In the twentieth century, the forest products industry evolved through three distinct focal orientations: a forestry orientation, a production orientation, and a marketing orientation. In each case, research and technology (R&T) was applied as a means of either solving the limitations associated with each orientation or shifting the industry orientation to the next focal point. In the beginning of the twenty-first century, R&T is required to facilitate a new shift for the wood products sector from a marketing orientation to a knowledge orientation. This requires an expansion of traditional research and technology to incorporate a market-based social sciences approach, along with the traditional physical and engineering sciences, as more than just an afterthought. In order to ensure future successes, innovative technological solutions must be applied to emerging market-based knowledge clusters such as connectivity, supply chain management, eBusiness, mass customization, and knowledge-based products. These are all practical manifestations of the new knowledge orientation. Each will require innovative R&T solutions to recreate successful wood products companies operating in the new millennium.

Key words: marketing, research, technology, innovation, knowledge

What is Marketing?

A discussion of the role of research and technology in the field of forest products marketing (or vice verse) should begin with a definition of marketing itself, perhaps one of the most misused words in business. Too often in the case of the forest industry, marketing is equated with sales. In fact, marketing encompasses many business activities from pricing to product development to advertising to sales to logistics to service. But to define marketing in these sorts of terms is a bit like saying that hockey is a game played with ice and skates and sticks and a puck—it does little to capture the subtle nuances of the game, not to mention its purpose.

So, what is marketing? Simply put, marketing is a management philosophy—the integration of many business activities into a dynamic and holistic system that expands business philosophies to inexorably link customers with the firm. On the one hand, the firm must provide goods and services to its customers in a manner that is profitable to the firm and satisfactory to the customer (the marketing mix). On the other hand, the firm must retrieve information from its customers that would allow it to remain competitive, prosper and continue to provide suitable goods and services (marketing research). Marketing puts the customer at the forefront of a firm’s mission, strategy, and operations.

Orientations of Forest Industry

Compared to other sectors, the forest products industry has been late in adopting a marketing philosophy. The industry itself has evolved through three distinct stages: a forestry orientation, a production orientation and a marketing orientation (Fig. 1). In the first half of the 20th century, the ability of forestry companies to produce wood products was limited only by the rate at which they could extract natural resources. This “forestry orientation” meant that companies could make and sell whatever they could harvest. Research and technology was focused on how to improve the extraction of trees from the forest, as exemplified by the development of growth and yield models,
chain saws, steam donkeys, tracked skidding machines, and road construction equipment.

By the 1960s and 1970s, technology enabled the removal of increasing amounts of logs and the industry shifted into a production focus to process readily available logs into lumber, panels and pulp for paper. This “production orientation” applied both informational and operational technology to improve productivity and reduce costs across all aspects of manufacturing. Firms produced what they were most efficient at manufacturing, thereby narrowing their product ranges and increasing production efficiencies. Logs were readily available and markets were able to absorb nearly everything that was produced. The focus of R&D was on technological advancements to maximize production: automated processing, process control, optimization, thin kerf sawing, the economic use of by-products, etc.

The wood products sector again changed its focus in the latter part of the twentieth century, driven largely by economic downturns, the globalization of the industry, changing consumer demographics and an increased environmental awareness among customers. With a well-entrenched fibre supply and well-established production efficiencies, markets would no longer absorb all that could be produced and the forest industry found itself exploring and articulating the concept of marketing as a means of expansion. This “marketing orientation,” which was embraced earlier by other, less commodity-oriented industries, meant that companies could no longer produce what they saw fit. Firms had to interact with their customers in order to remain competitive and prosper and many changed their corporate philosophies by adopting a customer focus. This marketing orientation meant that they began to produce only what they could sell. Technology such as bar coding, logistical tracking, market research and customer segmentation enabled producers to specialize by serving specific market segments such as the North American remodelling sector and Japanese wood house builders.

An awareness of this evolution helps us understand relationships between technology and other drivers in the development and deployment of corporate strategies as well as the research and technology requirements of the forest sector. The evolution from the forestry orientation to the production orientation, for example, was driven by and resulted in technological advancements in mass production. These technological successes led to a shift from producing a scarce good to a balanced supply and demand to an oversupply of goods on a global scale.

The evolution to a marketing orientation was also driven by and resulted in a different sort of technology focus. Here, efforts were concentrated on developing products and processes that would allow companies to out-do their competition by better meeting the needs of their customers in the increasingly unforgiving global economy.

Data, Information and Knowledge

Now, twenty years after the forest products industry had shifted to a marketing orientation, we find ourselves entering a new and perhaps even more challenging era. This new economy is characterized largely by the overwhelming, ubiquitous and easily accessible information that currently exists in the world (i.e., the Internet, intranets, popular media, research organizations, wireless communications, etc.). Companies must now adopt what we shall dub a “knowledge orientation” in order to thrive and prosper. In this context, knowledge refers to more than just information. It represents a new way of thinking, which by no means signifies the death of marketing. Rather, it refers to being able to select what information to use, when and how to use it, and by whom. This new orientation reflects a general societal shift away from the current information overload to a new appreciation of knowledge.

The evolution of orientations has mirrored the twentieth century evolution in the importance of what we know and how we apply this knowledge. In the beginning stages of the modern forest products industry, the acquisition of data was critical to the successful operation of businesses. For example, R&D used to focus on uncovering the inherent characteristics of different wood species. As technology advanced, data lost its value. Improved communications technology, including database management on mainframe computers, telephone and fax communications, and low cost printing and copying, made an abundance of data readily available. This focus on analyzing and better understanding data led to the creation of information-based products and processes. Information on the inherent characteristics of different wood species resulted in our ability to exploit these species in a more efficient manner (e.g., engineered wood products).

Today, technology has contributed to information overload: seemingly endless information from the 7/24 Internet, communications and media blitz is all around us. We are entering an era where information is fast becoming just another commodity and the innovative and imaginative creation of knowledge based on careful and thoughtful analyses of this abun-
dance of information is becoming the value-added activity. The wood sector, along with society at large, is adopting a knowledge-based focus, which is concurrently being driven by and driving new research and technology. There exist many knowledge-based technology clusters that will continue to drive research and technology in new directions over the next few decades. Some of these clusters are discussed below with respect to the forest product industry.

**Market-Based Knowledge Clusters**

A key area for increased research and technology applications is in connectivity—connecting all points in the value chain to enable effective and coordinated management from standing timber to the end user often located in a targeted market niche. Significant interdisciplinary research is required to ensure that there is a marriage of forestry, production and marketing orientations. This means creating true supply chain management without having a single orientation driving its values and objectives throughout the management chain. Markets and customers are integral to this activity, continually providing checks and balances to ensure that improved operations result only in products that will be valued by end users. Recognition of the interconnectivity of each of the actors between the two anchors of the supply chain, the forest and the end user, is critical. This is much easier to discuss than it is to accomplish. Commonly accepted languages (scientific, technical, electronic and human), mutual respect, truly interdisciplinary (rather than multidisciplinary) research and recognition of team contributions are relatively new and often unrecognized values, not only for business operations, but also for the scientific community. The problem is further exacerbated by the fact that the decision to plant a tree and the decision to use it are separated by a lengthy time frame, especially relative to other consumer goods.

Research and technology to connect the complete supply chain requires linkages not only between diverse disciplines within the research community, but also between the research community and the operational wood products sector. This will become increasingly important since the practical application of new connectivity solutions, and not theory development, will be the measuring rod for successful work in supply chain management.

One very timely issue related to connectivity and supply chain management is electronic business (eBusiness) and the world of content, communication and commerce possibilities that it can provide. While still early, some analysts believe that eBusiness is the panacea to all of the woes in the wood industry, while others simply dismiss it as a fad. In all likelihood, the truth lies somewhere in between. On their own, eBusiness solutions will not make the problems of the forest industry go away. That said, successful firms will be those that develop and deploy thoughtful, prudent and functional eBusiness strategies that address the needs of, and provide solutions for, all of the actors along the supply chain. Knowledge must drive the appropriate implementation of eBusiness strategies to provide solutions that go beyond the increased efficiencies that are already occurring. It is still unclear what the full range of eBusiness-based solutions will embody, but research and technology must be innovative and provide direction to uncover the full range of possible applications.

Today’s new knowledge-based orientation is conducive to the application of mass customization for all types of wood products. Mass customization is more than just a theory. Advances in computer technology and processing have led to it being operationalized in the production of specialty wood products like windows, doors, and stairways. Soon, mass customization will be a reality in construction, the major market for solid and engineered wood products. The demand for flexible housing design, healthful living, green architecture and improved quality consistency have all led to new pressures being placed on the market for residential housing. These forces are driving the industry towards applying mass customization in the form of factory-built housing components, modular housing, and flexible design. The successful implementation of these mass customization strategies will require research programs that marry wood engineering with architectural design, advanced wood processing, logistics and marketing to develop both theoretical and practical models. Here, the aim is simply to ensure that each individual house buyer receives a custom-designed home with all of the quality and cost savings inherent in mass-produced goods. It goes without saying that this presents a significant research and technology challenge. The truth of the matter is, though, that this objective that will be met by competing building materials (steel, concrete, plastics, etc.) if the wood sector does not act quickly to develop the required knowledge.

As mass customization becomes better established, it becomes increasingly important to identify the attributes that end users or customers require to be designed into their products. Customers are also reacting to information overload by becoming increasingly information-savvy and are demanding bundles of knowledge attributes with each product bought. This evolution towards knowledge-based products is occurring across all product segments and is having a major impact on customer choices. The popularity and importance of ethical investment funds, certified organic foods, global corporate image, green building products, after-sales service and engineered wood products are all examples of how products now incorporate knowledge—a non-physical, almost ephemeral, attribute that provides increased value for specific customer groups.

Market-based research and technology will need to identify the types of knowledge that must be bundled with physical products in order to meet the needs and wants of an evolving and increasingly complex buying public. Future research programs will need to identify customer segments based both on the physical products demanded as well as the knowledge that needs to be bundled with the physical products. In order to retain customers and grow markets, tracking studies conducted by the forest products industry will need to monitor both the physical and non-physical aspects of product demand. One recent example is the shift in the use of building mater-

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rials in Japan. While the demand for physical products has changed from green solid lumber posts to kiln-dried laminated posts, so too did the demand for knowledge. Now, customers require a 10-year structural performance guaranty rather than the traditionally used grade marks.

Concluding Remarks

We are entering a new orientation for forest products companies; one that requires an expansion of traditional research and technology to incorporate market-based social sciences with the traditional physical and engineering sciences. This new integration is necessary as the forest products sector evolves into what we have dubbed a “knowledge orientation.” Linkages down the value chain from the forest to the end user will require innovative technological solutions applied to market-based knowledge clusters such as connectivity, supply chain management, eBusiness, mass customization, and knowledge-based products. These are all practical manifestations of the new knowledge orientation that will both drive and be driven by successful wood products companies operating in the new millennium.

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