold" to these owners.

A multiple-day seminar for senior managers and owners related to lean manufacturing would be beneficial to causing the needed change. The seminar would provide information on what machinery is available, the benefits related to lean manufacturing, and how best to implement the new technology in their own plants. Furthermore, it could allow owners to meet representatives from other plants who have implemented lean manufacturing machinery and processes to share success stories. The seminar could be offered once a year and would be aimed primarily at promoting process improvements at the plant level.

More focus on electrical and mechanical aspects of the manufacturing process

As plants introduce more lean manufacturing and data handling technologies, there will be a greater need for individuals who are able to work with the electrical and mechanical components of the manufacturing process. This includes a greater understanding of troubleshooting the electrical components of the machinery and understanding how it relates to the mechanical components. However, these individuals will still need to have a thorough understanding of the traditional wood manufacturing processes.