

SOURCES OF THE INDIANA HARDWOOD INDUSTRY'S COMPETITIVENESS

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Abstract.—The estimated 1,600 forest products-related firms in Indiana employ more than 56,000 workers. Hardwood manufacturers are the largest segment, adding approximately \$2 billion per year of raw product value. A recent report by BioCrossroads ranked the hardwood industry as the most important in the agricultural sector in Indiana. Like most of the other forest products manufacturers, the hardwood manufacturers have lost a sizable market share to imports and substitutes. To improve their performance in both the local and global markets, the Indiana hardwood manufacturers must have a clear understanding of how to assess their competitive position. This paper argues that to better understand the factors affecting competitiveness in this industry, research is needed that combines technology and economic analyses of competition. We review existing information on the performance of the Indiana hardwood industry and summarize current models regarding competitiveness and its sources. A review of the literature suggests that both internal and external market and government policy factors affect firm and industry competitiveness, yet these factors are rarely linked in a comprehensive analysis.

INTRODUCTION

Today's firms have realized the importance of involving all the stakeholders in making strategic decisions in order to compete both locally and globally. According to Porter (1980) the competitiveness of a firm is its ability to increase real income by utilizing its competencies to produce high quality goods and services that meet the test of world markets. These competencies include production technologies, supplier relationships, improved supply chain, improved quality control, employee expertise, and new product designing.

The introduction of free markets to accommodate some of the low-cost countries has changed how competition is viewed. Previously competition was viewed as stationary, and accomplishments or failures depended on production factors. Now competition is viewed as a dynamic process with many firms investing in new products, going to new markets, and adopting new technologies and management concepts.

The hardwood industry is no exception. According to a recent study by BioCrossroads (2005), the hardwood industry in Indiana was identified as the most important sector when it was benchmarked with other manufactured agricultural-based products in the State. According to the report, the hardwood industry represents a 31.4 percent employment share of the top nine sectors and 28.17 percent of the total growth. Despite this standing, the industry has lost approximately 17.3 percent of its jobs in the last 5 years. This study reviews existing information on the performance of the Indiana hardwood industry and summarizes current models regarding competitiveness and its sources.

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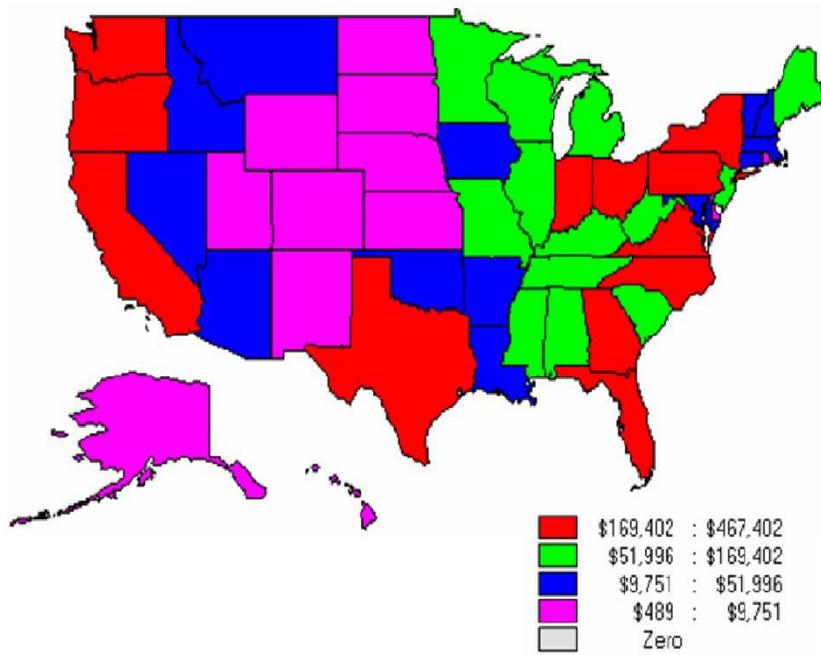


Figure 1.—The 2006 hardwood products exports to the world (by value and state; source: National Trade Data via web- <http://tse.export.gov>).

U.S. HARDWOOD INDUSTRY

The hardwood industry is composed of small, family-owned businesses. About 71 percent of hardwood growing stock on U.S. timberlands is owned by nonindustrial private landowners. Hardwood growth exceeded removal by 42 percent between 1996 and 2005 (U.S. Census Bureau 2005).

This industry plays a significant role in the U.S. economy. Estimates for U.S. hardwood lumber consumption in 2005 were more than 11 billion board feet (U.S. Census Bureau 2005). The major consumers of hardwood lumber are mostly value-added producers who manufacture such products as furniture, pallets, cabinets, millwork, and flooring.

Indiana was among the 12 leading exporters of hardwood products (Fig. 1), although in comparison of the total production volume of hardwood lumber per state Indiana was ranked 15th. We conclude that based on the production volume and export data Indiana's hardwood products must be either considered of better quality or have a certain competitive advantage. Most of the hardwood firms are located in the southern part of the state, close to the forest resource.

CONCEPT OF COMPETITIVENESS

Studies in competitiveness can be divided into descriptive and analytical approaches (Oral 1993). The descriptive approach provides a checklist of factors on general competition and strategic implications, while analytical approaches are based on models whose solutions provide insights for strategy formulation. Oral (1993) provides an example of an analytical approach study. He proposed a model to examine industrial competitiveness, and the phase-to-phase implementation in a large glass-making company. The competitiveness of the firm was expressed as a function of two major factors: industrial mastery and cost superiority. Industrial mastery indicated firms successes compared to competitors in terms of generating and operating capital and operational resources. Other studies where a model-based approach has been used are Sinha (1996) and Parkan (1994).

In the wood industry, model-based approaches have been used in several studies. Rich (1986) studied the competitive strategies of large wood-based firms. His sample included 42 of the largest U.S. corporations whose primary business was wood-based products. Corporations were classified by Porter's (1980) overall cost leadership, differentiation, or focus generic strategy types. Rather than infer overall corporate strategy from measurements of various strategic dimensions, Rich had respondents indicate directly which generic strategy type their company employed. Results showed that the majority of firms reported utilizing an overall cost leadership strategy. However, there was a trend toward the use of differentiation and focus strategies when compared with earlier results (Rich 1979). Another model-based study was by Cleaves and O'Laughlin (1986), who examined business-level strategy within a sample of 24 southern pine plywood producers. Fourteen variables were measured for each of the 24 companies, and a hierarchical clustering algorithm was used to define five strategic clusters.

Most wood industry studies based on descriptive approaches focused on structural characteristics such as the number of companies, output, productivity, raw material use, and market and market served (Bush and Sinclair 1989, Cardellichio and Binkley 1984, Spelter and Phelps 1984, and Wengert and Lamb 1980). Our study is intended to supplement these studies in addition to determining the hardwood industry's sources of competitiveness using a descriptive method.

SOURCES OF COMPETITIVE ADVANTAGE

A firm is said to have a competitive advantage if it has access to a resource or service that its competitors do not have. In a similar way the competitive advantage of an industry in a particular location is based on factors such as location advantage, resource proximity, and well established transportation network. These factors are made of various components which differentiate industries in one locality from the other. In this study five main factor components are analyzed in relation to the hardwood industry in Indiana: value creation, nature and scope of the market, internal sources of advantage, competitive strategy, and economics. A detailed analysis of each component is offered in Tables 1 through 5 in the Appendix.

Value Creation

The concept of value creation (chain) categorizes all the value-adding activities in a firm. The activities include inbound logistics, production, outbound logistics, marketing and sales, and services. For the hardwood industry the value chain will be composed of loggers (inbound), secondary manufactures, lumberyards, exports, construction (outbound) and marketing, sales and services (Fig. 2). In our study we will look only at the inbounds and outbounds. For firms to perform well, the inbounds and outbounds should be in balance, meaning that a manufacturer has to have a good control on both.

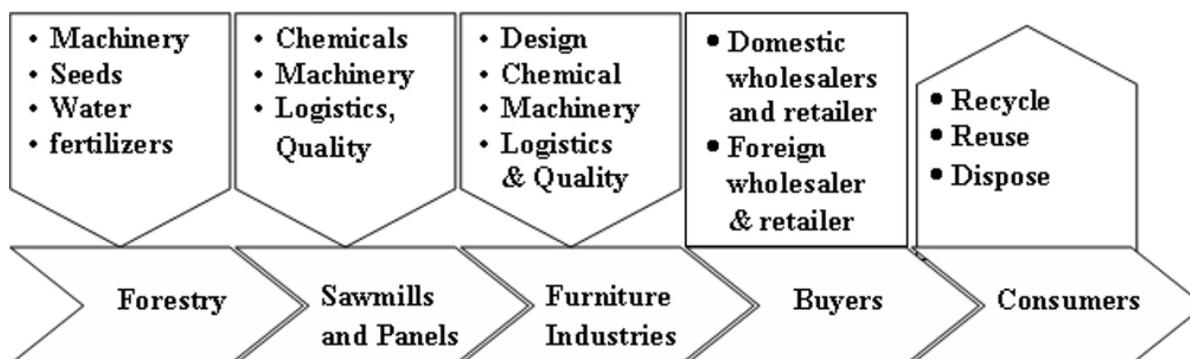


Figure 2.—Wood industry value chain.

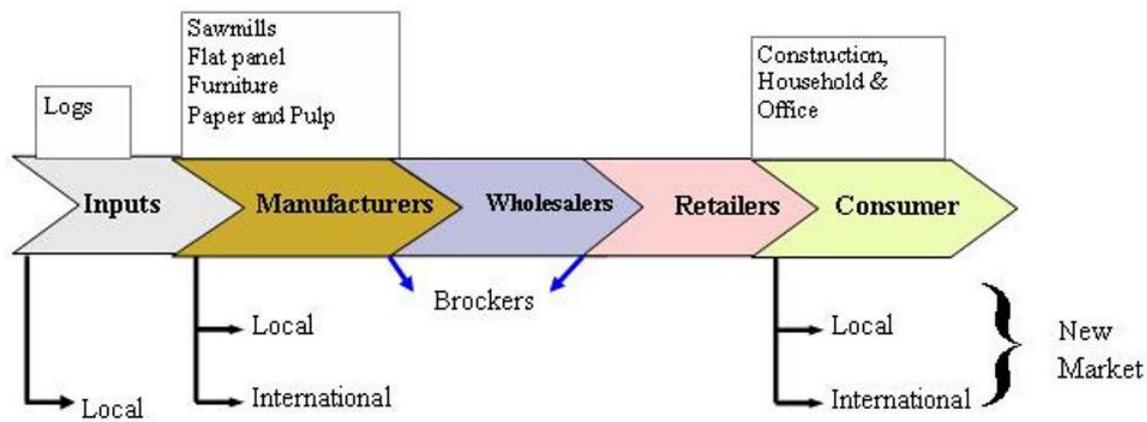


Figure 3.—New market.

For the hardwood industry the logs, which make up the highest percentage of the inbounds, usually vary in terms of price, species, source, and quality. Price is determined by the other three factors and market conditions. The type of species is also based on market demand and most manufacturers base their next production on historical data to determine which species is in demand. The logs can either be sourced from a government-managed forest or from individuals and families. Individuals and families usually have an incentive to manage for long-term sustainable benefits. Well managed forests usually imply increased quality and quantity, which lead to a competitive advantage. In Indiana about 85 percent hardwood forests are small and privately owned (Bratkovich and others 2003). The principal species found in these forests are walnut, oaks, hickories, ash, maples, and yellow-poplar.

Outbound includes furniture, pallets and boxes, building material, and exports. Outbound varies in terms of price, species, grade, and moisture content. Price is also determined by the other named factors. Competitive advantage can be gained through more efficient planning of the supply chain, better demand forecasting and improved control of the manufacturing processes. In Indiana, university and hardwood manufacturers collaborate to develop better manufacturing technologies that will lead to a competitive advantage. An example of this collaboration in an ongoing project involving log optimization through infrared scanning.

New markets are being developed along the value chain through the trade organizations (Fig. 3). These new markets will ensure that the hardwood manufacturers remain competitive.

Nature and Scope of Market

The nature and scope of the market are determined by looking at products, manufacturing, and distribution. In the case of the hardwood industry, lumber and other products can be differentiated through type of species, seasoning schedule, and type of sawing. What is demanded is usually determined by the market forces and trends. The sizes of lumber are standard, but firms gain competitive advantage through producing varying quantities of different sizes.

Manufacturing for most wood industries is internal and narrow lined, which means that there is limited flexibility in changing the structural layout of the manufacturing plant. But competitive advantage can be gained through technological advancement or adopting some of the successful production processes.

A good example is computer numerical controls, which when added to a manufacturing line and fully utilized to its full potential can lead to improved performance.

Distribution can be either single or multi-channeled. Based on our analysis hardwood industry firms usually have multiple distribution channels.

Internal Sources of Advantage

Indiana's hardwood industry has internal sources of competitive advantage through production technology, selling and marketing, resource leverage, networking, and supply chain management. A number of initiatives from the government, research institutions, and trade organizations are enhancing the industry's competitiveness.

CHALLENGES FACING THE HARDWOOD INDUSTRY IN INDIANA

Among the various challenges facing Indiana's hardwood industry are: labor, environment, international trade practices, quality inputs, transportation, and research and development.

The number of people working in the hardwood industry has been declining since 2001. This decrease can be attributed to the imports and substitutes that have driven the price of products down, thus affecting the economies of scale. The uncertainty in the job market in this sector has driven some of the experienced and best qualified workers to other industries with greater job security. The influx of imports and substitutes, coupled with the departure of experience employees, will reduce the firms' competitiveness.

Availability of quality input is another major concern to industry practitioners. Most of the hardwood forests in the State are individually owned, so it is very hard for manufacturers to determine with certainty the quality of logs they will get.

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APPENDIX: COMPONENTS ANALYSIS OF THE HARDWOOD INDUSTRY IN INDIANA

Table 1. Value creation (factors related to offering)

Factor	Primary wood industry
Organization	Business to Business
Sales point	Local Regional (Majority) National International
Customer in value chain	Down stream: loggers, machinery Up stream: builders, suppliers, value-adding manufacturers
Market	Broad
Business dealing	Transactional

Table 2.—Nature and scope of market

Offering	Primary wood industry
Products	Primary wood products from logs Standardized Sold by itself
Manufacturing	Internal Narrow lines
Distribution	Indirect multi-channeled

Table 3.—Internal source of advantage

Production technology
Selling and marketing
Resource leverage
Networking
Supply chain management

Table 4.—Competitive strategy factors

Factor	Primary wood industry
Image of operational	Consistent Dependability Speed
Product / service	Quality Features Availability
Cost versus efficiency	Efficiency

Table 5.—Economic factors

Factor	Primary wood industry
Pricing and revenue sources	Fixed mixed
Operating leverage	medium
Volumes	High
Margins	High Medium