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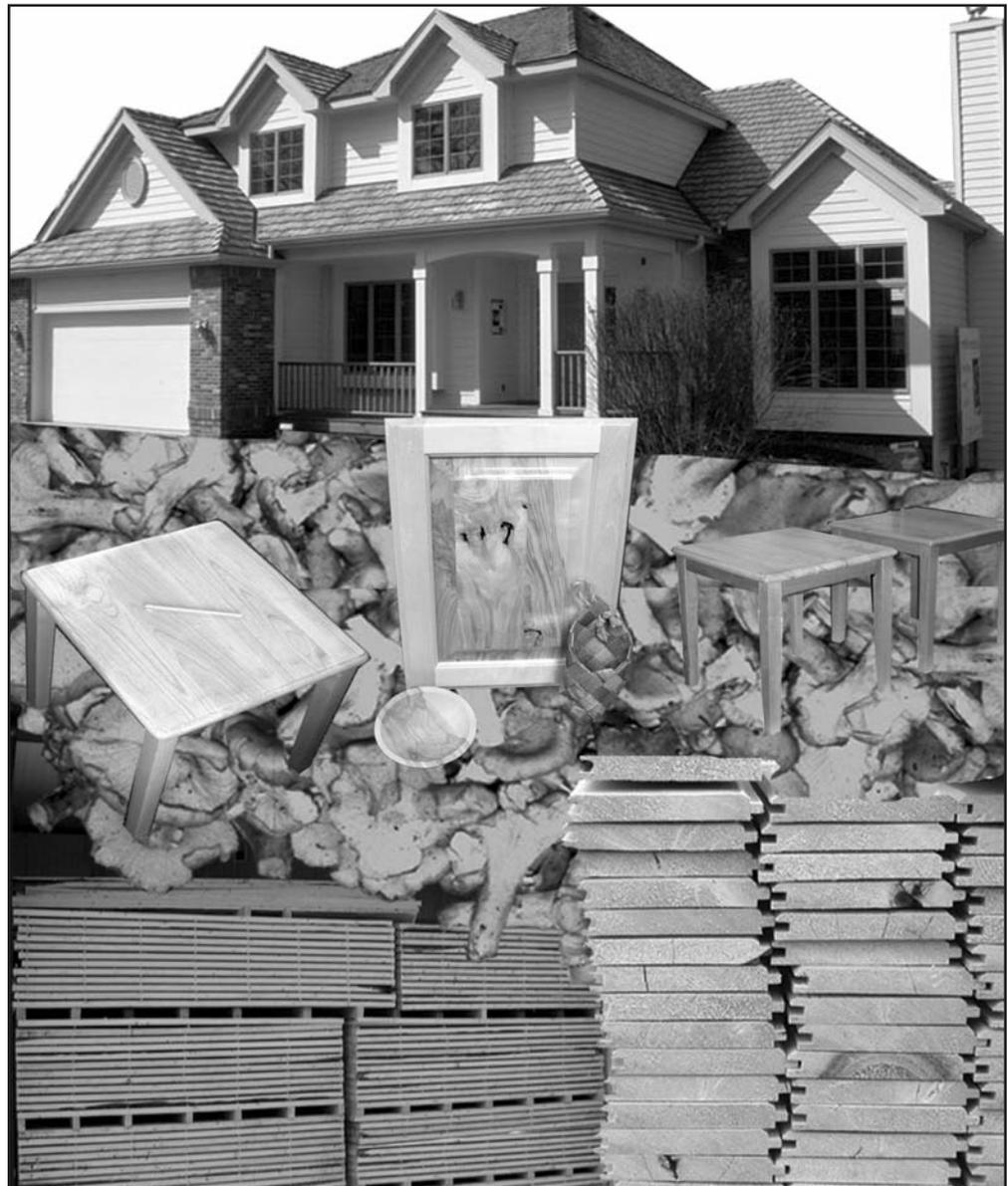
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Innovation in the Forest Products Industry: an Analysis of Companies in Alaska and Oregon

Abra Hovgaard, Eric Hansen, and Joseph Roos



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Authors

Abra Hovgaard is a former graduate student and **Eric Hansen** is associate professor of Forest Products Marketing, Wood Science and Engineering Department, Oregon State University, Corvallis, OR 97331-5751; **Joseph Roos** is a research marketing specialist, U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Alaska Wood Utilization Research and Development Center, 204 Siginaka Way, Sitka AK 99835-7316.

Abstract

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Because there is a lack of innovation research in the forest products industry and innovative activities in the industry are not well documented, this study attempted to fill that void. The objectives of this study were to understand the process and definition of innovation in the forest products industry, identify the constraints on innovative activities, identify resources that would improve innovation in forest products companies, compare the innovation environments in Alaska and Oregon, and provide a benchmark study for innovation in the forest products industry.

This study revealed that there are several aspects of innovation in the forest products industry. In addition, the innovation process is a combination of semiformal development stages, trial and error, intuition, and luck. A variety of factors constrained companies from being more innovative, including government regulations, shipping and labor costs, lack of cash flow, raw material characteristics, marketing expertise, and raw material supply. There do not appear to be any resources that would be helpful to forest products companies, at least none that the interviewed companies could recommend. Offering companies the chance to exchange ideas and network is the most valuable resource available.

The innovation environments in Alaska and Oregon are somewhat similar yet different in the marketing tactics employed and the techniques used to obtain market information. Furthermore, the type of innovation projects that each region focuses on differs, as does the actual process used to develop innovations.

Future research should focus on completing a quantitative component to this study, developing short courses or 1-day seminars, identifying factors that contribute to innovation success and failure, investigating why the forest products industry is not innovative by nature, and exploring the external acquisition of innovation in the forest products industry.

Keywords: Innovation, forest products, marketing, lumber, forest products marketing.

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Introduction

The new millennium brings many challenges to the forest products industry in Alaska and Oregon. In addition to inherently high transportation and labor costs, increased globalization has made it more difficult for Alaska species to compete in commodity markets. To face these challenges, Alaska forest product firms must seek new strategies to compete in a global environment. One strategy that has helped firms compete in the era of globalization is innovation. The purpose of this exploratory report is to describe the process of innovation, present case study anecdotal data as to what makes a successful innovative forest product company, and show how concepts described in the literature are illustrated by these data.

Background Information

Traditionally, market share has been used as the main measure of company competitiveness, but recently competitiveness has evolved to include product quality, design, technology, and production efficiency (Porter 1990). Several sources have shown that new product development (NPD) and other types of innovation are integral factors for a company to maintain a competitive advantage (Brown and Eisenhardt 1995, Martin et al. 1991, Pratten 1991, Scarborough and Zimmerer 2000). In a study of 90 smaller companies in the United Kingdom, one of the sources of competitiveness most often cited was product development (Pratten 1991). Bean and Radford (2000) recognize that “product development is not really about creating products; it is about competing in the marketplace.”

However, innovation can do more for a company than simply increase its competitiveness in the marketplace. The development of innovative products and technologies has several other advantages including providing ways to better meet consumer needs (Cooper 1996), capitalizing on a strategic market (Thomas 1995), and realizing the financial rewards of creating successful innovations.

At the 1998 International Panel and Engineered-Wood Technology Exposition, keynote speaker Warren Easley, Vice President for Technology and Quality at Louisiana Pacific, insisted that “new, innovative products are badly needed” and that the key to the future success of forest product manufacturers will be centered on new products, new processes, and the use of new raw materials (Blackman 1998).

New product development and other types of innovation are integral factors for a company to maintain a competitive advantage.

Innovation in the Forest Products Industry

Traditionally, the forest products industry has been grouped into two main segments: primary and secondary. The secondary forest products industry includes millwork, furniture, cabinets, containers, veneer, flooring, and fixtures manufacturing sectors. Much of the secondary forest products industry consists of smaller firms that use labor-intensive operations while incurring high raw material and transportation costs (Hoff et al. 1997). A large body of research suggests that this type of smaller company has a competitive advantage in industries with short product life cycles, heterogeneous consumer demand, and advanced product technologies such as the wood furniture industry. In addition, smaller firms have the ability to remain flexible in product design, marketing, and production, which aids in their ability to gain a competitive advantage and leverage innovation (Howard 1990, Pratten 1991, Rosenfeld 1992, Sommers and Leinbach 1989).

Not only do forest products companies need to remain competitive at home, there is a strong consensus that suggests the industry will need to invest in technology and product development in order to keep pace with foreign competition. While U.S. companies continue to lag behind, foreign competitors are investing in new technologies that are ultimately giving them a greater share in the market and a larger competitive advantage. The National Research Council states, “The keys to regaining competitiveness in most U.S. manufacturing industries are quality, productivity, and responsiveness in bringing new products to the marketplace” (Canada and Sullivan 1989).

Because there are many activities that may be termed innovative, defining innovation is a key component to this study. Identifying innovative companies is essential to obtaining an appropriate sample and assessing the state of innovation in the industry. This study defines an innovative company as one that excels at one or more of the three dimensions (product, process, and other), when compared to others in the industry. Examples of such innovative activities include:

- New finishing techniques
- More efficient processing operations
- Product improvements through line extensions
- New uses of materials
- Changes in management structure and decisionmaking
- Innovative methods to gather market information or sell products
- Innovative means of addressing environmental issues

An excellent example of innovation in the primary sector of the forest products industry is the relatively recent switch from the use of old-growth logs to smaller diameter, second-growth material. This has forced the industry to make process improvements and offer new products (i.e., composites) based on the changing resource. Although some of these changes relied on completely new technologies, most of these adaptations made minor adjustments in existing technologies to achieve processing improvements and design improvements.

An example of design improvements from the secondary forest products industry involves the improvements in furniture used in retirement homes and hospitals. Companies have started developing furniture, especially chairs, that are sturdier, more resistant to tipping over, and with raised seats to facilitate movement of the elderly or less mobile patients. These incremental improvements in the product have provided added benefits to the consumer and given companies an innovative edge.

Innovation Progress

The forest products industry began by using whole logs and solid sawn lumber. Over 100 years ago, plywood technology was developed and became accepted in the marketplace, dramatically changing the forest products industry. Within the last two decades, newer products and processes have begun taking hold in the market. A recent (2001) presentation by Scott Leavengood of Oregon State University at the Forest Sustainability, Assessment, and Certification Conference summarized these now relatively commonplace products and processes that were once quite new and innovative:

- Oriented strand board (OSB) and particleboard
- Wood I-joists using laminated veneer lumber flanges and OSB webs
- Parallel-strand lumber
- Laminated-strand lumber
- Medium-density fiberboard
- Glulam beams
- Wood fiber and inorganic (plastic/cement) composites
- Small-log processing and curve sawing
- Computer-aided manufacturing

In addition to introducing innovative products, the forest products industry will remain competitive in the industry by implementing innovative experience and unique management and marketing arrangements.

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Methods of Developing Innovative Products

Cooper (1996) provides an excellent historical perspective on the evolution of innovation processes. Cooper characterizes these processes as first-, second-, and third-generation innovation development processes.

The **first-generation** innovation process or “phase review process” was developed by the National Aeronautics and Space Administration in the 1960s and was also used by the U.S. military for weapons development. The process attempted to break development into discrete phases, each with its own review process. Movement to and funding for the next phase were contingent on successful completion of the previous phase. The process was driven mainly by engineers, and marketing people were not involved in the development process. Drawbacks of this process include:

- It was too narrow (it only dealt with the development phase).
- It was too functional (focused on technical/engineering aspects).
- It was cumbersome and slow.

The **second-generation** innovation process was termed the “stage-gate model.” It also had discrete phases with a review phase at the completion of each step. However, the entire system and the decision points at each phase’s completion were cross-functional, involving many different departments within the organization. Eventually, marketing and manufacturing personnel were included in the development process. The process became much more holistic, covering the innovation from idea to market launch rather than focusing solely on development. This type of development process has been successfully implemented by several companies including IBM, 3M, and Northern Telecom. This process also has problems, however, some of which include:

- Projects must wait at each gate until all tasks have been completed.
- Overlapping of stages is not possible (activities are not undertaken concurrently).
- Projects must go through all gates and stages.
- The process tends to be too bureaucratic.
- The process does not lead to project prioritization and focus.

Finally, Cooper suggests that we are entering the **third generation** of innovation processes. This newer process emphasizes efficiency in both time and allocation of development resources. Cooper characterizes this process with four fundamental F’s:

1. Fluidity—the process is adaptable with overlapping stages that increase development speed.

2. Fuzzy gates—the process has conditional “go” decisions that are situation dependent (e.g., projects may pass through gates without having completed all tasks).
3. Focused—the process takes all projects into consideration and prioritizes in order to focus resources on “best bets.”
4. Flexible—the process is not a rigid stage-gate system but allows each project to take its own course through the process.

Certainly, the third-generation process is not the end. The product development process will continue to change and adapt with changes in the business environment and consumer needs. According to Tomkovick and Miller (2000), “New product developers now find themselves in an age of change, the likes of which the world has never known.” The authors offer seven themes focused on the new product development that will affect the innovation process.

1. New product development is of growing importance to companies and is often the activity that offers the greatest leveraging of investment.
2. New product development champions must continually encourage the known foundations of new product success.
3. Companies may benefit by translating innovation and sales growth rates into more new product development cycles per decade.
4. Continuous product quality improvement protects and builds brand equity and should be a vital part of new product development contribution to the firm.
5. Product elimination is an integral part of the innovation process; retention of poorly selling products can drain scarce resources needed for more successful projects.
6. Fun and optimism are essential and often overlooked ingredients for new product development success.
7. New product development credibility is built by delivering on promises made.

Based on these seven themes, the authors conclude that:

- Innovation and product development are becoming increasingly important in the business world.
- Successful innovations require both process and product champions.
- Product modifications and quality improvements are important components of product development.
- Product elimination is an often overlooked but essential product development activity.

Tomkovick and Miller (2000) predict that the processes of developing products will continue to undergo changes while the importance of product development to a company's success will continue to increase. Although Tomkovich and Miller focus on product development, the broader innovation environment is also impacted by these themes. Certainly there must be processes and management/marketing structures that allow companies to be successful product developers.

The Secondary Industry in Alaska and Oregon

A recent report by the USDA Forest Service highlights significant changes in the structure of the Alaska forest products industry and a movement away from the dominance of primary producers. Part of this is due to the recent closures of the two major pulp mills in southeast Alaska (Sitka in 1993 and Ketchikan in 1997), which contributed to a 41-percent decrease in employment in the forest products sector in this region (Allen et al. 1998). Consequently, Alaskans are turning to lower paying retail and service sector jobs, which is predicted to slowly erode wages (Allen et al. 1998).

The closure of these large pulping companies has also resulted in the underuse of sawmill by-products (chips, lower grade saw logs, and utility-grade logs) that were typically used in the pulp mill operations. Some researchers predict that this underutilized resource is the raw material needed for the emergence of a stronger secondary forest products industry. This resource could provide an opportunity for small to medium-sized companies to find markets and develop new, value-added products or processes that would use this resource (Allen et al. 1998, Brooks and Haynes 1997).

This study is timely for both Alaska and Oregon. Both regions are experiencing recent growth in the secondary forest products industry. Furthermore, the secondary industry in both regions consists of smaller companies that could prosper from innovative activities that could help them compete in both the domestic and international markets.

Marketing and Innovation

Since the late 1960s, researchers have been studying the factors that influence the failure or success of innovative products. In nearly all of these studies, the importance of marketing planning is apparent. Studies conducted over a period of more than 30 years show the important role that marketing plays in product development.

Studies show the important role that marketing plays in product development.

The importance of marketing in product development processes

Study	Findings
Myers and Marquis 1969	Most successes were market-derived (market pull) ventures rather than technology push (present in only 21 percent of the cases). Understanding user needs and both internal and external communication are important factors in product success.
Cooper 1975	Ineffective product marketing and poor market research are the main causes of product failures.
Hopkins 1980	Inadequate market analysis , product defects, lack of marketing , high costs, bad timing, and competitive weakness were the main causes for product failures.
Rothwell 1972, Rothwell et al. 1974	The most important factors for the success of innovative products are understanding user needs, attention to marketing and publicity , efficiency of development, effective use of outside technology and external communication, and the influence of responsible managers.
Cooper 1979	The factors that separated 102 product successes from 93 failures in 102 Canadian firms were a unique and superior product in the consumers' eyes, strong market knowledge (well-researched markets), and technical/production synergy.
Cooper and Kleinschmidt 1986	A good fit between the marketing strategy , sales force, distribution needs of the product, and a firm's marketing resources and skills is fundamental to product success.
Hise et al. 1990	A high level of marketing involvement in product development is more likely to result in greater commercial success for new consumer products than for new industrial products.
Griffin and Hauser 1996	Marketing plays an important role in product development by providing information on customer needs and aiding in product positioning decisions.

Atuahene-Gima and
Evangelista 2000

If innovative products are to be successful, **marketing** and research and development need to play influential roles in innovative activities.

Bagchi-Sen 2001

Market research is more important for business development and problem solving in innovative companies than in non-innovative companies.

Success of new products depends on several marketing components including:

- A market-derived venture
- Effective product marketing
- High level of marketing involvement
- Adequate market research and market analysis
- Sufficient publicity
- Strong market knowledge
- Ample marketing resources and skills

Without a strong and effective marketing framework, the extensive resources, energy, and time spent on the development of an innovative product will likely be lost to high failure rates.

Methods

Measuring Innovativeness

The concepts of innovation were explored through a series of case studies of 18 innovative companies in Alaska and Oregon. Personal interviews took place in Alaska and Oregon during 2001. These interviews produced key phrases, characteristics, and stories that can be used to describe an innovative forest products company and the innovation process. Furthermore, these interviews could be used to turn the concepts into variables that can be measured in a future quantitative survey (not part of this research project).

Sample

Nine innovative forest products companies were chosen from each state because they excelled in at least one area of innovation: product or process improvement, new product or process development, or innovation in management or marketing that represents added value (i.e., added benefits) to the consumer. A company participating in one or more of these activities was termed an “innovative” company for the purposes of this study.

Alaska

The identification of innovative Alaska companies took place in three phases with the help of several professionals and organizations. First, the Alaska Wood Utilization Research and Development Center (WUC) in Sitka, Alaska, a branch of the USDA Forest Service Pacific Northwest Research Station, helped to develop a preliminary list of innovative companies. Collectively, individuals at this center have been working with Alaska forest products producers for over 30 years and are consequently very familiar with the industry.

Once a preliminary list was formulated, other Alaska experts evaluated the list and provided recommendations. This helped to establish commonalities and obtain the best possible sample. Experts included Alaska Science and Technology Foundation, Alaska Department of Commerce and Economic Development, Wood Products Development Service, consultants, and academics.

As a third and final measure, several of the first companies interviewed were asked to suggest other Alaska companies that they considered to be innovative or that fit with the study requirements. This process yielded nine innovative companies (table 1). The company names are purposefully withheld to provide anonymity.

Table 1—Profile of innovative forest products companies studied in Alaska

Sector	Interviewee(s)
Primary	V.P. corporate development and V.P. manufacturing
Primary	Owner/operator
Secondary	Owners/operators
Secondary	Owner/operator
Secondary	Owner/operator
Secondary	Operator
Both	Owner/operator
Both	Owner/operator
Both primary and secondary	Operator

Oregon

Innovative forest product companies were also selected in Oregon by using the same criteria. Again, a three-stage approach was implemented starting with the Northwest Wood Products Association (NWPA). Next, feedback was sought from other experts including Oregon Economic and Community Development Department, Oregon Forest Industries Council (OFIC), the Pacific Northwest Research Station, extension agents, academics.

As a third and final measure, companies interviewed first were asked to identify other innovative companies in Oregon. This process yielded another nine companies (table 2). Again, company names are withheld to provide anonymity.

Table 2—Profile of innovative forest products companies studied in Oregon

Sector	Interviewee(s)
Secondary	President/CEO
Secondary	Owner/operator
Secondary	Owner/operator
Secondary	Vice president/general manager
Secondary	President
Secondary	President
Secondary	Production manager and bookkeeper
Secondary	Owners/operators
Both primary and secondary	Owners/operators

Data Collection

Owing to the nature of the innovative model of marketing planning, whenever possible, more than one individual from each company were interviewed. Having the perspectives of several individuals is ideal, as those most knowledgeable about strategy and structure may not be the same individuals who have a thorough understanding of the marketing functions. Owing to a variety of constraints, however, interviewing several people was not always possible. This does not pose a significant problem as many of the companies were small and one individual often served many functions (e.g., chief executive officer, marketing manager, and product champion).

This technique has been used previously in innovation research (Griffin and Page 1996). Table 3 shows the individuals who are likely to be most knowledgeable about each concept in the study.

Key issues with case study data are reliability and consistency across multiple cases. In an attempt to address these issues and to guide the data collection phase of the research, a case study protocol was developed as defined by Yin (1994):

- An overview of the case study project (objectives, issues, relevant readings)
- Field procedures (credentials, sources of information, procedural reminders)
- Case study questions (specific questions, table “shells”)
- Guide for the case study report (outline, narrative format, documentation)

Table 3—Research concepts and individuals most knowledgeable

Level in marketing planning	Concept	Key individuals
Strategy	Products	Chief executive officer, top management
Strategy	Competitive advantages	Chief executive officer, top management
Structure	Management	All managers
Structure	Organization	Top management, marketing manager, production manager
Structure	Planning and info. systems	All managers
Function	Marketing communication	Marketing manager, sales manager
Function	Market information	Marketing manager, sales manager
Function	Product planning	Product champions, team leaders, production manager, project manager

Data Analysis

Data collected through case studies are inherently qualitative and can be both descriptive and explanatory in nature. For the purposes of this study, the case studies were used to identify key innovation concepts and characteristics of the forest products industry. This was accomplished by looking for patterns in the way that an innovative company was described across the case studies. Yin (1994) describes this technique as “pattern matching.” The patterns that emerged were key concepts and ideas used to characterize a typical innovative forest products company. For example, the case studies revealed commonalities among innovative forest products companies such as:

- A competent management team that is focused on innovation.
- Proficiency in market research and obtaining market information.
- Organizational structures that encourage innovative activities.
- Adequate innovation resources (expertise, money, risk-taking attitude).
- A product champion (a dynamic and visionary individual).

Results

Forest products companies define innovation in a variety of ways. Nine different definitions were identified in the interview data. Each of the definitions was supported by at least three companies.

Definitions of innovation in forest products companies

Aspect of innovation	Supporting quotations
Way of thinking	<p>“You have problems and you have solutions. You have to be willing to have a totally open, unstructured mind to address the problems.”</p> <p>“Well first of all it had to start with process...a process of mindset, a process of how we are going to do our business.”</p>
The only one	<p>“I have to say that we are very innovative...because nobody else is doing it.”</p> <p>“Our product is unique, one-of-a-kind, and something that has never been seen before.”</p>
People	<p>“Everything I read about with innovators and entrepreneurs is that there is something a little bit different. They are like their own drummer. That’s us.”</p> <p>“You really want that combination of free spirit, there are no boundaries and that independent drive to accomplish tasks without defined limits and without defined timelines.”</p>
Niche products and markets	<p>“Trying as best as you can to move from a high volume commodity to more of a niche market...you have your basic commodity market that keeps you alive and then you start targeting with special woods, some small runs of niche market type of products. I think that’s where the successes are going to be. The commodity keeps you alive and the niche just gives you that edge.”</p> <p>“We’ve gotten very good at what we do, but it’s a very small niche...it’s so small that the big companies aren’t going to address it...there’s an opportunity for innovative companies, in quality design in the high end.”</p>
Customer oriented	<p>“We certainly make innovative stuff when we’re allowed to by the customers [who say], ‘Well I need one of these and I want you to design one for me.’”</p>

“I think innovation means that you identify the need from the customer. You identify problems that your customers have and you are able to deliver a product that adds value to their problem...they have an issue and as an innovator, you can identify the problem and then you go out and solve it.”

Marketing

“Innovation is more likely to come in with products that people find that are marketable...I don’t think Alaska is going to produce a new use for wood. It’s more a matter of finding a way to market our stuff.”

“You’ve got a market for everything that goes out...marketing has to be up there at the top of the list in terms of being capable of not being dependent on a single product.”

“I think innovation is trying to be successful in marketing it.”

Process

“We are removed from other people by a certain unique manufacturing process that works, an innovative process.”

“Well certainly efficiency in raw material use.”

“We tend to think of machinery as innovation...we’ve built machines to solve specific needs.”

“To get more recovery out of your existing supply. Keep up with the technology, basically to get more fiber out of what you got.”

“I think that one of the things that innovative companies do is they simply take advantage of innovative processes from other industries that are ahead of their industry...they go outside their industry and they learn from and take advantage of things that other industries do well.”

Product

“We have to take an innovative product and make it [more] innovative. We have to go to another product level.”

Several interviewees placed their product on the commodity side of the spectrum and their production process on the innovative side.

Business Structure

“I know with us innovation is design. That’s how we try to set ourselves a step ahead and a step apart...we make things that are just a little different.”

“Being capable of having a diversity of product line to survive through seasonality and economic cycles.”

“I think an innovative company would be one that would do everything it could to try to get new acceptance for an old product on a national scale.”

“That’s another semi-innovative part of this business... the way we treat our suppliers and customers is as a partnership as opposed to trying to get the best thing for the buck right now.”

“So you have this mill that is now owned by an owner and a nonprofit with the idea that ok, so now we have the incentive. We can get grants. We can go out there and try and get more certified lands around us. We’ll be one of the only mills that is producing stud lumber that’s Doug fir, certified material. That’s innovation... how do we structure this thing that’s going out of business? How do we structure it and partner?

Relationship innovation...get out of the old paradigm of, you’ve got to do it alone or die.”

A review of the literature and company interviews revealed nine concepts present in innovative companies: product focus, competitive advantage, customer focus, management, organization, planning and information systems, marketing communications, market information, and product planning (a review of the literature is included in app. 1). In addition to these main concepts, the interviews revealed that cost-efficiency, persistence, ability to survive, and environmental sensitivity were key characteristics of innovative forest products companies.

Product Focus (Concept 1)

To assess the product focus of innovative companies, interviewees were asked to place their product on a spectrum with commodity products on one side and specialized products on the opposite side.¹ None of the interviewees placed all

¹ In the case of lumber, commodity products include dimensioned lumber such as that used in housing construction. Specialized products in the case of softwood lumber include shop and select lumber that is often remanufactured into value-added products.

aspects of their business on the commodity side. This is expected as our sample should contain only innovative companies. Interestingly, several interviewees placed their product on the commodity side of the spectrum and their production process on the innovative side. One interviewee stated it this way, “From a technological standpoint, there are not many new things that you can do to wood furniture. ...On the other hand, what we are doing is we’re applying other industries’ technology to our industry. There are things that we do in our plant that aren’t found in other wood-working plants.” Another interviewee stated it slightly differently when he said, “I think our [tool handles] fit... towards the commodity, typically. I think the application or how we do it tends to be at the higher [innovative] end.”

Competitive Advantage (Concept 2)

Innovative companies described their competitive advantages in a variety of ways. At least 3 companies supported each of 10 competitive advantages. This indicates that innovative companies draw on a variety of competitive advantages to survive in the forest products industry.

Competitive advantages of innovative forest products companies

Benefit	Supporting quotations
Technology	<p>“We’re hoping that the computer will be a competitive advantage in the future.”</p> <p>“We’ve had to automate to stay ahead of the lower priced competition that has always been out there. I think that’s probably our strength, the building of automation to stay price competitive.”</p>
Shortened supply chain	<p>“We install our projects too....we can design it, we can build it, and we can install it.”</p> <p>“We only build custom-made cabinets. You have to come in here with a design and a drawing and we custom build them. We don’t build anything to inventory and sell to Home Depot so they can put it on their shelf.”</p>
Customer focus	<p>“You get on the phone and you don’t get ‘Press one to talk to someone in sales, press two to talk to our shipping department, press three to,’ they call and they get me. Every time they call they get me. Be attentive,</p>

call back, follow through, talk to people. For a lot of people, that's it. They want to feel like they know who they are buying from."

"I'd have to say public relations, our relationship with our customers. It's very one-on-one. It's not just talking and purchasing. We're in the cabinet shop talking to the cabinet shop guy almost on a daily basis."

Local (mostly an advantage to Alaska companies) "It's local, and it's local...it's the local workmanship, it's the local material."

"If it's made in Alaska, they will buy it."

Material utilization "Being able to do more with less."

"We've got to create a use that [overseas competition] is not creating. They're taking old technology and old ideas and coming up with cheap labor to put something to market...but it's a container. We want to be something that just happens to be shaped like a container."

Cost reduction "That includes reducing the cost of labor and reducing the cost of wood. There are various ways to do that but you have to get very innovative in reducing your costs so that you can stay competitive."

"We buy our raw product cheap. That's a big plus."

No competition "We had to do something that wouldn't pop up in Wal-Mart. Our kiln drying process was the first ever for [our product]."

"How you compete with the big boys is don't do what they do, don't compete with them...do something that you're more suited to do."

Quality "I built my business on service to the customer, quality, and attention to detail."

"The competitive advantage that we have right now is our quality. Our quality is not gallery but its better than what you'll see for a similar price anywhere else...quality and then its American made, those are the

two main things that people like to hear from us.”

Outsourcing activities

“We’ve had a few products that we’ve had to out-source to stay competitive. We’ve even had to take them out of people’s hands making them here. That’s not an easy, fun decision when your whole mentality is to make it local.”

“So how do we get innovative and compete in that market? One of them is we’ve actually decided to purchase these products from Chileans and Brazilians ...so what we’ve done is essentially walked away from producing that inside our company and bought it outside...but we will make all the odds and ends, the specialty items that they aren’t good at.”

Marketing

“My competitive edge is I sell direct. I don’t wholesale out to anybody. I just deal with the end customer.”

[The brand] “puts us in a very, very good position...to stay competitive and more importantly, keep the Chileans and the other South Americans from getting a foothold in our...market.”

In addition to these aspects, some interviewees cited flexibility, adding value to products, superior material characteristics, and environmental sensitivity as components of their competitive advantage.

Customer Focus (Concept 3)

Most companies interviewed had a strong focus on the customer. Focusing on the customer provides a variety of benefits to companies including product improvements, design improvements, repeat purchases, and new product ideas.

Benefits of a customer focus in forest products companies

Benefit	Supporting quotations
Product improvements	“We’re working on trying to put together an order system where [customers] can actually place their orders and manage their orders...when they have a change in the shop, they have to go through 10 people to get the change to us, which sometimes can be too

late. This way we are trying to create a live system that they can make their updates...and next time we cut one it will be ready.”

“While I was waiting my turn to talk to the store owner, a consumer comes raging in and she says, ‘My feeder that you sold me yesterday, it leaks seed all over the ground. The birds are eating on the ground and the cat just got a bird right in front of me...’ So our feeders don’t spill seed.”

Design improvements

“You come up with a plan, [the customer] might have a sketch but then you start drawing it out and you put your input into it...you engineer it, you tweak it this way and that. You get it to where they want it...almost every job we get involved in revolves around those custom spaces.”

“Quite often somebody will call you up on the phone and you’ll sit there with a pad in hand and they’ll be rattling off numbers. Well I want a table this size and I want it to look like this. So you’re sketching it out right before your eyes. You might even be working on some numbers or...this kind of wood versus that, maybe get an idea of [which] wood might be a little more expensive and/or harder to get.”

Repeat purchases

“We do have a lot of young couples, a lot of people who have never built. They come in and we spend some time with them. Then while they’re doing the project they can call up the office...we’re there for any questions they have on their project, which you don’t get anywhere. That has been a really big deal with us...and they’ll come back.”

“We’re trying to concentrate on repeat areas. We can get them at birth and high school graduation. So that’s a very important part of our marketing.”

“Now with our stamp on the back of them, whoever buys them there, we’ll probably get four or five repeat

calls from just our name being on the back of them. So you don't know where it's going to end. It will slowly start mushrooming out."

New products ideas

"I would say that 99 percent of all new ideas come from the customers. What happens in a lot of industries, ours included, is that people take credit for it. They say, I have this wonderful new invention that I've created...I would argue that a customer clued them in on that somewhere...its highly unusual that somebody creates innovation without a demand."

"Greenhouses...that came from a client. They said, 'This is a great building, I could grow something in this.' I had somebody else that said, 'I would love to have a kids' playhouse at the top'...That's how a lot of the ideas have come."

"I was at a tradeshow and a lady came up to me and said, 'Don't you have anything that will hold little knives? Because we sell a million of these little knives and people want to display them, they collect them. They have eight sets. They have nowhere to store them. Can't you make me something?' Sure, we can do that."

"A customer will come and say, 'I've got a sample that looks like this...how much will it cost to get something like that?' Sometimes we just look at it and say, how do we do it? Go back and look at what have we done similar to this before."

Management (Concept 4)

Interviewees were asked to describe the management structure of their organization and the role that management plays in the innovation process. Management theories ranged from a top-down, military mentality to more commonly, an open exchange of information between all levels in the organization. Although the following form of management is rare, a retired military officer described his management philosophy in this manner:

Everybody in this organization believes in and agrees with my framework, my thought process, and my set of goals, standards, and objectives. I'm a retired military officer, 30 years in the Army. I don't have a problem getting people to do things the way I want them to do things...But I will tell you that in 9 years of manufacturing now in three different companies, it's not easy getting civilians to do what you want them to do. You don't own their hearts, minds, and souls like you do a soldier. And they have this propensity to ask you questions like, "why?" At times it takes three or four times. I'm not in that mindset.

Other companies had attempted a team structure with mixed success. One company stated, "There's a team structure...we're all in the same boat together kind of a thing. We all just have different tasks that we have to do." Another commented, "We have a general manager. We have team leaders. We have morning leader meetings. Who's on first, what's going out, and what's happening...we try to keep [communication] strong but everything is still just crazy." The president of a large softwood manufacturing company had implemented a team structure that eventually failed. He describes his philosophy of management below:

Our goal was to use these teams to establish plant goals for improvement; plant goals for productivity and to identify various projects within the plant that could help them achieve those goals. In that we took people right off the production line, off the floor, along with management and we went in and told them, "You guys come up with it and you have to come up with it with everybody being equal." The net result was we took the leadership out of the plant manager's hands, forced them to spread it out amongst everybody and try to come up with a consensus and a decision on what we are going to do. What happened was nothing happened. It takes you four months to come up with goals. You meet once a month or once a week and you go through this whole process of trying to educate everybody on the various aspects of the company, the financial part of how the plant operates ...and four months later you finally come up with some goals. In all reality, the plant manager, if he's prudent and does his job right, he can come up with the goals. There's no big secret there. If they are good quality goals that are well communicated, nobody is going to have a problem with it. Unreasonable goals, then yes, people are going to have a problem with it. As a good manager and as a good leader you have to recognize [that you] don't take leadership out of the organization, you enhance leadership.

You allow leaders to organize their people rather than taking that leadership out of a person’s hands because when it comes down to it, the guy running the plant is the one who’s in charge of running the plant. If it goes belly up, he’s the one that gets fired. You can’t take that out of his hands... you don’t have to delegate that down to the smallest, lowest level.

Even if a formal team structure is not always a successful management structure, Open communication between all levels in the organization was beneficial for nearly all of the companies interviewed. However, companies may lack the ability to structure that communication and derive meaningful opportunities from the exchange. An interviewee commented, “We have a lot of people that at times work really well together and come up with really free-flowing type ideas. Then there are other times where those ideas are in conflict. We don’t have a real good way to have competition, to find a clear winner.” Another interviewee summarized their difficulties in the following manner, “The ideas are there [from line workers], maybe some people have the capability to do it but they’re so busy doing other things that...we never get to that. I know it’s our general desire to make the people grow, help them grow in capabilities but we don’t always invest in training or the time to get them there.”

Open communication between all levels in the organization was beneficial for nearly all of the companies interviewed.

Organization (Concept 5)

Linked with a company’s management structure is the organizational culture of an innovative company. Many of the companies interviewed were operated and owned by one individual or a husband and wife team. This is the nature of smaller companies in this industry and especially in Alaska. In these companies, an individual becomes responsible for the entire organization.

When the company is this small, it does not seem appropriate to discuss the organizational culture, because it rests solely on the mindset and activities of one or two people. In the larger companies interviewed (more than five employees) a variety of working environments existed. The organizational culture of these companies displays one or more of three features: family atmosphere, employee focused, reception to change.

The organizational culture of forest products companies

Cultural aspect	Supporting quotations
Family	“We’re always helping each other out. We had a cabin raising for one of our employees, one of our guys who

is putting up a place...We're going on a company fishing [trip]...we're leaving on Thursday."

Employee focused

"You have to listen to your employees. They're the ones out there. We all have open-door policies."

"You want people to do a quality job and increase production and quality and everything else. You cannot let them perceive that they are going to work themselves out of a job. So what I tell them is this: I want you to work yourself out of a job, and I promise you that I'll find you a better job. I'll create a job for you."

"So we empowered every employee in this plant to pull the chain and stop the plant. They see a mistake or an error or a problem, stop. Everybody in this building walks over to where their problem is...we solve that problem...get it put in process, solid stone procedure... then it doesn't get [further along in the manufacturing process]. Worst of all, it doesn't get out the door to a customer...every employee is empowered to stop the plant."

Receptive to change

"Over the last 20 years or 15 years we've gone from 100 people to 1,200 people, we've essentially built a company facility. We've essentially engineered and built almost every component in the company except for the primary equipment...everything else we built ourselves. So what you get is an extremely aggressive can-do attitude...people are not at all afraid to change as compared to most companies...so as a culture it's very easy to change what we are doing."

Planning and Information Systems (Concept 6)

Although present in the literature, as a key concept of innovative firms, once the interview process began, it became apparent that this concept was not relevant for smaller forest products companies. Because only one of the companies interviewed performed any formal market research (see "Market Information"), most companies would have no way of incorporating those data into product planning or information

systems. Consequently, this concept was dropped during the analysis stage of the research.

Marketing Communications (Concept 7)

Within the marketing communications concept are the pricing of new products, outsourcing activities, marketing tools, and marketing tactics used by innovative forest products companies.

Pricing new products —

For nearly all of the companies interviewed, marketing is a significant challenge. In particular, many innovative companies expressed difficulty in pricing new and even existing products. One interviewee stated,

Keeping updated with all the prices is always a challenge. When we first started doing this, we did not price these accurately...we've got the wages and then you still have to make something for all the equipment that's breaking down, the trucks that are delivering it. So it's a hard call...we are still trying to figure out if we are at the correct amount. I bet out of all my challenges, pricing is my biggest challenge.

In pricing new products, companies employed various strategies:

“I could not come out with a product introduction and slap a 30-percent price increase on it. Nobody would even listen to us...so what we did sell was very low margin. I didn't raise the price to pass on the cost of the materials.”

“I look at what things cost, what could go wrong, and what the fixed costs are.”

“Certainly I went out and got all my competition's price lists...go to the flooring magazines or the home magazines and in the back where they have all the lists of the people who sell flooring, just check off those boxes and have them send you all the literature that they've got...and certainly you have to know what your costs of production are. I've found that a lot of manufacturers don't.”

[Paraphrased] Pricing of newer products is paired with that of the competition.

Outsourcing—

A portion of the interviewed companies have decided to outsource their marketing to larger firms with more marketing expertise. About one-half of the companies interviewed were using this approach to marketing:

“We’re working with an outfit down in Oregon...we’re starting in veneer, not knowing a whole lot about it. We wanted to concentrate on production, efficiencies, and recoveries. So we went with those guys for a few years to let them do the marketing. Because a new guy, with the volume that we expect to produce is not going to say ‘OK, here we are, buy our wood.’ So they’ve been buying it...it’s been a very, very good relationship. They said, ‘We’ll consume it internally until you can get on your feet and we’re going to start marketing for you.’ So they do our marketing.”

“We’re a little bit short on marketing expertise or experience like that. On the main stuff, we went with one of the guys who works for [company]... so we engaged his help to market the stuff that went out of here.”

“How do we get it out of state? How do we get it into other people’s hands? Pretty difficult. We’re not going to do a big mass mailing. The easiest way is to get under somebody’s already established marketing program and that’s what we hope to do with [company].”

“We have a company up in Seattle that sells a lot of our veneers...We’ve dealt with a company in California for years on firewood.”

“Then [company] stepped in and said ‘OK, you guys really aren’t good marketers. We’re the better marketers so we’ll take this from you and we’ll do it from here.’”

Marketing tools—

Innovative forest products companies that do not outsource their marketing activities use a variety of tools to promote their products.

Marketing tools of forest products companies

Marketing tool	Supporting quotations
Displays	<p>“Then they also had a display in their entryway and so they had our [product] also on that display, and we got quite a bit of inquiries from that point of view.”</p> <p>“He said, ‘You might want to make a display like this and show the wainscot and have a cabinet and a piece of base and have some trim in the corner. Maybe have a little window and some wallpaper.’ You know we went through the whole marketing deal to try and grab people.”</p>

	<p>“It’s important to have things displayed correctly and visible in retail stores.”</p>
Phone book	<p>“When you think about your advertising in the phone book, and it’s mostly outlay of cash to deal with, it’s incredible. But we do get calls from the phone book. It is a payback.”</p>
Newspaper	<p>“Newspaper was our initial [marketing tool] and still we are in the newspaper every day, all day long. We have a newspaper contract. We do larger ads at certain times, building times.”</p> <p>“A lot of people have really liked that newspaper article.”</p>
Word of mouth	<p>“We get a lot of word of mouth...we send a thank you out to every client after they are done with their project, their storage barn or their garage. That’s really important because...the word of mouth is how we have grown.”</p> <p>“Ninety percent of our business is word of mouth.”</p> <p>“It’s referral. It’s huge...we do a lot of data collection...we know that 87 percent of our business is referral.”</p> <p>“Most business is word of mouth.”</p>
Shows	<p>“We went to home shows, wholesale show...we went to the holiday marketplace. So that’s how we started out showing people what we were selling. We went to the sportsmen’s show...I tried to stay away from... bazaars because it’s all retail and I wanted to stay in the wholesale end of it.”</p> <p>“So primarily we sell through gourmet products...the nice thing about the gourmet products as a wholesale show is it’s not just that you meet buyers, but you meet other manufacturers. The networking between other manufacturers is tremendous.”</p>

The companies interviewed often pursued segmentation or differentiation in their marketing tactics.

Internet

“I did the Web page when we first started...It’s been very successful. I figure 70 percent of our clients have been to our Web page...they’ve fought it out between significant others on what size, what price, everything before I get them.”

“My only marketing tool of any significance is the Web site.”

“I sell directly off my Web site as a retailer. But it’s not significant. It’s maybe one or two orders a month... I haven’t really done much with the Web site and with marketing it.”

“We hoped that the Internet site would be functional enough and we were wrong...Internet sites are just like anything. It works, but if you’re not fully committed to it, you get no results.”

A few forest products companies have tried television ads, radio announcements, free promotional products, door-to-door selling, cold calls, and magazine ads, although these tools were in the minority.

Marketing tactics—

The companies interviewed were oftentimes pursuing one of two tactics in marketing their innovative products: segmentation or differentiation. Segmenting serves to divide a market into smaller niches with specific needs. A company using this tactic targets its products to satisfy a niche market need. Differentiation works to separate or differentiate a company’s product from that of the competition. In theory, this difference enhances the value of the product in the customer’s mind.

Marketing tactics of forest products companies

Tactic	Supporting quotations
Segmentation	“We checked into doing ads at the theatre too. You know, aimed at certain types of movies, certain types of people who are going to buy our product. We certainly have a pretty good idea [of who will buy our products]...they have to be able to afford your product. Middle-income to high-income bracket is where our product usually goes.”

“It was an opportunity to set up an either/or, which is always nice in marketing. Knotty, displayed, less money. Clear, functional, more money.”

“You think of yourself as being the customer and you’re not...It’s taken me a long time to realize that I’m not who I’m targeting. I’m targeting the guys who work for Bill Gates. I’m targeting people that have a lot more zeros after their bank account number.”

“Well let’s talk about target markets. There’s the distributor, there’s the flooring retailer, and there’s the architect/interior designer market, and the homeowner. Each one kind of requires a different approach...but start with one market category, learn it well, do it well, know the marketing tools to really be successful there, and then expand once we have success instead of trying to diversify.”

“The window companies are redesigning their entire product line with the idea of creating...their goal is to produce a more segmented marketing approach and try and come in with some very good price pointed windows on the bottom end of the market with the effort to compete against the vinyl window.”

Differentiation

“The transition for marketing for me was...where I figured out that I could do them as a kit.”

“One of my ideas...to take [the furniture] further, is to put tags on it. Give a description of the piece and the harvesting and that....Another thing I wanted to do was to scoop out an area and stamp our name on it with a logo on it somewhere. ‘Cause it comes from Fairbanks, Alaska, and I think people would like that.”

“We came up with a marketing plan to... distinguish our [product] as different from everybody else’s... We’ve focused very hard on explaining the fine points of [our product], the difference...explaining essentially why it works to the benefit of our customers...I think

we've successfully created... a very recognizable brand that is definitely unique in the market"

"Our marketing concept is build the very best product and then present it and promote the fact that it's the best product. But it has to genuinely be the best product...you have to create the best design, the best product, the best function...the whole marketing concept is, I think, misleading for a lot of people... You find a need and you address it and you solve it. That's what innovation is."

"We have fairly unique stuff and we're not trying to sell to the person who is looking for a #2 red oak... what we try and do is position ourselves as the provider of fairly unique floorings so we're not going to compete price-wise with that lower grade common floor."

Market Information (Concept 8)

The majority of companies interviewed had no formal marketing research efforts. As with marketing, there is some evidence to suggest that companies may outsource their marketing research activities. Of those who attempt marketing research, searching the Internet, magazines, and books; asking employees; attending conferences; conducting surveys; making field visits; and networking with other manufacturers are among the methods that companies may choose. Only one company of the 18 interviewed had formal marketing research techniques. The president of that company stated, "It's so important for a company to know who their customer is and to know as much about the customer as possible. So we do annual surveys of our customers... to find out [about] demographics and design tastes."

When asked why marketing research is not attempted, companies most commonly cited lack of time and money.

Product Planning (Concept 9)

Product planning includes three topics: drivers of innovation, resources helpful in planning innovations, and the stages of the innovation process.

Drivers of Innovation

The drivers of innovative activities in interviewed companies can be easily split into two categories: external and internal drivers. A list of the external drivers of innovation identified in the interviews follows.

External drivers of innovation in forest products companies

External drivers	Supporting quotations
Environmental pressures	“The pressures from a lot of outside interest [and] environmental changes, everything else was sort of working on the industry.”
Governmental pressures	“The government people have been talking about value-added for a number of years...so that’s why we decided to do something to it.”
Customer pressures	<p>“Probably our relationship with our customers... working together you find better ways to do things.”</p> <p>“So if you look at innovation, what drives innovation? To a certain extent, our customers are driving the need from innovation on the distribution side because of cost. So really the customer is trying to pull that innovation through the process so we can get continued cost reduction.”</p>
Competitive pressures	<p>“Innovation really is driven, a lot of times, by crisis competitiveness. Where if you have one company, even if they’re very good, they may not be competitive unless they’re forced to....I can’t think of any examples where innovation has happened in a void. It’s always happened in a cooker with a variety of people.”</p> <p>“But very, very stiff competition that way...in part due to our own mistakes in thinking that we’ve got it all down. We’re the number one supplier and nobody else can bust into us. That, oh yeah, we did have to improve our quality and, oh yeah, we did have to improve our delivery, and, oh yeah, we had to make better machines... that’s part of the external push to change how we do things.”</p>

There are also significant internal drivers that put pressure on forest products companies to innovate. The two main internal drivers are employees and company needs.

Internal drivers of innovation in forest product companies

Internal drivers	Supporting quotations
Employees	<p>“All of our maintenance people, they come up with lots of ideas and you just have to work that one. That’s the advantage of a small company. You don’t get locked into that corporate structure.”</p> <p>“There’s probably more internal innovation...the requirements, quality wise, that we’ve had to go through have required a lot of innovative thinking, innovative processes and stuff like that. But even when things were fairly stable as far as the product that we were making at that time, there was a lot of internal pressure to change, to do something different, to do something better. So I think there’s a strong internal need to change.”</p>
Company needs	<p>“When you look at what drives [innovation, it] was not so much the customer’s desire, it was our need to sell wood....We had to push this wood into the market. We had to find a market and we had to find a way to get the market to accept it.”</p>

Resources

In general, companies could not recommend many resources that were helpful in planning innovative projects. Several companies mentioned the local chamber of commerce and builders and manufacturers associations as useful for networking with other manufacturers and a way to meet local suppliers. One company mentioned a formal seminar that was helpful in marketing products to Japan.

One manufacturer in Oregon commented that a product champion or visionary individual is an essential resource in any company. He says, “You find that the company was started by somebody who really loved that product and just had a tremendous passion. I think that’s a requirement.”

Innovation Process

Most interview discussions focused on the innovation process. Overall, the companies interviewed did not have a formal innovation process; there was no manual or official company policy on this topic. Although the process is often influenced

by company strengths and skills, gut feeling, being in the right place at the right time, luck, and accidents, there are identifiable stages to the innovation process. These stages are not completed in any particular order. Instead, forest products companies use a tailor-made approach specific to their company’s needs. Rather than going through all stages, the interviews showed that forest products companies tend to pick and choose an innovation process based on their unique needs.

Stages of the innovation process in forest products companies

Stage of innovation process	Supporting quotations
Idea generation	<p>“The process: how we can load things better, how we can get it out better, how we can make movement... keeping equipment repaired. Keeping an equipment log of who’s done what to what. But most of our products have developed because we’ve thought about it.”</p> <p>“Probably 98 percent of the product ideas come from my head, although a few originate from customers.”</p> <p>[Paraphrased] At the start of the NPD process we have a brainstorming session with employees, board of directors, customers, and salespeople to generate new ideas.</p> <p>“Anything that comes down the pipe...that’s something within our realm of doing without tipping over the cart.”</p> <p>“We’ve created things by accident but those things came as the result of a lot of hard work and the typical capitalistic drive. It didn’t come about wondering.”</p>
Screening	<p>“The cuteness factor...any building won’t do. It’s got to be cute and well built.”</p> <p>[Paraphrased] All products go through a design check where we question its feasibility and its manufacturability.</p>

“I think more than anything...the design of the product is determined by the machinery. You want to make it efficiently. You want to make it as cheaply as possible. So we develop everything so that it can be created by the router.”

Design

“So for the last year and a half there’s been a significant R&D effort and design effort to put a brand new window on the market. [Our customer] in a lot of ways drives much of the process through product specs, product lines, at least initially. Then we come back in with offering various engineered products and various changes to patterns to reduce the amount of wood and keep the part within the standards of our industry...and we also introduced LVL into the window, which they hadn’t integrated before.”

“I played around with different assembly techniques, different sized roofs, and different body sizes, and different length sizes, and then different types of roofs.”

Samples/prototypes

“Sometimes we’ll make a prototype. With the furniture we make prototypes of pieces.”

Trial and error/testing

“We sent some [samples] down with their local rep to a regional meeting. It was one of these last-minute things and he came back very positive.”

“I drilled 100 [products]. I tried drying them in the microwave, and I tried putting in cat litter so it would pull the moisture out. I tried doing it in the oven, and I tried polyethylene glycol...it’s supposed to keep wood from cracking...that didn’t work. I tried every experiment I could do.”

“We jump up and down on [the furniture] to see how much of a load they can carry at the joints. And so you find out...that’s going to fail and we don’t want to deal with that. We want it to change it around.”

“A lot of trial and error, lots of trial and error...I revamped and designed a bit of my own so I can interchange lathes.”

“We did it by field testing.”

“[Wheatboard] repels water 100 percent better than particleboard because the straw itself has a flaxen cover on the outside. Then we put the plastic polymer in there and it just repels water. We floated it in a goldfish pond for a month and it didn't sink. Particleboard was at the bottom of the goldfish pond the next morning. And the MDF was like oatmeal and mush and sunk two days later.”

Customer involvement

“Before we do it we'll draw up a real shop drawing or a plane drawing and fax it to [the customers] and [they] have to approve it. Or they'll say, 'Well that sounds OK but I want this, this, and this done.' So then you sit down and you really start drawing it and you incorporate all those different changes. You just go through that process with a customer.”

“We did it by...talking with consumers and store-owners.”

“Usually what happens is the customer comes to me and says, 'I need a such and such.' Then I say to [my husband], 'I need a such and such, make me one.' Then he'll design what he likes. Then I put in my two cents and we end up with a finished product.”

“Ninety percent of the time what we are making satisfies [the customer's] needs. It's the 10 percent of the time, which is the leading edge of innovation, where they need something that we don't have or they can't find. At that point, we have to greet them, we have to find something in common and then we have to say, 'Well what was it that you are looking for'...you deliver a product that satisfies a problem.”

Employee involvement	<p>“[Our employees] keep saying, ‘What if we could?’”</p> <p>“We had one of our employees take the slab that we cut out of the middle, which is part of the heartwood... and he takes it and makes some matching spoon and fork sets. So we buy those back from him. We supply the wood, he supplies the labor, and we buy those products back...I think we maintain a supplier-customer relationship as well as an employee-employer relationship.”</p> <p>“One of our employees...he’s a very articulate artist. He’s one of our cutters...and this guy is extremely talented, irritatingly talented. He says he puts on his headset and when the classical music is over with, he happens just to be finished...so again, an employee starting something...so henceforth comes the [product].”</p>
Plant layout	<p>“Basically they came in with a crew. They went through the plant and they timed everybody...they made a map of the plant layout...we came up with a better design for all of the equipment...moved all the equipment around, set it up, moved the duct system, all the electrical system.”</p> <p>[Paraphrased] We have a separate building for developing new products so that we don’t have to stop production in the main building during the design phase.</p> <p>“One of the things that I, as a manufacturing designer [do is] I go into their businesses and say ‘OK, where can we streamline? What can we do here?’” Sometimes its just lining up so you’re not carrying wood from one place to another place...setting up your equipment in a fashion that allows the wood to just flow through... Little things that I think most larger manufacturers do anyway but bringing that down to a smaller scale.”</p>
Marketing	<p>“This is cute...and everybody says ‘Oh, ah, isn’t that cute’ ...who would buy this? Well grandparents like to visit their kids and gosh wouldn’t they like to get the</p>

kids something before they left? Well grandma and grandpa probably have more money than the folks that have a couple of kids at that age...so that would be our market probably, grandma and grandpa. How would we display it? Everything kind of goes [on display at] the road, then it goes on the Web site.”

Types of Product Development

Product development efforts in innovative forest products companies were usually product improvements or line extensions. On occasion, a new product was developed, and in one company, a rapid product development process was undertaken

Product development efforts were most often product improvements or line extensions.

Types of product development in forest products companies

Development type	Supporting quotations
Product improvement	<p>“The first hot tub, the original one was crude in comparison. A lot of different parts of it have been refined.”</p> <p>“Every client comes in and they’ve got their own needs, wants, and desires for the look of their building...we do two sizes of trusses for the garages and the cabins. We have an engineered stamp. If you have every size, you can’t do that...we can keep a standardized look design with a couple odds and ends changed ...the basic design, that’s where we can produce it at a really fair rate.”</p> <p>“Part of it is just better equipment in the shop and...making them dependable enough...So I had to make the fit up that much more accurate and just accuracy mainly on the whole thing.”</p>
Line extension	<p>“We ended up with a third product. Most people would call it a second, sort of a throw away [product]. But out of that we developed our bird feeder...and I would venture to say this is probably the only place where you’ll find that type of bird feeder. We used to sell them for \$12 or \$15 apiece and just happy to get that.</p>

But by going back and putting a little bit more work into the [product], putting a brand on it and getting it to where it really looked better and was shaped better, we were able to generate three different sizes.”

“I was trying to create different price points and more products out of the same parts...there are about 10 different lengths that we cut, and I bet I’ve got 80 different products.”

“You have to have a line. You have to have enough to show them. If you show them 12 items then they’ll be excited and they will pick out the 3 they like best. If you show them two items, they’ll say, ‘Well that’s nice’ and walk off.”

New product development “Another product I want to expand into is predrilled kits where they can use that electric, cordless screw-driver, like a flashlight. Real easy to hold, two hands, push the button, the screw goes in. And this 3-year old girl says, ‘I can build a bird feeder.’...They’ll have a totally different attitude the rest of their life. It’s true. So those are the things that we can make money at doing.”

Rapid product development So a week before the show we designed the [product]...we did all of those in like the week before the show. It’s like quick samples, quick get them in the box, and quick get it to the show. It was great. We got a tremendous response.”

Overall Innovation Process

Two interviewees summarized their innovation process in a paragraph or less. They provide good examples of the innovation process in forest products companies. The first is an example of a product development process.

We boil it down to a five-step process and it happens both at a retail level and it happens on a national level...the first step is, you have to genuinely greet someone. You have to be able to greet the customer at whatever level. The second step is the one that is most lacking in industry...you have to have something in common with that person...maybe you went to the same college,

maybe you're both Scandinavian, maybe you're both football players, maybe you both like kayaking, but that's a required step in the innovation process. You have to have something in common with that person. And the reason is... if you don't have anything in common with that person, then the customer or the end-user won't let you go to the next [third] step, which is asking questions to find out, to understand the need. The fourth level is addressing that need. Of course the fifth is the application of it.

The second is an example of a process development process.

There seems to be a certain series of steps that everything goes through. There's the concept phase...how [will] it remove material? How is it going to shape the basic handle? What is it going to do...then there's a design phase. Actually how do you build [it]...how do you put the steel and components and that kind of stuff together to do that, the concept. And then there's the fabrication of the machine to put that design together, to put it into real time. Then we test it. We're starting to debug it, and this machine will have a lot of debugging to do. Then there's basically production testing and production. Maintenance...we hardly ever design our machines with maintenance in mind...After maintenance comes the end of the life cycle on that machine. So phase it out and get something else.

Oregon companies tended to define innovation in terms of the process whereas Alaska producers were more focused on the product.

Comparing Alaska and Oregon Companies

Definition of Innovation

In general, companies in Alaska and Oregon have similar ways of defining an innovative forest products company. However, there were two subtle differences. First, Oregon companies tended to define innovation in terms of the process whereas Alaska producers were more focused on the product. Secondly, several Oregon companies felt that unique business arrangements and structures could be termed innovative in the forest products industry. Furthermore, two Oregon producers identified cost-efficiency as an innovative characteristic. Neither of these characteristics was used by Alaska companies to define an innovative forest products company.

Product Focus (Concept 1)

There does not appear to be any distinct difference in whether Alaska or Oregon companies focus on commodity or specialized products. Both regions seem to have a mix of commodity and specialized products in their product lines.

Customers are important to the innovation process.

Competitive Advantage (Concept 2)

Alaska companies cited flexibility, local resources and workmanship, and efficient material utilization as key competitive advantages, whereas Oregon companies mentioned shorter supply chains, reduced costs, and unique approaches to marketing. Both regions make use of technology, focusing on customers, quality, and outsourcing of activities to gain a competitive advantage.

Customer Focus (Concept 3)

Customers are important to the innovation process. However, Alaska was different in that companies used customer suggestions for design improvements and to personalize the product. In addition, Alaska companies focused on customers in hopes of yielding repeat purchases. On the other hand, Oregon companies more often used customer feedback to improve existing products. In addition, Oregon companies were more likely to get new product ideas from customers.

Management (Concept 4)

As mentioned previously, most of the companies interviewed did not have any formal management structures in place. However, Oregon was more likely to have a more organized system in place. This is probably due to company size rather than regional differences; the companies interviewed in Oregon were slightly larger than those in Alaska. Several companies in Oregon and the largest company interviewed in Alaska had experimented with different management structures and delegating greater responsibility farther down in the organization. Overall, the smaller companies (1 or 2 employees) in Alaska and Oregon were managed similarly, whereas the somewhat larger companies (5 to 50 employees) were managed differently from the small, although similarly across regions.

Organization (Concept 5)

Of those companies interviewed, there did not appear to be significant differences in the organizational cultures of Alaska and Oregon companies.

Planning and Information Systems (Concept 6)

As mentioned earlier, this concept was eliminated once the research began because it was irrelevant for the companies interviewed.

Marketing Communications (Concept 7)

The pricing of new and existing products posed significant challenges in both regions although Alaska companies struggled with it a bit more. This probably is due to the remoteness and lack of resources available to most Alaska companies. For example, it would be difficult for an Alaska company to obtain a competitor's price list when there may not be another producer in Alaska. If that were the case, it would be impossible for that company to pair its pricing with a company in the Lower 48 States because the cost structure is drastically different (e.g., shipping, labor, and materials).

Although the companies interviewed in both regions used a variety of marketing tactics, the Alaska producers use displays, phone books, newspaper ads, and shows more often than Oregon producers. Most companies interviewed claimed that word-of-mouth advertising is one of the more important means of obtaining new customers. Furthermore, there are companies in both regions that use a mix of segmenting and differentiation marketing tactics.

Market Information (Concept 8)

Although market research activities are limited in both regions, some companies choose to conduct more informal types of market research. Alaska companies that attempt to informally gather information more commonly used the Internet, employees, field visits with other manufacturers, magazines, books, and conferences. On the other hand, one Oregon company focused on formal customer surveys, and several others outsourced market research activities to partner companies, suppliers, or customers. Companies in both Alaska and Oregon relied on conversations with fellow manufacturers (networking) as an informal means of obtaining market information.

Product Planning (Concept 9)

The factors that drive innovation differ from region to region. In terms of external forces, Alaska is more driven by environmental pressures and government regulations whereas Oregon companies are more influenced by customer pressures and competitive forces. In terms of internal drivers, both receive pressure from employees, but only Oregon companies indicated that internal company needs drive innovation. In general, among the companies interviewed, the innovative pressure is more external in Alaska and more internal in Oregon.

There are no recognizable differences in the resources that were used to plan innovative projects. Both regions seemed to draw the most benefit from networking with other forest products companies.

There are differences in the paths that the interviewed companies take through the innovation process. In particular, the screening stage seems to be implemented more often by the Oregon companies. In addition, the Alaska companies were more likely to make samples and prototypes of innovative products. This is probably because most innovative activities in the Alaska companies were focused on products. Oftentimes it is not feasible to make samples of the process type innovations that were more common in the Oregon companies. Although the interviewed companies in both regions use customer feedback and attempt to include customers in the innovation process, this occurred more often in the Oregon companies. Again, this likely is due to the remoteness of many companies in Alaska. Of those interviewed, Alaska employees were more involved in their companies. This is probably because of the smaller size and the more family-oriented work environment of the Alaska companies interviewed. Oregon companies were more concerned about plant layout and material flow considerations than were the Alaska companies. This is expected as the innovative activities in Oregon are more process oriented.

Of the types of innovations that companies undertook, Alaska companies tended to focus more on product improvements whereas Oregon companies concentrated efforts on product line extensions or new product development.

Constraints on Innovation

A wide variety of internal and external factors constrain forest products companies from pursuing innovative activities. The most commonly cited problems are listed below.

Constraints on innovative activities for forest products companies

Constraint	Supporting quotations
Government regulations	<p>“The Undersecretary of Agriculture just arbitrarily cut 100 million board feet per year off the allowable cut with a stroke of a pen, no due process, nothing. He just chopped it...he said the market demand wasn’t there...he just assumed...so after \$13 million and 8 to 10 years of due process, he just [cut it with] a stroke of the pen.”</p> <p>“Probably the biggest constraint to us right now, the growing of our business substantially, is the Canadian tariffs and antidumping they just imposed. A significant issue for [us]...we could have easily added</p>

another \$20 million to our business without it. But with it, it all but eliminated some options we had for growing our business.”

Shipping and labor
(mostly in the Alaska
companies)

“Shipping and labor, I would say. That I-5 corridor, its pretty tough to compete. Those guys down there with lower wages and they ship out by truck...we ship by bargeload or shipload.”

“It’s one of the more critical parts of this business, skilled personnel. We’ve hired a lot of people here that talk a big story and they come in here and they don’t know as much as they claim to know.”

“I went through 50 people last year...keeping them is tough...the government jobs pay \$38.00 per hour for a carpenter. I can’t compete with \$38.00 per hour...why are they paying so much? Why are they screwing up the market? I don’t understand it.”

Machinery

“There is lots of machinery that we could use to upgrade. Our drill press is pretty ancient. We need an adjustable table on our drill press...we spend a lot of extra time horsing around...we don’t even have a line-boring machine. We should have a line-boring machine. I mean that’s the machine that we need to have. It’s not like we can pay a lot of money for them or anything. It would help us be more efficient. It would save a little bit of wear and tear manually on tools and the person doing the job.”

“It seems like we never have enough machinery, or enough guys, or enough good weather to get all the logs we need.”

Raw materials
(mostly in the
Alaska companies)

“The Alaskan birch we have here is paper birch, it’s terrible stuff...there’s at least 50 percent waste right off the get go...I would be willing to pay more money for the material if the material was worthy of that. Instead of having this broad range, every time you got an order

you would get an order of clear, straight-grained material...because we spend a lot of time sorting through that; we sort through those materials.”

“[Consumers in the Lower 48 States] want the clear, white wood. Eight percent of what you do is all you’re going to get of clear, white wood. That’s on a good day. So you’re going to have to cut how many millions of feet to get one million feet of clear, white wood. It’s just stupid to even think that way.”

Drying capacity
(mostly in the
Alaska companies)

“We have a furnace room that we put stuff in and stack it up in there but it’s not very big. The furnace is going, in the wintertime it’s going pretty much all the time...It’s not efficient...If we got any busier quite often we have to schedule things further down the road just to wait for materials to dry. So drying of materials is a biggie.”

“I haven’t been able to keep up with the demand on some things. The kiln doesn’t hold enough volume. I’m at a point where I’m maxed out here as far as how much wood I can get through here.”

Supply

“I’ve never gone out there and tried to [aggressively] sell myself because I was always worried about the supply...The worst thing you can do is promise somebody something and then not deliver it. That’s terrible. You’ve not only shot yourself in the foot with that person, but you’ve shot yourself in the foot with every person that that person knows.”

“There’s the supply problem of...the environmental groups constantly [taking] away the supply...whether there is going to be logs or not. That creates uncertainty among someone who is going to go ahead and try to do the logging end of it....If I can have that supply there where I didn’t have to worry about it...I could focus my time and energy into the business aspect of it, instead of the political aspect.”

	<p>“One of the constraints would be wood fiber...just being able to get enough domestic wood for the process and stay competitive.”</p>
Cash flow	<p>“Being undercapitalized is a problem for most small businesses. The bank is not going to lend you a bunch of money because you don’t have anything.”</p> <p>“Cash...cash and also manpower. But manpower is tied to cash. If you had the cash you could hire the qualified people that you need.”</p> <p>“There started to become a market. It was more [a matter of] no money in it. We had to come up with money to cut it. We had to come up with the money to dry it. We had to sit on it until it sold...If you sit on it too long it cracks and splits.”</p>
Market	<p>“What’s our biggest stumbling block? I always say market because they’ll say, ‘Is it supply?’ ‘Is it financial?’ It’s not...because if the market is there, the rest just falls into place.”</p> <p>“One of the challenges we’re faced with is the by-product. Right now we’re faced with chips, getting rid of our chips.”</p>

Limitations

This research was conducted with a small sample of forest products companies in Alaska and Oregon. The sample was not randomly chosen; therefore no inferences can be drawn for the larger population of forest products companies in either state or on a nationwide basis. The results presented in this paper are limited to those companies interviewed and represent their opinions and ideas about the topics explored.

Conclusion

Because there is a lack of innovation research in the forest products industry, this study attempted to fill that void by examining innovation through various concepts. Interviews with innovative forest products companies in Alaska and Oregon revealed several aspects of innovation in the forest products industry.

Product focus—These results can be summarized into two groups: product innovation and production innovation. Many companies stated that their innovative advantage lies in the production process rather than the product itself.

Competitive advantage—Innovative companies draw on a variety of competitive advantages in order to survive in the forest products industry. These include flexibility, adding value to the product, material characteristics, and environmental sensitivity.

Customer focus—Customer focus was found to be a major source of innovation. Companies found that customer focus leads to improved products, repeat purchases, and new product ideas.

Management—Innovative companies differ in the type of management structure they implement. The most effective structure seems to be one that has clear leadership and allows ideas to be transferred through two-way communication.

Organization—In small companies, organization culture tends to mirror the proprietor, whereas in larger companies culture is influenced by a variety of working environments.

Planning and information systems—Respondents had very little experience with planning and information systems.

Marketing communications—The major marketing tools used by respondents were product displays, print ads, word of mouth, tradeshow, and the Internet. Many companies stated that word of mouth was the most important venue for finding new customers.

Market information—A majority of these innovative companies did not engage in formal market research because of the lack of time and money. Rather they relied on informal methods such as field visits, books, magazines, and conferences.

Product planning—The results showed that innovation sometimes is the result of planning and execution. However, often innovation is a natural progression influenced by gut feelings, being at the right place at the right time, accidents, and luck.

The innovation process is a combination of semiformal development stages, trial and error, intuition, and luck. A variety of factors constrain companies from being more innovative including government regulations, shipping and labor costs, lack of cash flow, raw material characteristics, marketing expertise, and supply.

Offering producers the chance to exchange ideas and network is the most valuable resource available.

The innovation environments in Alaska and Oregon are somewhat similar, yet different in the marketing tactics employed and the techniques used to obtain market information. Furthermore, the type of development projects that each region focuses on differs, as does the actual process used to develop innovative projects.

Future research should focus on completing a quantitative component to this study, developing short courses or 1-day seminars, identifying factors that contribute to innovation success and failure, investigating why the forest products industry is not innovative by nature, and exploring the external acquisition of innovation.

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Appendix: Previous Research

Studies that examine innovation in the forest products industry are few and far between. However, there have been several noteworthy studies over the last 15 years. Calantone et al. (1995) completed one of the few product development studies in the forest products industry.

These researchers attempted to find a link between performance of certain innovative activities and business performance in the furniture industry. They evaluated eight product development activities (discussed in 2.1.1.) for their effect on six business performance measures:

- Return on investment (ROI)
- ROI growth
- Return on sales (ROS)
- ROS growth
- Market share
- Market share growth

Their results show that:

- Top-performing companies place a greater emphasis on innovative activities than do other companies.
- Innovative activities have a strong positive influence on ROI and ROI growth.
- Most innovative activities are related to increases in all performance measures.
- Overall company performance is linked to excellence in innovative activities.

Other research in the furniture industry was recently completed by Bumgardner, et al. (2000) in their investigation of product development and marketing issues surrounding character-marked furniture. Through the use of interview-based case studies, they examined the influence of designers, retailers, and product design on the successful development and marketing of character-marked furniture. They found that retailers are persuaded to buy from manufacturers with a reputation for “design proactiveness.”

In another study involving the furniture industry, determinant attribute analysis was used to determine which physical characteristics of furniture are most important in a consumer’s purchase decision (Trinka et al. 1992). These results were in turn used to develop products that fit the needs of consumers, thereby creating a competitive advantage in the marketplace.

More recently, Cohen was involved in a study of technology in sawmills (Lee et al. 1999). This study focused on the interrelationships among innovation, quality

control, and markets. They found that markets have a dramatic influence on innovation because they dictate a manufacturer’s ability to survive and sell products.

Finally, Nystrom (1985) completed case histories of 14 new products developed by 4 pulp and paper companies in the 1970s. In his research, Nystrom distinguishes between what he terms an “open strategy” and a “closed strategy” to both the technology and the marketing environments. These differences are shown in table 4. In his research of several industries over a 10-year period, Nystrom found that companies that pursue a more open strategy, both in technology and marketing environments, are more likely to be successful in product development.

Table 4—Open strategy vs. closed strategy

	Open strategy: creative potential for changing, uncertain environments	Closed strategy: focus for efficiency in stable environments
Technology orientation	External to firm	Internal in firm
Technology use	Interdisciplinary	Intradisciplinary
Product line focus	Diversification	Modification
Customer focus	New	Existing
Product design	General needs	Specific needs
Process design	General production	Specific production

The Forest Products Industry in Alaska and Oregon

Size

Parrent (2000) listed over 160 Alaska companies in the secondary forest products sector, most of them small operations (usually fewer than 5 employees). Companies listed in this directory focus on a variety of products including house logs, prefabricated buildings, furniture, certified “Made in Alaska” products, artwork, carvings, bowls and utensils, musical instruments, molding, cabinets, craft products, and other specialty items. These smaller secondary companies also abound in Oregon.

As of June 2000, approximately 130 companies were listed as primary producers in Alaska (Parrent 2000). These companies mainly concentrate on manufacturing lumber, cants, railroad ties, siding, decking, shingles, and timbers. However, the average Alaska sawmill operates one shift a day, 150 days a year, and has only seven employees (Laufenberg and Brady 2000). This is in stark contrast to the larger producers in Oregon and Washington who operate 24 hours a day, 365 days a year, and with thousands of employees.

As a result, the majority of research to date is focused on the secondary sector of the industry. It would be too difficult to compare the primary industry across regions because of the large fundamental differences.

Market Access and Competition

Because Alaska markets are small and the cost of transportation within Alaska is extremely high, most of Alaska's wood products are exported to the Lower 48 States or to overseas markets, especially to Japan (Wurtz and Gasbarro 1996). However, access to markets in the Lower 48 States is difficult for Alaska because of the remoteness of most producers and the constraints of shipping products on barges. In contrast, Oregon producers have access to trucking and rail corridors and therefore much greater market access within the United States.

The domestic market within Alaska is relatively small and insufficient to solely support the industry. However, a local forest products market exists in Oregon and the surrounding Pacific Northwest (PNW) region.

Recently, Alaska forest products producers have received more competition from European (primarily Scandinavian), Canadian, and Pacific Northwest companies (Brooks and Haynes 1997). The Oregon industry has received more competition from Scandinavia, Canada, New Zealand, and South America.

Supply

The Alaska industry is also complicated by a decreasing supply of commercial timberlands. As of 1994, 1.7 million acres of commercial forest land existed in the Tongass National Forest of southeast Alaska, the largest timber base in the state. This acreage had decreased from 6.4 million owing to the reclassification of lands and transfers to private, Native corporations (Wurtz and Gasbarro 1996).

This decreased timber supply has placed constraints on forest products companies and will force the industry to consolidate and use a shrinking resource in a more efficient manner. In a study completed by Rule and O'Laughlin (1990), one panelist reported that "Alaska's timber industry needs innovative planning, management, and investment to properly utilize the resource."

The supply of timberlands in Oregon, at least on public lands, has been similarly scarce throughout the last decade. However, the larger Oregon primary producers have been able to stay afloat through their private timber holdings. Alaska producers, those in southeastern Alaska in particular, do not have this luxury as nearly all the harvestable timberland is in government hands.

Costs

A recent report produced by the Center for Industrial Trade and Forest Products Marketing at University of Washington compares the primary producers in the PNW (Oregon, Washington, and British Columbia) to those in Alaska (Braden et al. 2000). From table 5, it is apparent that Alaska producers will have difficulty competing in the primary wood processing industry when shipping to the Lower 48 States.

These higher production and shipping costs along with size, market, competition, and supply factors are all unfavorable for the primary forest products industry in Alaska. In fact, lumber shipments from Alaska to Japan decreased by nearly 90 percent from 1990 to 1996 (Brooks and Haynes 1997). This also is due, in part, to newer products (i.e., laminated veneer lumber and other engineered wood products) that have received increased acceptance in Japanese markets and have contributed to the decline of Alaska lumber producers' competitive position in international markets. Consequently, more emphasis is now being placed on developing Alaska's secondary forest products industry.

Table 5—Producers in PNW (Oregon, Washington, and British Columbia) compared to producers in Alaska

	Alaska	PNW
Percentage of manufacturing costs in the cost of lumber	50%	21%-27%
Labor costs	65% higher than the PNW	
Number of employees in an average sawmill	Half employ fewer than four people	Usually 100 or more
Harvesting costs	High due to high labor, fuel, and transportation costs, as well as minimal road infrastructure	
Processing technology	Low	High
Manufacturing costs	High due to smaller economies of scale	Lower due to gains in efficiency, processing technology, and infrastructure improvements
Competitive advantage	High-quality wood	Efficiencies in harvesting and manufacturing
Transportation	Shipped by barge to Lower 48 States	Shipped by truck and rail throughout the United States
Energy costs in 1995	9.8 cents per kilowatt hour	3.25 cents per kilowatt hour; more cogeneration plants
Domestic market	Very small	Large
Cost to produce 1,000 board feet of lumber in 1995	\$370	\$170

Source: Braden et al. 2000.

Pacific Northwest Research Station

Web site	http://www.fs.fed.us/pnw
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Publication requests	(503) 808-2138
FAX	(503) 808-2130
E-mail	pnw_pnwpubs@fs.fed.us
Mailing address	Publications Distribution Pacific Northwest Research Station P.O. Box 3890 Portland, OR 97208-3890

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