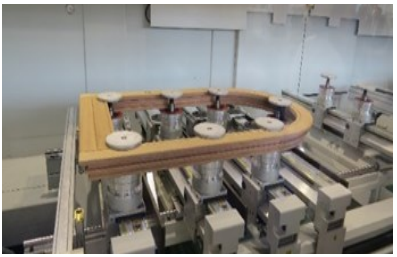
Business Management Practices

for Small to Medium Sized Forest Products Firms



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ANR-160P

Preface

One of the most exciting and frightening choices an individual can make is to start a small business. Yet this entrepreneurial spirit is the backbone of our economy and the free enterprise system that drives many individuals to great success. From Henry Ford to Frederick Weyerhaeuser, individuals with a good idea can help shape a nation. This book is written to provide the information you will need to start your small forest products company. However, business planning is not what you really want to do. If you are like most entrepreneurs, you have a product or service in mind and want to sell it without a lot of formal planning in mind. Yet, since the majority of small businesses fail within five years, the more you plan before you start the business, the greater the chances of success. Coming from a family that ran successful and not-so-successful small businesses, I am confident that if you apply the concepts in this book, you will have a better chance of capitalizing on your business idea and have a successful enterprise. This book is a "work plan" for you. If you answer the questions at the end of the chapters and develop the suggested business plan, you will have an idea of the work that is needed to be successful.

Robert Smith

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Introduction

There is no better determinant for long-term business success than following good business practices. However, many small to medium sized forest products companies do not start with adequate training in this area. The development of the business in many cases is based upon the owner's passion for working with wood. The running of a profitable company may not have been in the owner's initial plans. In other cases, the day-to-day pressures of running a business may not allow the owner time to develop sound business practices. The purpose of this book is to provide an easy-to-use guide for business management in the forest products industry.

The contents of this book are based on the authors' management experience in the forest products industry and as educators and researchers. The idea for this effort arose from our interactions with industry, in which many owners and managers identified education in business management and planning as a major need for companies.

This book is organized into eight chapters covering major topics in business management. Although the chapters follow the business planning process, they do not need to be read in sequence. Concepts and calculations are illustrated with examples from the forest products industry. Throughout the book, examples that illustrate the different topics are provided in boxes; links to relevant websites are also included. A list of questions is provided at the end of each chapter to help managers and entrepreneurs think about the critical aspects of business administration.

Chapter 1 provides a brief introduction to the U.S. forest products industry, including its importance and its major markets and products.

Chapter 2 briefly introduces business management and the business planning process. The remainder of the book is organized following the business planning process.

The long-term success of a business depends in great part on the owner's ability to formulate and execute strategy. **Chapter 3** introduces the most important components of strategic planning, from formulating the mission and vision of the enterprise to strategy implementation and evaluation.

People are the most important component of an organization and are critical for successful strategy implementation. **Chapter 4** discusses human resource management in detail, from recruitment and selection to compensation strategies.

Chapter 5 describes the process of marketing management, including the fundamental four P's (product, price, promotion, and placement), methods to conduct market research, and strategies for customization and niche marketing. Since the importance of social media and online advertising is growing for all industries, including wood products, this chapter also includes an introduction to online marketing strategies. Strategies to incorporate the environmental attributes of wood into the communications strategy of the firm are also discussed.

Forest products firms must compete not only against other firms in the same sector but also against cheaper imports and substitute materials; thus, streamlining operations and becoming more customer oriented is more important than ever. **Chapter 6** discusses operations management, including product development, manufacturing strategy, operations planning, inventory management, quality and process control, and maintenance. The chapter ends with a discussion of the recent trends in operations management, such as lean manufacturing and supply chain management.

Chapter 7 provides a detailed description of the financial management process, starting with financial planning. This chapter also provides a guide to financial statements and ratios, and how to use them to measure and improve business performance. Businesses have limited resources, and investment decisions must be made based on careful evaluation. Chapter 7 includes an explanation of the major capital expenditure evaluation methods used. Financing options for new ventures are also discussed.

Any new business venture or major project within an existing business should start with a written and detailed description of the business goals and the way the owner plans to accomplish those goals; such document is called a business plan. **Chapter 8** describes the process of preparing a business plan and lists useful resources to aid in the writing of such a document.

Finally, **Appendix A** includes links to organizations that the reader might find useful during business plan preparation or during the day-to-day running of the enterprise. **Appendix B** includes an example of a complete business plan for a forest products company.

Chapter 1: The U.S. Forest Products Industry

From the dawn of the civilization to modern times, wood has been used for countless applications, from energy to tools to shelter. In essence, forest products have been one of the keys to the success and development of humans. Historically, few industries have contributed more to the development of the U.S. than the forest products industry. Timber products were actually the first U.S. export when the Pilgrims sent the ship Fortune back to England in 1621 "laden with good clapboard as full as she could stow" [1]. Wood has played an immensely central role in all aspects of the U.S. economy, from transportation to construction, and energy to communications.

The United States has some of the most productive forests in the world. The country's forest products industry is also one of the most dynamic sectors of the economy. Although the U.S. has only 7.5 percent of the total global forest area, it produces 22 percent of all the industrial roundwood, and Americans use five times more timber per capita than the rest of the world [2]. And yet, the country's forested area has not changed in more than a hundred years — the result of sound forest management practices and a strong wood culture [3]. The forest products industry is among the top 10 employers in 47 states, generates 4.5 percent of the manufacturing output, and employs nearly 1 million people [4]. The industry is also the leader in renewable energy generation, producing more than a fifth of the renewable energy consumed in the country [5].

The U.S. forest products industry has been facing substantial challenges. Domestic wood products manufacturers have lost market share to low-cost producers overseas, with some sectors, such as household furniture and flooring, particularly affected [6, 7, 8]. Furthermore, the economic recession of 2008 and the decline in the housing market have negatively affected domestic demand, resulting in thousands of layoffs and plant closures [9, 10, 11]. Substitute materials such as steel, plastic, and concrete are taking market share away from wood-based products such as siding, framing, or decking. Also, the increase in electronic communications has impacted the paper industry [12], reducing the demand for fiber considerably. U.S. softwood and hardwood lumber shipments dropped by more than 40 percent between 2005 and 2009 [13, 14]. While markets have started to recover, job losses in the forest products sector are estimated to be in the hundreds of thousands [15], with small businesses and rural communities hit particularly hard [16, 17].

To evaluate the market(s) you are about to enter, it is important to have a good understanding of the existing industry. The forest products industry is as diverse as any on Earth. Products range from the paper we write on to the houses we live in. Products from the forest can be found in toothpaste to jelly, and from cancer drugs

to pizza crust. This chapter will introduce the most common markets in the forest products industry.

Products and Markets

The U.S. forest products industry has evolved into a complex network of suppliers, customers, materials, products, and relationships, as illustrated in the generalized supply chain mode shown in Figure 1.

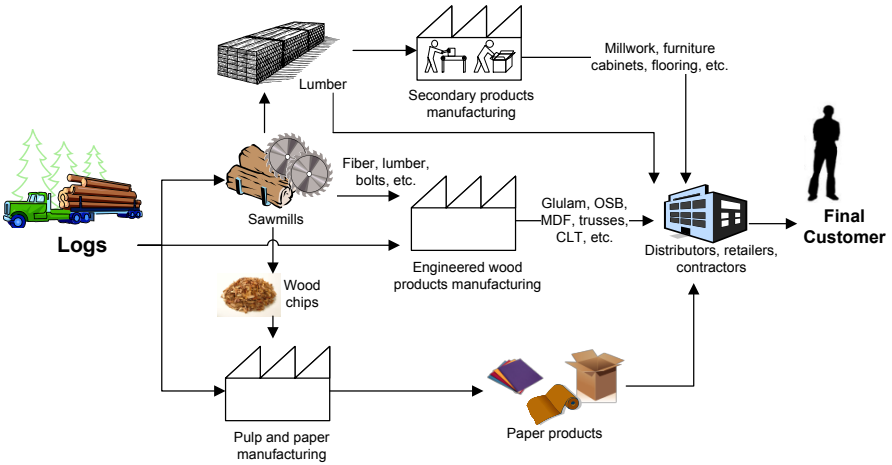


Figure 1. Generalized wood products supply chain.

Logs are harvested and merchandised to maximize their market value. According to their quality, logs can be designated for pulp and paper products, construction lumber, veneer or panel products, and lumber for further processing into value-added products. After conversion, wood products are sold to wholesalers, retailers, or contractors, who in turn sell them to the final customer. Different channels of distribution are used for each product category. For example, most household furniture is sold through independent retailers [18], while hardwood lumber is shipped directly to users or sold through distributors. Housing contractors can be supplied by wholesalers, retailers, or directly from manufacturers. Throughout the supply chain, wood residues are used as fuel or as raw material for engineered wood products, wood panels, landscaping products, or wood energy products.

Forest products can be classified broadly into primary products (those that are obtained directly from logs) and secondary products (those that are derived from primary products). In the remainder of this chapter we provide a brief description of the major product categories, based on the product tree in Figure 2. This is not intended as a comprehensive list (many products are not listed) but provides a good representation of the different market segments and products.

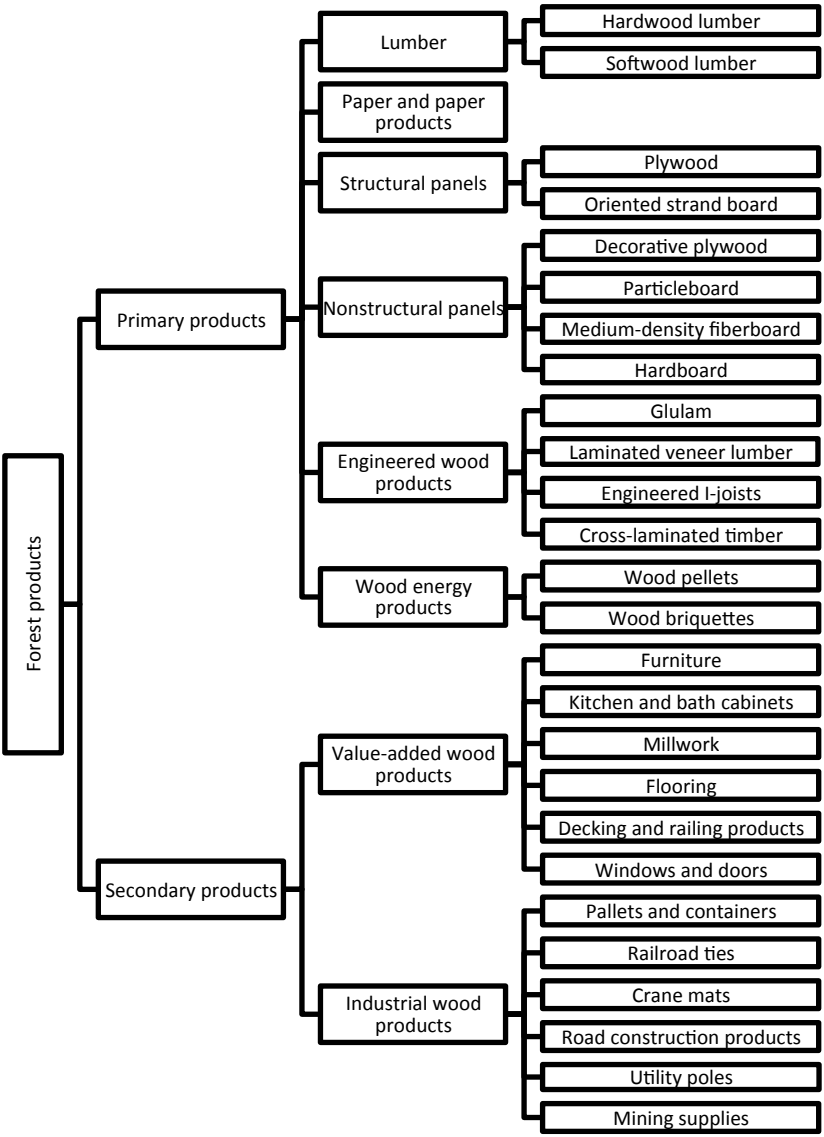


Figure 2. Major forest products classification.

Lumber

Lumber has been manufactured and used for many centuries; the basic principle in which logs are converted into lumber has not changed over the years. Before the use of steam and electric saws, early lumber manufacturing was carried out through "pit sawing," in which a two-person team, one on top of the log and the other below it in a pit, would hold a large saw (whipsaw) and alternate pulling the

saw through the log. This process required a lot of physical effort and time, and the volume of lumber produced was small: a two-person team could saw only about 200 board feet[1] of lumber per day [19]. Water-driven power sawing mechanized the process by means of a water wheel, greatly increasing production. Steam-powered band saws were introduced into the United States during the 1800s. The early 1900s brought material handling mechanization to the sawmill process and, during the late part of the century, scanning and process optimization technology greatly enhanced efficiency and accuracy. Today's modern systems enable an average U.S. hardwood sawmill to cut 7.6 million board feet per year [20], and a softwood sawmill over 50 million board feet per year [21]. In 2005, U.S. lumber production reached a record of 51 billion board feet, 78 percent of which was softwood lumber [22].

Although the transformation process from logs into lumber is fundamentally the same for both hardwood and softwood species, there are significant differences in the way they are graded, traded, and distributed. These differences arise from the different final uses for hardwood and softwood lumber, as explained in the following sections.

Hardwood Lumber

Hardwood lumber producers form a highly fragmented industry, with a large number of small companies, primarily concentrated in the eastern and central United States. Hardwood lumber is used for a variety of purposes, from furniture to flooring to pallets. It is usually cut to random widths and to uniform thickness, which usually ranges from 1 to 3 inches and is expressed in increments of quarters of an inch (4/4, 5/4, 6/4, 8/4, 10/4, and 12/4). Lengths range from 4 to 16 feet.

Figure 3. At the hardwood sawmill's "green chain," processed lumber is classified into grades and lengths, and sorted accordingly. Photo credit: Robert Smith.

[1] A board foot is the amount of wood in a board 12 inches wide, 12 inches long, and 1 inch thick.

Hardwood lumber is marketed using a quality classification system developed more than a century ago that is maintained by the National Hardwood Lumber Association (NHLA) [23]. Lumber comes from a living organism and thereby is susceptible to defects and imperfections; noticeable defects include knots, stain, cracks, rot, and wane. The NHLA lumber grading rules are based on the percentage of the total face-area of the board that is clear of any defects [24]. A sample of the NHLA grading standards is presented in Table 1; further explanation follows.

Table 1. NHLA grading rules for hardwood lumber [25].

Criteria	Lumber grades					
	FAS	**F1F**	**SEL**	**1Com**	**2ACom**	**3ACom**
Minimum board	6″×8′	6″×8′	4″×6′	3″×4′	3″×4′	3″×4′
Minimum size cuttings	4″×5′ 3″×7′	Better face must meet FAS requirements. Poor face must meet 1Com requirements		3″×3′ 4″×2′	3″×2′	3″×2′
% clear	SM×10 (83 ⅓%)			SM×8 (66 ⅔%)	SM×6 (50%)	SM×4 (33 ⅓%)
# clear cuttings	SM/4			(SM+1)/3	SM/2	Unlimited

The column headings in Table 1 list the lumber grades from highest to lowest (left to right). The following grade definitions are based on "The Illustrated Guide to American Hardwood Lumber Grades," published by the American Hardwood Export Council [26].

- **FAS** stands for *First and Seconds*. This is the highest lumber quality under the NHLA grading rules. Boards graded FAS provide long, clear cuttings that extend to both faces of the board. These boards are suitable for high-quality furniture, doors, interior joinery, and solid wood mouldings.
- **F1F** grade lumber is similar to FAS except that only one face is required to meet the FAS specifications. The other face must meet all of the requirements for the Number 1 Common (1Com) grade (see below).
- **SEL** stands for *Selects*. This grade is very similar to F1F; the primary difference is that lumber that falls into this grade allows a minimum board width of 4 inches and a length of 6 feet.
- **1Com** stands for *Number 1 Common* and can also be referred to as "cabinet grade." 1Com grade lumber is commonly used in manufacturing furniture and cabinet parts.
- **2ACom** stands for *Number 2A Common* and can also be referred to as "Economy" grade owing to its lower price point. 2ACom lumber is used to make a variety of furniture parts.

- **3ACom** stands for *Number 3A Common* and is one of the lowest grades that can be assigned to lumber. It will have a very low price point and will have to be reworked intensively for furniture parts.

The far left column of Table 1 provides information regarding the way each grade is established.

- **Minimum board** refers to the minimum board width and length associated with each grade.
- **Minimum size cuttings** refers to the minimum size of the cuttings required to get a clear piece of wood from the board.
- **% clear** lists surface measure (SM) equations to calculate the amount, as a percentage, of clear face that needs to be showing.
- **# clear** cuttings is the minimum number of clear cuttings that can be taken from a board and is calculated by dividing the surface measure by the corresponding number shown in Table 1.

While individual companies may use custom grades for their lumber purchases or sales, the NHLA grading rules for hardwood lumber are the national standard for understanding the quality of lumber being sold. Many companies use NHLA grades and prices as a basis for price negotiation. Hardwood lumber prices are published by the Hardwood Market Report [27] and the Hardwood Review [28]; both are subscription-based publications. The Hardwood Market Report is a small booklet produced weekly containing the average price for hardwood lumber (in dollars per thousand board feet) of specific grades, thickness, and species. The Hardwood Review, published every Friday, provides pricing information on more than 700 hardwood items. Importantly, some select species, such as walnut, require a tailored grading system because they are used in special applications and some types of defects may be desirable for customers.

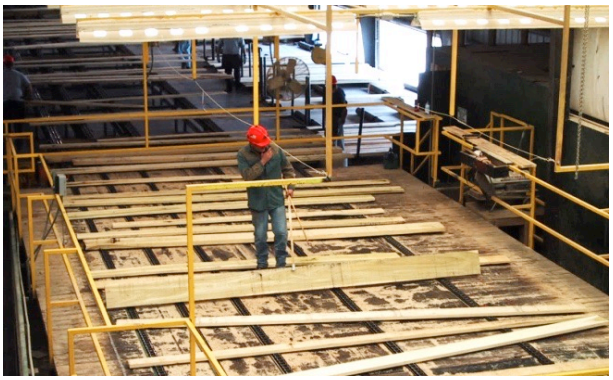


Figure 4. A grade inspector grades lumber as it travels on a hardwood sawmill conveyor. Photo credit: Phillip Araman.

Softwood Lumber

Most softwood lumber is intended for structural applications, such as framing members like joists, studs, rafters, and planks. Structural lumber, also called construction lumber or dimension lumber, is certified to bear weight in a building structure. Dimension lumber is sold in nominal sizes such as 2x4, 2x6, 2x8, 2x10, and 2x12. (The actual widths and thicknesses are smaller. For example, the actual dimensions of a 2x4 stud are 1.5 by 3.5 inches.) Softwood lumber is also utilized in the manufacture of secondary products, such as mouldings, flooring, and furniture. Lumber for such uses is known as appearance-grade softwood lumber or "shop lumber." Current softwood lumber prices are published by Random Lengths [29].

Figure 5. Softwood lumber bundles ready to ship. Photo credit: Robert Smith.

Quality grades for softwood lumber are determined in a fundamentally different way compared with hardwood lumber. While the grading of hardwood lumber is based on the percentage of "clear" cuts that can be obtained from an individual piece, the grading of structural lumber is based on its structural integrity — grades are based on the presence of defects that reduce the mechanical strength of the element (e.g., knots or splits). While there is only one universally accepted grading system for hardwood lumber (the NHLA grading rules), there are several for softwood lumber. For example, southern pine lumber is graded according to the Southern Pine Inspection Bureau (SPIB) [30], and the Western Wood Products Association (WWPA) develops and publishes the grading rules for softwood lumber in the 12 Western states [31]. There are seven certified agencies that develop grading rules for softwood lumber (including SPIB and WWPA). General requirements for developing softwood lumber grades were established by the Voluntary Product Standard PS 20, created by the U.S. Department of Commerce

and maintained by the American Lumber Standard Committee (ALSC) [32]. Table 2 includes some of the quality requirements for two grades of southern yellow pine.

Table 2. SPIB selected grading rules for 2-inch southern yellow pine dimension lumber [30].

Characteristics	Grades	
	No. 1	No. 2
Compression wood	Not allowed in damaging form for the grade considered	
Slope of grain	1" in 10"	1" in 8"
Decay	Not permitted	Heart center, ⅓ thickness × ⅓ width
Splits	Equal to the width	Equal to 1½ times the width
Bow allowed per length	10'-1⅜"; 12'-1½"; 14'-2"; 16'-2½"	10'-1⅜"; 12'-1½"; 14'-2"; 16'-2½"
Skips	Hit and miss in 10% of the pieces	5% of the pieces may be hit or miss or heavy skip for 2'

Softwood lumber appearance is classified in two major grades ("finish" and "selects") and subgrades (designated with letter A, B, C, and D) based on the prevalence of visible defects such as knots. "A Select," for example, is suitable for use in cabinets or running trim, while "D Select" could be used for unexposed parts or paint grade.

Another difference between hardwood and softwood lumber grading is the location of the graders in the production process. Softwood lumber is graded after drying and in front of the trim saw (which gives lumber its final length), whereas hardwood lumber is graded "green" off the saw and behind the trim saw. Grading of softwood lumber can be carried out by either inspectors (visual stress grading) or machines (machine-grading), while hardwood lumber grading is carried out by a grade inspector.

Pulp and Paper Products

Paper was first produced from wood pulp in the mid-19th century. Until that point, paper was obtained from recycled fibers that came from rags of hemp, linen, and cotton. Wood fibers for paper production were initially obtained by the physical grinding of log sections; chemical methods were developed later [19].

The United States is by far the largest consumer of paper products. Americans use about 69 million tons of paper and paperboard products every year; per capita

annual paper use is 750 pounds [4]. In paper manufacturing, wood is broken down into fibers, formed into a mat, and then dried. The reduction of wood into its fibers can be accomplished by two basic methods: mechanical (thermo-mechanical and groundwood pulping) and chemical (sulfite, kraft, and soda pulping). Paper products come in many forms, such as newsprint, printing and writing papers, corrugated, paperboard, and tissue paper. Given the economies of scale needed to make paper manufacturing a profitable business, large amounts of capital are required to enter this industry. There are currently approximately 350 paper mills operating in the U.S. [33]. In recent years the paper industry has suffered a decline; production in 2013 was down 14.5 percent from its peak of 94 million tons of paper and paperboard in 2000 [34]. However, paper manufacturing continues to be a large share of forest products economic output, with $176 billion in value of shipments in 2011, while wood products and furniture reached a combined $132 billion [35, 36].

Structural Wood-Based Panels

Structural wood-based panels are used in construction as sheathing for roofs, floors, and walls. The Engineered Wood Association (APA) [37] is an industry association that develops standards for the marking and performance rating of structural panels. There are two basic types of structural panels: plywood and oriented strand board.

- *Plywood* is a structural panel composed of wood veneers held together and laminated in layers of alternating orientation. Structural plywood is almost invariably made from softwood species, such as southern yellow pine and Douglas fir, and is manufactured into standard size sheets 4 feet wide by 8 feet long by ¾ inch thick [24]. Plywood is used in flooring, roofing, and side panels for both residential and nonresidential construction.
- *Oriented strand board (OSB)* is made from small-diameter logs that are processed into flakes, strands, or wafers, which are then formed into mats and bonded with an adhesive under pressure and at high temperature. Like plywood, the mats are layered; the orientation of the strands is alternated in each layer. OSB is similar to plywood in dimensions and purpose. OSB panels are made from softwoods such as spruce and pine, and hardwoods such as beech and poplar.

Nonstructural Wood-Based Panels

Nonstructural wood-based panels have countless applications, such as furniture and kitchen cabinets, laminated flooring, millwork, doors, wall paneling, car parts, and siding. Producers innovate constantly and develop panels to fit all kinds of requirements, from high resistance to moisture and temperature, to molded products of all kinds of shapes. Combined with computer-controlled equipment, wood-based panels have allowed manufacturers to produce customized products

at a massive scale and with little waste. Below are brief descriptions of the most common types of nonstructural wood panels.

- *Decorative plywood* is made in the same basic way as structural plywood, but it is intended for different uses, such as furniture and decorative paneling. Decorative plywood is made mostly using appearance-grade hardwood veneers. Most decorative plywood is made for interior use, but it is possible to find plywood made with waterproof adhesive for outdoor applications.
- *Particleboard* is a panel product made by compressing and bonding particles of wood in several forms, such as flakes, shavings, chips, sawdust, or strands. Much of the raw material is the byproduct of wood processing. Particleboard is one of the most versatile wood products and can be engineered to fit a wide variety of uses by changing particle size and geometry, the adhesive used, the mat configuration, and other parameters. Some uses of particleboard are as core stock for panels to be used in furniture and kitchen cabinet manufacturing, shelving, flooring underlayment, sound insulation, and concrete forms.
- *Medium-density fiberboard (MDF)* is made from wood that has been reduced to individual fibers, which are then formed into mats and bonded under pressure. The major uses of MDF are for furniture and kitchen cabinets. Thanks to its smooth surface and uniform density, profiles can be cut and finishing applied directly; unlike particleboard and plywood, edge-banding is not needed. These properties also make MDF a good material for wall paneling, millwork, store fixtures, embossing, and laminate flooring. MDF panels are commercially available in many thicknesses, such as ⅛, ¼, ½, ¾, 1, and 1½ inches.
- *Hardboard*, similar to MDF, is made from wood reduced to individual fibers and bonded under pressure. Hardboard, however, has a higher density (800-1,400 kg/m^3) compared with MDF (600 to 800 kg/m^3) [38], and is typically manufactured in thicknesses ranging from 2.1 mm to 15.9 mm (1/12 to 5/8 inches). Major uses for hardboard are furniture and kitchen cabinets (for backing), perforated boards for tools and store fixtures, wall paneling (unfinished or prefinished), and underlayment. Hardboard can be molded into different shapes, for example, for car components (e.g., door panels), and to simulate raised panels in door skins.

Engineered Wood Products

Engineered wood products (EWPs) were developed to address wood variability and to more efficiently utilize the raw material. EWPs, which are generally made by breaking down wood into smaller pieces or particles and then reassembling them together using special adhesives, are designed to meet precise standards and specifications. Some common EWPs are described below.

- *Glued-laminated timber (Glulam)* is made by face-laminating lumber to form large and very strong beams [24]. Glulam products are typically used in structures

such as field houses, sports arenas, bridges, churches, and residential and commercial buildings [24].

- *Laminated veneer lumber (LVL)* is composed of veneered sheets that are face-laminated and pressed. LVL differs from plywood in that it is normally much thicker and the veneer layers do not alternate orientation [24]. LVL beams can be made to customer specifications.
- *Engineered I-joists* use a combination of two engineered wood products. The I-joist is composed of top and bottom flanges and a web joined together to form a structural joist (Figure **6**). Typically the web stock is made of OSB and the flanges are made of LVL or solid wood. When combined and glued in this shape, the two products form a structurally sound joist used for construction [24]. An I-joist can carry large loads, and its manufacture requires much less material (and weight) than an equivalent solid-wood joist. Since its invention in the late 1960s, the wood I-joist has quickly gained market share and is now used in the floors of half of new single family homes [39].
- *Cross-laminated timber* is a fairly new engineered wood product made of multiple layers of wood boards that are oriented perpendicular to the adjacent layers [40]. See more detail in the box on the next page.

Figure 6. Engineered wood products: parallel strand lumber (top left), laminated veneer lumber (bottom left), and I-joists (right). Photo credit: Maria Fernanda Laguarda Mallo.

Cross-Laminated Timber

Cross-laminated timber (CLT) technology was developed in Europe in the early 1990s. CLT quickly grew in popularity over the past two decades as the market began demanding more environmentally friendly products. The cross-laminated configuration of CLT (Figure 7), in which adjacent layers of CLT elements support each other and act as reinforcement, results in excellent mechanical properties. Thus, CLT can be used as a load-bearing element and a shear panel, something that distinguishes CLT from other wood-based panels. CLT panels have been used in a wide range of applications, such as houses, barns, power line towers, churches, bridges, and high-rise apartment and office buildings. The structural characteristics of CLT allow for shapes and openings of the most diverse sizes and forms without compromising the structural integrity of the structure.

Figure 7. Cross-laminated timber layout (left) and finished panel detail (right). Drawing and photo: Maria Fernanda Laguarda Mallo.

One of the most prominent characteristics of CLT is its massive use of wood, which acts as a repository of carbon. Life cycle analysis (LCA) research on CLT has consistently demonstrated that CLT manufacturing produces less greenhouse gases and requires smaller amounts of water, energy, and fossil fuels than concrete and steel. Also important from an environmental perspective, CLT can be made from low-value forest resources, such as small-diameter logs and insect-killed trees. Other advantages of CLT include the following.

- The prefabricated nature of CLT makes it an attractive alternative to steel and concrete. It allows for high precision and a construction process characterized by faster completion (as short as three to four days per story, compared with more than 28 days for concrete).
- CLT structures have been shown to provide excellent fire resistance, owing in great part to the predictable fire behavior of large wood sections and the tight nature of CLT buildings, which limits the spread of fire to adjacent spaces.
- Tests have also shown that CLT buildings have good seismic performance because they are lighter and more ductile than structures built with traditional materials.
- CLT panels, both in the building enclosure and in interior floors and walls, act as a thermal mass, which can greatly reduce heating and cooling loads, shift the time of peak loads, lower overall building energy use, and enhance occupants' comfort.

Wood Energy Products

More than half of all the wood harvested globally is used for energy, primarily as firewood for cooking and heating. Half of Europe's renewable energy comes from wood biomass in its various forms [41]. In the U.S., wood is the source of 3 percent of total energy use [42] and is the primary source of biomass energy. The pulp and paper industry generates a great part of its energy inputs from wood residues and process byproducts, generating electricity and thermal energy. An increasing number of municipalities are adopting wood energy sources for their heating needs. At the household level, wood is the fastest growing fuel for heating, with 2.1 percent of homes using wood-derived sources as a primary fuel for heating and 7.7 percent using wood to supplement heat [43]. Concerns for the environment, energy costs, and energy independence are factors in the recent expansion of this industry. Examples of wood-to-energy products for residential heating are described below.

- *Wood pellets* are made from small wood particles, which can be sourced from mill byproducts, small-diameter trees, or logging residues. In wood pellet manufacturing, wood particles are dried and reduced in size using a chipper and/or hammer mill to reach uniform moisture content and particle size. Materials are then forced through a die at a high temperature and cut to a designated length. Wood pellets have uniform diameter (¼ to ⅝ inches) and range in length from ¼ to 1½ inches. The U.S. wood pellet manufacturing industry has experienced considerable growth during the last decade, mostly driven by exports to Europe.
- *Wood briquettes* are produced in a similar way to wood pellets — small wood particles are extruded through a narrow opening but at a lower pressure and temperature. Wood briquettes, however, are much larger in size than pellets, approximately the size of construction bricks or firewood.

Figure 8. Wood pellets (left) and wood briquettes (right).
Photo credits: Maria Fernanda Laguarda Mallo.

Value-Added Wood Products

Value-added wood products are made using the outputs of primary operations, like lumber, veneer, and wood-based panels. Although small and medium sized companies can find it very difficult to compete with large producers of value-added products, it is possible to serve niche market segments and remain competitive. Some examples of value-added products are described below.

Figure 9. A hardwood panel gluing operation. Photo credit: Urs Buehlmann.

- *Furniture*. This sector has faced great challenges during the last two decades, especially competition from low-cost imports, with household furniture producers hit particularly hard (more than 70 percent of the furniture sold in the U.S. is imported). Companies that weathered this trend have radically changed their practices by streamlining their supply chains, automating production processes, outsourcing components, and consolidating to achieve economies of scale. There are positive signs that some of the industry is returning to the U.S., in part owing to increasing labor costs in China and other previously low-cost locations [44]. This industry can be classified into two major groups: household furniture and office furniture. Household furniture can be further classified into upholstered, nonupholstered, and home entertainment furniture. One additional category that is gaining market share is “ready-to-assemble” furniture, which is almost invariably made of reconstituted wood panels.
- *Kitchen and bath cabinets*. This sector has fared better against global competition than furniture, in part owing to the nature of the product (for the most part it is made and installed to order) and the capacity of the industry to improve its internal processes. These products can be categorized into three major groups:

- Stock cabinets are lowest cost option, sold assembled and in standard sizes at large home centers and other retailers with very narrow options of finishes and hardware.
- Semicustom cabinets offer more choices of sizes, finishing, and accessories than stock cabinets. Customers usually place orders at home centers and dealers, and the product is made to order.
- Custom-made cabinets are the most expensive option. The customer specifies dimensions, materials, design, and accessories; the producer makes and usually installs the cabinets.

- *Millwork*. The millwork industry is primarily concerned with the production of wood components for interior finish, such as running trim, mouldings, paneling, and stair work. This industry normally buys lumber of higher grades since most of the millwork is exposed and requires long boards. However, there is an increasing use of alternative materials, like wood-based composites (MDF) and some plastic-based materials. Companies in the millwork industry can be categorized in two major groups:
  - Custom millwork shops receive orders directly from architecture and interior design professionals or firms. They make, finish, and, many times, install their products. High profit margins are possible, but this sector is particularly vulnerable to market forces (especially in the commercial construction sector). Firms in this industry require highly skilled personnel, and training is typically carried out in-house. Sales and marketing are based mostly on word of mouth.
  - Standard millwork firms are usually of medium or large size, and make standard products for both residential and commercial construction. Firms in this sector require high expertise for marketing and distribution.
- *Wood flooring* has been growing in popularity during the last decade owing to style trends and health concerns. Wood flooring is important for the efficient utilization of timber, as it provides an outlet for lower grades of lumber. It comes in a wide variety of shapes and materials but can be classified in two major groups:
  - Solid wood flooring is usually shipped unfinished and requires skilled personnel for installation and finishing, which increases its cost significantly. Most solid wood flooring is made of hardwoods, with oak and maple the dominant species, and is ¾ inches thick. There are two types of solid wood flooring based on width: strip flooring, from 2¼ to 3¼ inches in width; and plank flooring, from 3 to 6 inches in width.
  - Engineered flooring is usually made by lamination, with only the top layer of the highest quality veneer. The market share of these products is increasing at a high rate owing to their lower cost relative to solid wood flooring, dimensional stability, and ease of installation. Engineering flooring comes prefinished and thus can be installed as a do-it-yourself project.
- *Decking and railing products* include the materials that go into residential deck construction, such as deck boards, rail posts, and rails. There are approximately 30 million residential decks in the U.S., and about 3 million new or replacement

decks are built each year [45]. Historically, the majority of residential decks have been built with pressure-treated softwood, mostly southern yellow pine, and naturally durable softwoods, such as western red cedar. However, this industry is undergoing rapid change. Alternative materials, such as wood plastic composites and plastic lumber, are rapidly gaining market share away from solid wood decking owing to a perceived advantage in durability and maintenance requirements.

- *Windows and doors*. Similar to other value-added products, substitute window and door materials such as vinyl, plastic, aluminum, fiberglass, and wood-plastic composites have taken market share away from what used to be almost exclusively wood-based products. It is common for large window and door manufacturers to outsource the manufacturing of a significant part of their components.
  - Wood windows are more prevalent in residential construction than in commercial buildings, and the home remodeling market is growing in importance as the number of new home starts is below the historical average. Ponderosa pine is the dominant species for wood windows, although radiata pine and other softwoods are gaining market share.
  - Although nine out of 10 entry doors are made of steel or fiberglass, the ratio is reversed for interior doors; more than 90 percent of interior doors are wood. Interior wood doors can be classified in two groups: stile and rail, and flush doors. Softwoods are the prevalent material for wood doors, but hardwoods make up about a third of the market. Although large manufacturers dominate the market with stock doors, a profitable custom door market still exists.

Figure 10. Custom-made entry doors, in process (left) and installed (right), are a value-added wood product. Photo credit: Diana Mourin-Ayish.

Industrial Wood Products

Industrial wood products are made to support transportation and logistics operations as well as communications infrastructure. Preservative treatment is common for industrial wood products, many of which need to withstand tough handling or harsh outdoor conditions and are replaced after a number of use cycles or years in operation. These products, described below, are gaining in importance as logistics become more global, the oil and gas industry in the U.S. prospers, and the outlets for lower-grade hardwoods shrink (e.g., lower demand for solid-wood flooring).

- *Pallets and containers*. Pallets are a critical component of the logistics infrastructure as they reduce handling time and cost. Although the use of plastic and metal pallets has increased in recent years, more than 90 percent of pallets are made of wood, primarily hardwood species [46]. Pallets and containers, as well as railroad ties (see below), are important for hardwood timber utilization as they provide an outlet for the lower-grade material from lumber manufacturing. The most common pallet size in the U.S. is 48×40 inches, which is known as a grocery pallet. This industry is highly local and fragmented, with 2,700 firms, more than 70 percent of which have with less than 20 employees. Some industry trends include the steady growth of pallet recycling and an increase of pallet rental systems.
- *Railroad ties (or crossties)*. The United States has over 140,000 miles of railroad in use [47], and over 20 million railroad ties are produced every year [48]. Like pallets, over 90 percent of railroad ties in the U.S. are made of wood, mostly eastern and Midwestern hardwoods. Crossties are treated with creosote solutions to enhance their durability. Dimensions come in five categories; the most common is 7×9 inches by 8.5-feet long [48].
- *Crane mats* are large wooden platforms (6-24 inches thick, 4-8 feet wide, and up to 40 feet long), reinforced with steel rods and built to provide ground stabilization for heavy machinery in several industries, such as oil drilling and exploration operations. Both hardwoods and softwoods are used in their manufacture.
- *Road construction products* are typically made from small-diameter logs and require minimum transformation. Preservation treatment is required since most of these products are exposed to weather and have soil contact. Examples include sound barriers, guardrail posts, retaining walls, signposts, and trail and road bridges.
- *Wood utility poles*, which provide an excellent support for overhead transmission, distribution, and communications lines [49], are reasonably priced, nonconductive, and easy to install. There are approximately 135 million wood utility poles installed in the United States. They are replaced at a rate of 1.5 million per year, and the average life span for a conventional wood utility pole is 30-40 years [50]. Most wood poles are 45 feet in length with a butt-end diameter

of 12 inches [51]. Common species for wood poles are southern yellow pine, Douglas fir, jack pine, lodgepole pine, Pacific silver fir, red pine, and western red cedar [52]. The most common chemical treatments for wood utility poles are pentachlorophenol in heavy oil, chromated copper arsenate, and creosote.

- *Mining supplies*. Wood in the form of props, cap boards, wedges, and "cribbing" pieces was used extensively in mining; a considerable amount is still being used for this purpose. For example, the Colorado mining industry alone uses about 5.8 million board feet of wood products per year [53].

Figure 11. Pallet stock, usually produced from interior portions of higher grade saw logs. Photo credit: Brian Perkins.

Chapter Questions

1. Describe the product or service you plan on providing.
2. In what markets do you plan on selling this product?
3. Do you have access to the raw material needed to produce it? Who will be your suppliers?

Chapter 2: What Is Business Management?

Management is about human beings. Its task is to make people capable of joint performance, to make their strengths effective and their weaknesses irrelevant.

—Peter F. Drucker

According to the late management guru Peter Drucker, without good management practices, there is neither material nor human progress. Management is the allocation of **resources** to achieve the organization's **goals** [54, 55]. The nature of these goals varies depending whether the organization is a private enterprise (maximize profit), a nonprofit (maximize social impact), or a government agency (provide services in a timely and efficient fashion). Resources include financial resources (bonds, stocks, loans, cash on hand), physical resources (buildings, processing equipment, land, transportation equipment), natural resources (raw materials, forest land), and human resources. There is relatively little difference among businesses in the same industry subsector regarding the raw material they use, the technology for processing those raw materials, the products they produce, and the markets they serve. The difference in organizational success lies in the management of the human resource. Effective managers understand what motivates employees and what employees consider success, and communicate effectively with them. Real and sustainable competitive advantage, which is difficult to replicate, comes from the quality of a company's workforce, the quality of its relationship with customers, and the way the human resource is managed. The basic functions of management are explained in this chapter.

The Management Process

The major responsibilities of a manager fall within four functions: planning, organizing, implementing, and controlling (Figure 12). This section briefly explains each of these functions.

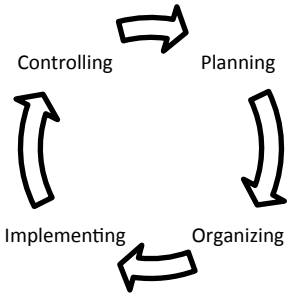


Figure 12. The management process [54].

Planning

Simply stated, planning is the process of setting goals and formulating actions needed to achieve those goals — it is probably the most important management activity. Studies have shown that successful companies tend to have a formal planning process (i.e., formal plans are written and follow a certain structure). However, planning is often neglected, in part because of time constraints, lack of training on planning, and also because some people believe uncertainty is too significant to plan future actions.

There are different levels of planning. The "planning pyramid" (Figure 13) illustrates the different levels of the planning process [56], starting at the top with formulating the vision of the business and the strategic plan to achieve that vision. The marketing plan and the operating plan are inputs to the financial plan, and there is a constant feedback among these three components. The organizational plan is at the bottom of the pyramid since achieving the goals set by the strategic plan depends on the abilities and motivation of the people in the organization [56]. Chapter 3 of this guide details the steps in strategic planning, and Chapter 8 covers the process of developing a business plan, including marketing, financial, and operations planning, as well as planning the organization.

Figure 13. The planning pyramid [56].

Organizing

Managers must determine what resources and actions are needed to achieve the goals set in the planning process in the most effective and efficient manner. Organizing includes establishing the organizational structure, providing the required physical conditions to accomplish work, and assigning manageable amounts of work to employees according to each one's training and abilities. Employees must be given the authority and responsibility they need to succeed in a certain task.

Organizing also comprises finding the right employees (human resource), training them, and assigning them roles in which their contribution to the organization can be maximized. Chapter 4 includes detailed information on planning, recruiting, and retaining human resources.

Implementing

During the implementation process, managers guide and motivate employees in implementing the actions formulated during the planning process. Managers also direct the business operations, which are the essential activities a business performs to achieve its goals. Operations management is the subject of Chapter 6.

Controlling

The management process is a cycle, and this cycle is closed by measuring performance and taking corrective actions. It is management's job to establish the standards for each of the organization's goals, assess the organization's performance, identify gaps between current and desired performance in a timely fashion, and formulate actions for improvement [54]. Performance standards are set for different areas of the organization and take different forms. Some examples include:

- *Quality* standards (e.g., maximum defect rate of 5 percent, measured at the final product inspection, based on 10 quality attributes)
- *Time* standards (e.g., an on-time completion rate of 97 percent, measured as the percentage of orders shipped complete and on or before the due date)
- *Cost* standards (e.g., reduce scrap by 10 percent relative to the previous year)
- *Quantity* standards (e.g., increase production volume by 20 percent relative to the previous period)

Chapter 6 contains information on methods to assess process performance, and Chapter 7 covers aspects of financial performance.

Manager's Checklist

Most of a manager's activities are aimed at maximizing the business's profitability. Managers have two options to increase profitability: reduce costs or increase revenue. Options to reduce costs include the following.

- Implement new technologies.
- Increase yields.
- Purchase raw materials at a lower cost.

However, these actions can only provide a short-term competitive advantage since they can be copied by the competition. Actions that result in a more sustainable advantage by increasing revenue and improving profits include the following.

- Identify your sustainable competitive advantage.
- Serve your customers better than your competition.
- Have a people-driven organization.

These activities require that you adopt sound management practices. The following are generally accepted practices of effective managers [54].

- Demonstrate commitment to the organization's success.
- Take responsibility for developing and implementing plans to achieve the goals of the organization.
- Identify the resources needed and ensure these resources are available in a timely fashion.
- Organize and coordinate work in such a way that operations are conducted efficiently and effectively.
- Recognize the importance of employees and balance their needs with the organization's goals.
- Monitor activities and performance, and identify actions for improvement.
- Demonstrate respect, offer encouragement, and value input from others.

Employee Engagement

As mentioned at the beginning of this chapter, the way in which human resources are managed is the key to business success. Therefore, having employees engaged in their work is one, if not the most important, task of a manager. According to one definition, engaged employees "work with passion and feel a profound connection to their company; they drive innovation and move the organization forward" [57]. Research supports this assertion, with higher employee engagement strongly correlated with lower turnover, higher customer loyalty, and higher profitability, among other performance metrics [58]. The following tips from JoAnna Brandi in "Power Up Performance: 9 Ways to Keep Employees Engaged" [59] can create and sustain employee engagement.

1. Let go of any negative opinions you may have about your employees.
2. Make sure your employees have everything they need to do their jobs.
3. Clearly communicate what is expected of employees, including the company's values and vision, and how the company defines success.
4. Get to know your employees, their goals, what excites them, and how they define success.

5. Make sure they are trained in problem-solving and conflict-resolution skills.
6. Constantly ask how you are doing in your employees' eyes.
7. Pay attention to company stories and rituals.
8. Reward and recognize employees in ways that are meaningful to them.
9. Be consistent for the long haul.

Chapter Questions

1. State the vision of your company.
2. What is your personal management philosophy?
3. Who are the key personnel and what are the key positions you will need to start your company?
4. Describe how you will apply the four major responsibilities of a manager to your organization (planning, organizing, implementing, and controlling).

Chapter 3: Strategic Planning

Strategic planning is a critical activity for the success of any organization. Research has shown repeatedly that there is a positive correlation between strategic planning and firm performance for both financial and nonfinancial measures (e.g., market share, reduction in employee turnover, new product development) [60]. More than 75 percent of U.S. companies report having some formal process for strategic planning, according to a survey among executives [61]. Surprisingly, less than 50 percent of those executives indicated satisfaction with their firm's strategic planning [61].

The purpose of developing a strategy is to achieve sustainable competitive advantage. The business strategy puts your business into the context of its competitive environment. A business strategy answers the questions where are we now, where do we want to go, and how do we get there.

Table 3. Strategic management activities.

Strategic planning	Mission and vision formulation
	SWOT analysis
	Long-term strategy
	Short-term strategy
	Implementation and evaluation

To understand strategic planning, we need to first define corporate strategy. There are countless definitions; this one covers most of the aspects that will be addressed in this chapter [62].

Corporate strategy is the pattern of decisions in a company that determines and reveals its objectives, purposes, or goals, produces the principal policies and plans for achieving those goals, and defines the range of business the company is to pursue, the kind of economic and human organization it is or intends to be, and the nature of the economic and noneconomic contribution it intends to make to its shareholders, employees, customers, and communities.

—Kenneth Andrews

The process of strategic planning is illustrated in Figure 14. The following sections detail each of the steps in the strategic planning process.

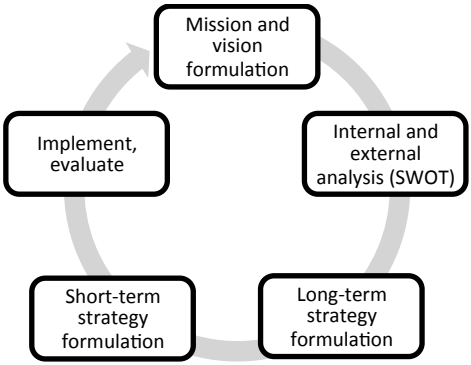


Figure 14. The strategic planning process.

Mission and Vision Formulation

Strategic management starts with the formulation of the company's mission and vision. These set direction, guide the organization's efforts, and set the company apart from the competition.

Mission

In short, the mission is a statement of an organization's reason for existence. A mission conveys the firm's philosophy and self-image. At a minimum, the mission should include what service/product the organization provides to its customers and what goals are pursued as an organization. A mission statement should answer the question, "What business are we in, and why?" [61]. Other components that can be included in a mission statement are the market or customers the organization serves, the technology that the organization uses to meet customers' needs, the firm's philosophy, its approach to and goal for quality, and the company's self-image. As for philosophy, many companies include the values with which the company is committed and reflect the organization's character and culture, as well as the desired behavior. According to Howe and Bratkovich [63], mission statements should address three areas: (1) who is your customer, (2) what customer needs should you satisfy, and (3) how can you most effectively satisfy those needs. Mission statements can be concise, such as the following examples.

- Herman Miller, manufacturer of office furniture: "Inspiring designs to help people do great things" [64].
- Columbia Forest Products, manufacturer of veneer and plywood: "Our ideas will be groundbreaking, and our stewardship will be forever mindful of the ground we live on" [65].

Vision

The vision statement describes a desirable future, including the goals of an organization in the medium or long term. A vision statement typically describes how the firm wants to be perceived by customers and other stakeholders. The purpose of a vision statement is to provide a unifying goal, which all of the organization's efforts and resources will be focused on achieving. Thus a vision needs to be measurable. According to Kasowski and Filion [66], a vision statement should (1) be future looking, (2) identify a market space, (3) be specific and realizable, and (4) involve change. Can you evaluate the following vision statements using such criteria?

- Weyerhaeuser, an integrated forest products company: "Our vision is to deliver superior sustainable solutions for the world. We do this through strong leadership, unwavering values, and a talented employee base. We invite you to learn more about our company's rich history of environmental stewardship, customer commitment, and community involvement" [67].
- International Paper: "To be one of the most respected and successful companies in the world" [68].

SWOT Analysis

Strategy does not exist in isolation; its formulation should be informed by an in-depth analysis of the organization's external environment and its main competencies. This process can be carried out using a logical framework known as "SWOT" analysis, which includes the following components.

- *Strengths* are the organization's unique competencies relative to its competitors that need to be leveraged to the firm's advantage. For example, a vertically integrated forest products firm can have some advantages compared with competitors, such as the availability of raw materials and efficiencies in aspects such as quality control (e.g., no need for inspection of inter-plant deliveries) and control of the supply chain.
- *Weaknesses* are limitations in the company's capabilities that inhibit its ability to meet customer needs. For example, a company's inability to collect, implement, and reward employees' improvement suggestions can lead to a disadvantage with competitors who have such programs.
- *Opportunities* are trends, events, and ideas in the external environment favorable to the company. For example, an increased interest in environmental sustainability (e.g., green building, forest certification) presents an opportunity for manufacturers of wood-based building materials. A stronger enforcement of regulations about illegal timber trading (e.g., the Lacey Act in the U.S.) presents

SWOT Analysis at Timber Frame Homes [69]

Timber Frame Homes, which started operations in the early 1980s as a general contractor, has two facilities and 45 employees. It builds solid wood timber frame structures, using mostly oak, southern yellow pine, Douglas fir, and white pine. The average size of the homes constructed is 3,500 square feet, with prices ranging from $150 to $500 per square foot. The company has experienced sustained growth and now holds about 3 percent of the national market in its product category. As part of its strategic planning efforts, the company has identified the following in a SWOT analysis.

Strengths

- There is a perceived high quality of the craftsmanship.
- The company has direct contact with its customers, from design to construction.
- The design is fully tailored to customer needs: a unique structure for each individual.
- Operating its own sawmill allows the company to have a better control of the quality of its raw materials.
- A recently acquired 5-axis CNC cutting machine can improve productivity and efficiency.
- The company's show home is a one-of-a-kind 2,700-square-foot timber frame home that provides a visual example of the company's craftsmanship.
- The company's website allows customer interaction and provides a great deal of information to people interested in Timber Frame Homes.
- The company currently has an excess capacity, which can allow it to increase production without great investment.

Weaknesses

- The marketing and sales functions are not fully developed.
- The company does not provide financial options to its customers, which can represent some competitive disadvantage.
- The company lacks a relationship network with contractors, which could help to greatly increase sales.

Opportunities

- The timber frame home market and the construction industry in general have experienced sustained growth over the last two decades.
- There is a potential to take market share from similar market segments, such as log home or green home markets.
- There is a potential to expand the market geographically in the U.S. and internationally.

Threats

- The timber frame market is fast growing and the barriers of entry are relatively low, which makes it very attractive. Many companies may want to enter to the market.
- There is a lack of differentiation from log homes; people tend to believe that timber frame homes and log homes are the same.

Based on this information, what strategic steps do you think the company should take to leverage its capabilities and the opportunities in the external environment?

an opportunity for U.S. hardwood lumber manufacturers, as imports of tropical hardwoods are likely to decrease, at least temporarily.

- *Threats*, the opposite of opportunities, are developments in the environment that are unfavorable to the company's success. The firm needs to plan how to mitigate the effects of these forces. For example, the forest products industry is faced with constant threats from substitute materials, such as steel studs, vinyl siding, and plastic pallets.

Long-Term Strategies and Objectives

Long-term objectives are set for more than one year and are formulated for more strategically oriented areas, such as profitability, product development, competitive position, corporate social responsibility, and human resources [70]. To accomplish long-term objectives, strategies are formulated that can fall into one or more generic competitive strategies, suggested by Michael Porter [71] as illustrated in Table 4. A cost leadership strategy emphasizes low cost compared with competitors (e.g., Walmart). In the differentiation strategy, a company aims at being recognized as having a unique product, superior to the competition and thus achieving higher prices and customer loyalty (e.g., Apple). A firm pursuing a focus strategy concentrates its efforts on a narrowly defined market segment (e.g., PepsiCo).

Table 4. Generic competitive strategies [71].

Target scope	Competitive advantage	
	Low cost	Customized product
Industry-wide	Cost leadership	Differentiation
Market segment	Focus (low cost)	Focus (differentiation)

Short-Term Strategies and Objectives

Short-term objectives provide guidance for conducting the firm's operations within one year. These objectives should be quantitative, measurable outcomes that the firm intends to attain in the short term. Short-term objectives should be consistent with the long-term goals set in the company's strategy. Examples of short-term objectives are to reduce lead time to four days by July 1, reduce scrap by 10 percent by the end of the year, or increase on-time complete orders to 99 percent by May 30. In order to achieve short-term objectives, companies typically formulate short-term strategies for their functional areas, such as marketing, human resources, manufacturing, and sales [70]. For each short-term objective, an action plan is formulated that specifies the activities to be carried out to accomplish the objective and, ultimately, the strategic goals of the company.

Strategy Questions for Start-Ups

There are a number of questions that need to be answered before starting your company. They fall into three areas: the company, the competition, and the marketplace.

The Company

- What is your uniqueness?
- How are you going to find customers?
- What is your competitive advantage?
- Where is the value added for your customer?
- What are the potential problems with your plan?

The Competition

- Who are your competitors?
- How do you plan on competing against them?
- What are their strengths and weaknesses?
- How do you compare on the "Total Product" offering (explained in Chapter 5)?

The Marketplace

- How can your company take advantage of current trends?
- How is the market changing?
- Is your market a commodity, differentiated, or niche market?
- What is the greatest growth potential for this market?
- How will you establish good customer relationships?

Strategy Implementation and Evaluation

One challenge organizations face when developing strategies is translating them into operational terms and measures. Norton and Kaplan developed a highly successful performance measurement framework that relates the company's long-term strategy with goals and measures known as the "balanced scorecard" [72]. It classifies measures into four performance areas: (1) customer (how do customers see us?), (2) internal business processes (what must we excel at?), (3) learning and growth (can we improve?), and (4) financial (is the company making money?). This framework helps managers to have a balanced perspective of what is important for the firm instead of the common overemphasis on financial measures. Firms should try to have objectives, measures, targets, and initiatives for each of these areas.

The last step in the strategic management cycle is to evaluate strategy implementation, detecting discrepancies and making the required operational adjustments. Managers should also ask themselves whether their assumptions about the internal and external environments were correct. Unfortunately, very

few companies regularly compare their strategic goals with actual performance [73], and most employees report that their companies are poor at execution [74]. Research has also shown that, in general, most strategies result in only about 60 percent of their potential financial performance [73]. Common reasons are that companies fail to allocate the needed resources in a timely fashion, poor communication of goals and plans, poor short-term planning, and unclear accountability [73]. Some recommendations for successful strategy implementation are to keep the strategy statement simple, clearly define responsibilities, challenge assumptions, plan resource deployment early in the process, clearly define priorities, and continuously monitor performance [73].

Chapter Questions

1. Write your mission statement.
2. What is your vision?
3. Conduct a SWOT analysis of your enterprise.
4. What are your long-term goals for the company?
5. Identify individuals who can provide you with an objective evaluation of your enterprise.

Chapter 4: Human Resource Management

It is common to read in corporate literature the claim that "our employees are our most valuable asset," yet words and actions do not always go hand in hand. Executives often fail to focus enough attention and investment in recruitment, training, retention, motivation, and compensation of human resources [75]. It is the employees who implement the strategic and operational plans, and create and deliver the products and services to customers. Human resource management contributes to a firm's performance by enhancing employees' skills, knowledge, and abilities, and by motivating employees to use their skills, knowledge, and abilities for the firm's benefit [75]. Human resource management practices must support the overall business strategy and thus should be part of the strategic planning mix.

The major responsibilities of human resource management are to attract the right people to join the company's workforce (planning, recruitment, selection), develop a quality workforce (training, development), and maintain that quality workforce (career development, compensation and benefits, labor management relations). The function of human resource management and its major subfunctions are covered in this chapter.

Table 5. Human resource management activities.

Human resource management	Human resource planning
	Job descriptions and specifications
	Recruitment and selection
	Training and development
	Compensation and benefits

Human Resource Planning

Regardless of the size of the organization, long-term planning of human resource needs and ways to meet those needs is of great importance in order to attain the strategic goals of the company. Human resource planning includes forecasting personnel needs, in terms of both number and qualifications; assessing the availability of capable human resources; and forecasting when those resources will be needed. Forecasting can be conducted based on judgment, rules of thumb, or quantitative methods such as personnel ratios (e.g., productivity ratios).

The output from this process is a staffing plan, which includes actions aimed at recruiting, selecting, and retaining the required workforce. Very importantly, a human resource plan should address whether staffing needs are going to be met by recruiting in-house (promotion or transfers) or by external hires. These decisions must be based on a thorough analysis of the internal and external workforce.

Alternatives to consider to close the gap between needs and availability when there are staff shortages include hiring temporary or full-time workers, overtime, automation, subcontract work, and increasing worker productivity (e.g., by process redesign, incentives, or equipment upgrading). Potential strategies to deal with staff surpluses include temporary or permanent layoffs, attrition, job-sharing (the duties and responsibilities of one position are shared by two or more employees), and a compressed week (a workweek of less than five days but with same number of hours). Similar to operations planning, the time horizon for human resource planning has different levels, from short term (six months) for immediate needs, to medium term (up to three years) and long term (more than three years).

Planning human resources in small companies is typically carried out in a less systematic way. Since it is common in small businesses for family members to participate in management and operations, special attention should be placed on succession planning and incorporation of nonfamily members.

Job Descriptions and Specifications

Job descriptions and job specifications are carefully prepared documents used extensively in human resource activities such as compensation, training, and performance evaluation. A job description identifies the responsibilities, tasks, and duties of a job. Job specifications, which are typically included in job descriptions, list the qualifications, skills, behaviors, and abilities needed to perform a job in a successful manner. Spending time in preparing job descriptions and specifications is a good investment because they establish what is expected from the employee and are a basis for performance evaluations as well as training and compensation purposes. Also, these documents can have important legal implications. For example, the Americans With Disabilities Act requires employers to maintain accurate job descriptions [76] and ensures that those descriptions do not unfairly prevent qualified candidates with disabilities from getting hired. Also, overtime payment is closely related to the type of function that an individual performs, which should be detailed in a job description [77]. Other legal aspects that should be considered are the Civil Rights Act, the Age Discrimination in Employment Act, and the Pregnancy Discrimination Act. The components of a job description include the following elements.

- *Job title*. A brief description reflecting the scope, purpose, and content of the job.
- *Identification*. Reporting relationships, location, date of analysis, pay grade, and other information.
- *Summary*. A short description of the significance of the job and its major responsibilities. Suggested length is 30 words or less.
- *Job functions and duties*. Description, in order of importance, of the job expectations, essential tasks and duties, and responsibilities. It is perhaps the most important section of the job description.

- *Job specifications*. A description of the qualifications that an employee needs to perform the job in a proficient manner. This section has four major components: (1) education and certifications required; (2) minimum experience needed and acceptable substitutions; (3) skills, abilities, and knowledge; and (4) physical requirements.
- *Disclaimers and signatures*. Disclaimers are usually included to give the employer flexibility to change a position's requirements and to ask employees to perform duties not listed in the job description.

Some recommendations when preparing job descriptions include the following.

- Focus on what the business needs the individual to accomplish (i.e., results and performance) rather on how you want the employee to spend his or her day.
- Focus on the job, not the person.
- Differentiate between credentials (e.g., a bachelor's degree in wood technology or comparable), skills (e.g., intermediate proficiency in Microsoft Excel), and traits (e.g., attention to detail).
- Make sure you are in compliance with legal requirements.

Some online resources for information to aid the job description development process are listed below.

- The Department of Labor created a database with hundreds of detailed occupation descriptions, which are continuously updated. Visit www.onetonline.org.
- An excellent tool to aid in job analysis can be found at www.job-analysis.net.

Recruitment and Selection

Recruiting is the process of developing a large enough pool of suitable candidates for each job. Recruitment efforts should be based on strategic planning. When recruitment is carried out effectively, qualified individuals are identified before they are needed. Companies can resort to internal recruitment to find suitable candidates for a job or look for talent outside the organization. Internal recruitment includes hiring from within the organization and using employee referrals, which may include rewards for successful referrals. Sources for external hiring include the following.

- *Different forms of media* (e.g., newspapers, magazines, radio). Bear in mind that the more technical the position, the wider you need to expand the search geographically.

- *Trade associations*. Some industry associations maintain a "Career Center" on their websites where job seekers can post resumes and employers can post job openings.
- *Trade publications*. For example, Wood & Window magazine maintains an Employment Center on its website (jobs.windowanddoor.com).
- *State employment agencies*. Each state has an employment agency, such as the Minnesota's MinnesotaWorks.net and Virginia's Virginia Workforce Connection (www.vec.virginia.gov/find-a-job).
- *Private employment agencies*. These companies normally collect a fee from the business or the candidate on a contingency or retainer basis. Special types of private employment agencies include headhunters and outplacement firms. The former typically specializes in management or professional positions; the latter assists people who have lost their jobs.
- *Educational institutions*. Most educational institutions have recruitment resources, such as career placement centers. Internships have become more common and can be a convenient way for students to learn about a company and for employers to evaluate potential employees. Other, less formal routes include maintaining relationships with specific departments and participating in advisory boards or as guest speaker for classes or events.
- *Job fairs*. These events are normally used by companies in need of filling a large number of openings and are typically organized by state or local governments, educational institutions, or trade associations.

Once a list of candidates for a job opening has been compiled, the company needs to select the individual with the best qualifications to fill the position. No training can compensate for a poor selection process, thus efforts should be made to select the right person for the job. An effective selection process matches the knowledge, skills, and abilities of individuals with the job. The selection process is based on well thought-out selection criteria; these criteria in turn must be based on predictors of good performance. Effective selection requires that companies adopt a structured process so the firm can ensure that all factors are considered and that the process is explicit and documented for future reference.

The first step in the selection process is typically to ask the candidate to fill out an application in order to collect relevant information to aid in the decision process. Caution should be taken regarding the specific information that is requested from the applicant to avoid conflicting with relevant laws. Information normally requested includes name, address, phone number, education, experience, and references. Permission is also asked from the candidate to check references. Disclaimers are included at the end of the application for legal protection and may include employment-at-will (the right of the employee or employer to terminate employment), information accuracy (right of employer to terminate employment if false information is provided), and notification of further tests (e.g., drug testing, physical exam).

After checking the qualifications from a number of applicants, the second stage in the selection process is typically a screening interview, usually conducted by phone, thereby saving time for both the applicant and the employer. Once the screening interview is complete, some companies conduct a selection test to assess whether an applicant has potential for success in the job. Selection tests can include personality traits, abilities, aptitudes, honesty, and motivation. To guarantee a fair selection process, tests should be reliable (yield consistent results all the time) and valid (actually measure what they are intended to measure). Tests help to further screen candidates and eliminate those who do not have the required abilities or skills. One example of a personality test is the Minnesota Multiphasic Personality Inventory. Ability tests may include cognitive, physical, psychomotor, and situational judgment tests. There are a number of standard tests developed by specialized organizations that can be purchased by employers.

Following the selection tests, an in-person interview is scheduled with several of the top candidates. The interview can be conducted by one individual or by a panel, which may or may not include the people with whom the candidate would interact if hired. The purpose of the interview is to learn how the candidate would behave in the job. Unlike a standardized test, there are typically no right or wrong answers in an interview, so the interpretation of the responses can be highly subjective. To avoid error or bias, a well-prepared job description is extremely important, and its contents should serve as the checklist against which the candidate's responses are compared. Interviews may include a combination of several different interviewing methods; a few examples are described below.

- *Structured interview*. A set list of questions is asked to all candidates, allowing follow-up questions when needed.
- *Situational interview*. As the name suggests, candidates are presented with the description of a situation and asked how they would handle the problem. Candidates are asked to support their responses with descriptions of past actions in similar situations.
- *Nonstructured interview*. A minimum number of open-ended and very broad questions are asked, resembling more a casual conversation. Sometimes questions are developed based on responses to previous questions.

After the interview, the candidate's references are checked and his or her background is verified. Unfortunately, applicants are not always truthful about their credentials. By some estimates, about 40 to 70 percent of applicants exaggerate their resumes [78]. Checking references from past employers can be difficult, as fear of legal process (i.e., a defamation lawsuit) can prevent a previous employer from disclosing negative information. However, not conducting proper reference checks can result in legal problems for the potential employer as well if the new employee would harm a co-worker (i.e., negligent hiring). Some companies conduct

criminal background checks or credit checks, upon written consent from the candidate.

The final step in the selection process is making an offer to the chosen candidate. Offers are usually made by phone, accompanied by a written offer with clearly described terms and conditions. Firms should ensure that offers are compatible with applicable labor laws.

Many resources are available online for human resource recruiting and selection. Guidance on how to conduct interviews and selection can be found at the Society for Human Resource Management's website (www.shrm.org).

Recruiting via the Internet

Companies are increasingly resorting to the Internet to conduct recruitment activities. More than 100 million jobs are advertised and 20 million unique resumes are posted online at any given moment [79]. Advantages of online recruitment include much lower costs and shorter times for hiring (87 percent lower, by one estimate [79]) and the ability to reach a much larger and diverse pool of potential candidates. It also enables employers to move from "batch" hiring to a more continuous hiring process, which is especially good for reaching capable people who may not necessarily be actively looking for a job but may be interested if a good opportunity arises [79, 80]. Internet hiring is not without its challenges. One major drawback is that because of its wider reach, it can create an additional workload for recruiters.

There are two basic ways in which your company can use the power of the Internet to recruit qualified personnel: (1) using Internet job boards, such as monster.com, Yahoo!, or indeed.com; and (2) using your company's website. An additional way companies are recruiting is through online social networks, such as Facebook, Twitter, and LinkedIn. Online social networks can be a powerful tool for start-up businesses without large budgets for recruitment. In some cases the use of these tools can reduce the cost of finding a viable candidate to zero. It is important to bear in mind that regardless of the online tool used, potential candidates who see your posting will very likely visit your company's website to learn more about the business. Thus it is important to pay attention to the message that the website is conveying. For advice on online recruitment and recruitment in general, visit www.recruitingblogs.com or recruiterbox.com/blog.

Training and Development

No matter how qualified and capable a newly hired individual is, he or she must receive training for successful performance in the job. This training can be required by law (e.g., safety) or by the company's policies (e.g., orientation). Equally important is to facilitate training with a long-term perspective (i.e., employee development) and to enhance the employee's problem-solving and interpersonal skills. Research has shown repeatedly that training is positively correlated with employee commitment and organizational performance [81, 82]. There is general agreement that an educated workforce is more productive and innovative. In

particular, forest products businesses need to invest in their employees to remain competitive in today's changing business environment.

Figure 15. Training human resources. Photo credit: Robert Smith.

As with any investment, training programs should be carefully evaluated based on their expected outcomes. Businesses should assess their training needs either formally or informally before committing resources. Training needs can be identified by comparing the organization's actual performance with the desired performance. Other indicators of training needs are customer complaints, absenteeism, and low employee performance. When job description documents are well prepared and maintained, they can be used as a basis for comparison with current performance and to identify where training is needed.

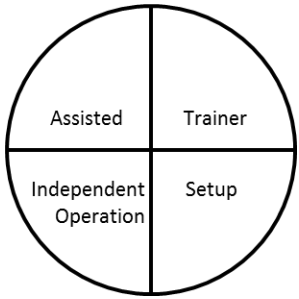
Once training needs are identified, a delivery method needs to be selected. Two basic options exist regarding training delivery — internal or external. Internal training may include on-the-job learning and cross training. On-the-job training is the most common method and can be very effective. Cross training is used when it is desirable for employees to execute more than one job (see box on next page). External training, in which learning occurs outside the company, can be a cost-effective option for small firms with a limited number of staff. A number of organizations provide training, such as suppliers, university extension, industry associations, government agencies, nongovernmental organizations, and consulting companies. Free online education is another source.

Cross-Training Assessment

In modern manufacturing techniques, such as flexible manufacturing and cellular manufacturing, employee cross-training is very important to realize the benefits of such production philosophies. One simple technique to monitor cross training of employees is the cross-training chart, which is a double-entry table with employee names in rows and machines/tasks in columns. The level of training of each employee on a specific machine or task is marked with a symbol. The chart is usually posted in the work area.

Assembly cell 2

Name	Lathe	Sander	Router	Packing
Employee 1				
Employee 2				
Employee 3				
Employee 4				



A 2012 survey of forest products companies in Minnesota and Virginia conducted by the authors [83] identified the most important training needs among small and medium sized enterprises in this sector. Companies indicated that quality and process control, process improvement, marketing, sales, and plant maintenance were their most important training needs. Companies also indicated that their current training suppliers were trade associations and private industry (including consulting firms) and, to a lesser degree, university extension programs. For training delivery, companies preferred in-person training (personal visits and short courses). Online delivery was not highly ranked as an effective training method. For more detailed information about the survey results, visit fpmdi.bbe.umn.edu.

Compensation and Benefits

Choosing the right combination of compensation and benefits is a difficult task for any company but particularly challenging for a new or small business. A balance should be reached between offering compensation packages attractive enough to find quality personnel and ensuring the financial viability of the business. Pay levels that are too high can also discourage potential investors. When designing compensation schemes, businesses should evaluate how the alternatives will impact cash flow (critical for start-ups), compensation and incentives offered by the competition, and the tax implications of the compensation alternatives being evaluated (e.g., secured or unsecured deferred compensation) [84].

It is advisable to think of compensation as a "total rewards system" that includes direct compensation (base annual or hourly wage plus bonuses), indirect compensation (Social Security, health insurance, retirement programs, moving expenses, paid leave), and nonmonetary compensation (job security, recognition, flexible hours). Employers need to be creative and design a total rewards system that best fits employees' expectations.

Employees expect that their base wage will cover basic living expenses plus some discretionary spending, and that it will increase over time to compensate for inflation and reflect both their contributions to the firm and their seniority [85]. Employees expect the compensation system to be fair, both internally (between employees in the same firm) and externally (compared with other businesses in the same industry). A perception of unfair compensation practices can lead to low employee morale, absenteeism, high turnover, and low productivity. Bear in mind that expectations for compensation and benefits change with employees' age and the stage of their careers. Typically, young employees value having time off for other activities and prefer "on-the-spot" rewards. As workers start families and reach the midpoint in their careers, they place more value on family health care and wealth accumulation benefits; child and elder care might also be on their radar. Employees approaching the latter part of their careers value insurance and health care benefits. Flexible schedules are also attractive for older employees, as they may want to pursue hobbies or community-related activities [86].

The changing nature of the workplace is resulting in different expectations for pay and benefits. Employers need to be aware of these trends to attract and retain a competent workforce. Some of these changes as identified by Dychtwald et al. [86] are listed below.

- Pay is shifting from systems based on tenure to performance based.
- Retirement plans are moving from being a defined benefit to a defined contribution.
- Reward systems are also changing. It is more common now to find informal reward and recognition systems rather than formal and periodic systems.
- Health benefits used to be predominantly managed and provided by the employer. It is now becoming more common that benefits are funded and managed by both the employer and the employee.
- In general, there is a trend to customize compensation and benefits packages to individual requirements. This makes it necessary to communicate with employees to learn about their needs regarding health insurance, vacation, childcare, and retirement plans.

Job Security at a Northern Minnesota Company

Nonmonetary compensation includes benefits that are not tangible. How much value do employees place on job security? U.S. forest products manufacturers faced great challenges during the last two decades, resulting from dramatic drops in demand for their products. One of the first responses to such challenges is to reduce the workforce. Between 2005 and 2009, 1.1 million jobs were lost in the forestry and forest products sectors [15]. Marvin Windows and Doors, a family-owned company in Minnesota, decided to keep its 4,000 employees on the payroll and maintain health insurance benefits. Employees agreed to reduce weekly working hours from 40 to 32 and suspend a 401(k) match. The company's executives referred to this policy as a "long-term business strategy" that allowed them to retain valuable employees. The company received praise from President Obama in several speeches in 2012 [87].

Chapter Questions

1. Write a complete job description for the positions in your company.
2. Where will you advertise for employees?
3. Compile a list of interview questions that you will use for each position.
4. What are the training needs of each new employee?
5. Where will you find competitive information for wages and benefits for each position?
6. How will you evaluate employee performance?
7. How often will you have a standard evaluation of each employee?
8. How will you determine salary or wage increases for employees?

Chapter 5: Marketing Management

Entrepreneurs often overlook marketing when they want to start a business. In many instances an individual has a great idea for a product or service and assumes that there will be demand for it, or the individual may be very good at making a product. Unfortunately, quite often many other people are also good at making the product, and the individual has to identify why his or her product is better or different. All good business start-ups thoroughly evaluate the market before investing in the business. They need to completely understand their competitive advantage in the marketplace. By the end of this chapter, readers should have an understanding of the marketing mix for their product, know how to conduct easy market research, know how to reach potential customers, and have an understanding of online marketing methods.

Table 6. Marketing management activities.

Marketing management	Marketing fundamentals – the four P's	Product
		Promotion
		Price
		Placement
	Market research	Talk to customers
		Watch the competition
		Read trade publications
		Academic institutions
		Government agencies
	Market customization and niche marketing	
	Online marketing	Websites
		Email marketing
		Online promotions and ads
		Online social media

Marketing Fundamentals – The Four P's

Any marketing strategy should include specific plans for the company's marketing mix, which is the set of actions that the business can take to increase the demand for its products. These potential actions can be grouped into four categories — product, promotion, price, and placement (or distribution) — known collectively as the four P's of marketing.

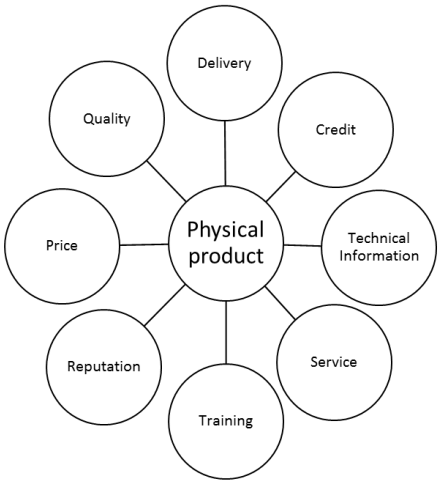
Product

A product is any physical object, service, place, organization, idea, or personality that satisfies a customer want or need. The three main types of products are commodity products, specialty products, and differentiated products.

- *Commodity products* are manufactured to a more or less standard set of specifications. Examples of commodity items include hardwood lumber, dimension lumber, and plywood. There is little differentiation in commodity products between manufacturers. For this reason, competition in the commodities market is based primarily on price. It is often a surprise to small and medium sized manufacturers of hardwood lumber just entering the marketplace how little control they have over the selling price of their products.
- *Specialty products*, on the other hand, are developed and offered to a small group of customers or a small market segment. Competition in the specialty products market is typically based more on product features and less on price. Because there is greater product differentiation with specialty products compared with commodity products, the potential for higher profit margins increases.
- *Differentiated products* are produced with differences or variations in order to satisfy different market segments. Compared with commodity and specialty products, differentiated products provide manufacturers with the greatest amount of control over selling price. Product differentiation is one of the most effective methods for increasing the value of your product.

Product differentiation involves developing a real or perceived difference between your company's product and that of your competitors. For a small to medium sized firm, one of the most effective methods of product differentiation is to manufacture a quality product and provide superb customer service. In the hardwood lumber market, for example, buyers want consistency in thickness, color, and grade. Many large-volume hardwood lumber producers do not have procedures in place to identify when their equipment is producing inconsistent lumber thicknesses. At larger sawmills, lumber that is sawn below a target thickness is often not identified until it is at the end of the production line. Depending on the accuracy of the lumber inspectors at the sawmill and the motivation level of the lumber stackers, lumber below the thickness specifications will end up being packed and shipped to the customer. As a low-volume manufacturer, your ability to inspect your product for consistent thickness and color enables you to better satisfy your customers' desire for quality. Remember that your product is more than its physical aspects, it includes nontangibles such as service and reputation as well as services such as delivery, credit, and customer support (see box on next page).

Total Product Concept



The total product includes not only the physical product itself but also the variety of image and service features that can impact customer satisfaction. This is collectively known as the total product concept. Components of the total product concept that are important to small and medium sized firms are quality, reputation, and service. By concentrating on these three components, small and medium sized firms can differentiate their product from those of competitors.

Promotion

The objectives of promotion are to inform, persuade, remind, and associate. Promoting your business and products serves to do the following.

- Build awareness among potential users.
- Differentiate your service from that of your competitors.
- Communicate the benefits of using your firm.
- Build a favorable image.
- Persuade customers to use your firm.
- Eliminate preconceived misconceptions.
- Advise existing and potential clients of new services.

A commonly used promotional method for small and medium sized operations is paid advertisements in local newspapers and trade publications. Paid advertisements should state the services you offer and your competitive advantage. An important aspect of paid advertisements is that the message should suit your target audience. If you are able to provide only small to medium volumes of lumber, that should be stated in the advertisement.

Developing a brochure about your company can also be an effective promotion tool for your business. Because the cost of paid advertisements in newspapers and trade publications is typically based upon the number of words and size, it can be expensive to completely describe your company. A personal computer and printer can be used to make an informative brochure that provides an overview of the capabilities of your organization in order to help a prospective client make a positive purchase decision. If you are able, hiring a professional writer, graphic designer, or both is likely a worthwhile investment. A brochure should include the following elements:

- A clear, positive image of the company
- Benefits available to clients
- What makes your firm unique
- The services you offer
- Professional information on the owners
- Qualifications and background of the firm
- Name, address, telephone numbers, and website of the firm
- Mission of the organization

When developing a brochure avoid including information that could become outdated in a year, such as pricing information. A common approach is to state that inquiries regarding current pricing can be made by calling your company.

Networking can help expand the number of people who are aware of your business. By joining a professional association, such as a local lumber drying society, networking efforts can be focused on those who will be directly interested in your business. Getting involved in local community efforts, such as by donating products to the local Boy Scout troop or the local high school wood shop class, can dramatically increase the number of your network contacts and generate good publicity, which serves as free advertising. Good publicity can create awareness of your company or product, build confidence in your buying public, and keep influential industry members apprised of your progress.

Price

Price is the amount of money that a customer gives up to acquire a given quantity of goods or services. The major factors affecting pricing decisions are:

- Customer reaction to pricing (price elasticity)
- Impact of wholesalers and retailers
- The competitive environment
- Costs of the development, manufacturing, and distribution of products

Price elasticity is the sensitivity of customers to a price change in terms of increases or decreases in the quantities that they will purchase. If demand is elastic, a small change in price will result in a large change in demand. If demand is inelastic, changes in price have little impact on demand. Customer reaction depends in part on the availability of acceptable substitutes and the urgency of their need. The distribution channel entities (wholesalers and retailers) affect pricing decisions by the different roles they play in the warehousing, distribution, and selling process. The degree of influence a company may have over pricing is affected by the competitive environment. In a market-controlled price environment such as hardwood lumber or engineered wood products, competition is high, products from competing suppliers seem similar, and there is little control over pricing.

Pricing has an impact on sales volume, profits, cash flow, inventory levels, image, potential for government regulation, and market competitiveness. Consequently, it is important to establish pricing objectives in order to clarify the role of pricing in overall corporate strategy. For small to medium sized manufacturing companies, pricing objectives are typically profit oriented. The goal is to maximize profits and achieve a target return on investment or sales. Larger companies tend to be more sales oriented when pricing their products. The goals of a sales-oriented pricing objective are to increase market share, maximize sales revenue, and generate traffic to the company [88].

Once the objectives of the pricing method have been established, a strategy is implemented to achieve them. For commodity items (e.g., dimension lumber), competitor pricing is the main determinant of price. In some instances companies can differentiate their products, either through service or quality, and create a greater perceived value for their products. With competition-based pricing, a price leader is typically a firm with a dominant market share that tends to lead the industry in terms of pricing. Competitors will usually watch the price leader and change their prices accordingly. Some price leaders can be so dominant that they have the ability to "force" competitors out through their pricing practices.

As small and medium sized lumber companies start developing specialty and differentiated products, it becomes important for them to move from a competitive-based pricing strategy to a cost-based pricing strategy. The first step is to determine a break-even point. A break-even analysis determines the number of units that need to be sold of an item to balance the sales revenue with the total cost of producing and selling that item. The break-even point in units sold is expressed as follows (a formula to calculate the break-even point using data from financial statements can be found in Chapter 7).

$$\text{Break–even point} = \frac{\text{Fixed costs}}{\text{Unit selling price} - \text{Unit variable cost}}$$

Although performing a break-even analysis in this fashion is oversimplified, and frequently even further simplification is made in practice, it is a useful tool that can indicate whether or not a competitive price can be reached on a proposed new product. Break-even analysis can also be used to determine how quickly a new product will become profitable and whether cost reduction moves are needed on an existing product.

Fixed costs are incurred whether or not your operation is running and often include property taxes, salaried employees, insurance, and payments on bank loans. Variable costs accumulate when your business is running and often include items such as fuel expenses, raw material purchases (e.g., logs, lumber, panel products), and supplies such as saw blades. Once you establish your break-even point you can then begin to mark up prices in order to make a profit. If you are not making a profit and are simply paying your bills, then it becomes difficult to grow your company. Consider the scenario in which it costs $150 to produce your product. If you want a 25 percent profit on that product, then the selling price should be $200, calculated as $150/(1.00-0.25).

Ultimately, you should strive to set price at a point that customers are willing to pay for the value they perceive in the product; however, that value can be difficult to quantify. If your local market is saturated with companies offering the same product or service, customers will usually choose the lowest priced one unless they perceive your product to be superior. Some common pricing strategies used by wood products companies are described in the box below.

Common Pricing Strategies Used by Wood Products Companies

- In establishing prices use some form of mark-up method that is logical, applicable, and relatively simple to implement. The problem comes in what the mark-up actually is and whether or not that amount adequately covers operating expenses.
- The most successful wholesalers appear to achieve some differentiation from competition through nonprice issues. Many wholesalers attempt and achieve little or no differential advantage and, consequently, compete solely on the basis of price. Many of these firms have not survived and others struggle.
- Among manufacturing firms, there is considerable variation in pricing methodology. Even successful manufacturers do not always use the “proper” pricing techniques.
- In the case of small manufacturers and wholesalers, pricing is frequently more an art than a science. Manufacturing or purchasing costs; overhead, general, administrative, and selling costs; and a reasonable allowance for profit are certainly considered, but often in more of an intuitive fashion than as part of a formalized pricing methodology.
- A practical pricing approach is to establish prices using a well thought out, frequently updated methodology and then to use a lot of intuition in formalizing the prices that are quantitatively determined. Obviously, if you don’t manage prices, they will manage you through low margins or lost sales.
- Many commodity producers use the prices in the Weekly Hardwood Review [28] or Random Lengths [29] publications as starting points and try not to lower their prices.

Placement

The fourth P of marketing is placement. Placement deals with the distribution channel (see box below), which is the method by which your product reaches the final consumer. Collectively the distribution channel is an inter-organizational system made up of all of the entities involved in moving things of value (products, services) from points of conception or production to points of consumption.

The Distribution Channel

Suppliers → Manufacturers → Wholesalers → Retailers → Consumers

Examining the distribution channel reveals how to most efficiently get a product to the intended customers. Because small and medium sized sawmills often deal in less volume than their larger competitors, they often have the option of distributing their product directly to one or more of the intermediaries along the distribution channel.

In order to choose the best distribution system, you must have a good idea of who your customers are. Once you identify your customers, there are three aspects of distribution to evaluate in choosing a method for each customer.

- *Feasibility*. What are the market needs and wants, capital requirements, reliability of the distribution channel, speed of product delivery, and suitability for target markets and market sizes?
- *Desirability*. Is the system practical? Does it meet your business needs?
- *Profitability*. Can margins be maintained at each level of the distribution system to make a reasonable profit? Who will promote the product? What costs are involved at different levels of the distribution system?

Figure 16. Loading lumber onto a ship (left) and truck (right). Photo credits: Robert Smith.

When choosing a distribution channel it is also important to understand the role of intermediaries. The main functions of intermediaries are as follows.

- Maintain contact with buyers.
- Negotiate on price and delivery.
- Establish contacts and agreements.
- Transfer title.
- Provide credit/collection.
- Service the product.
- Provide inventory and storage.
- Provide bulk breaking service.
- Arrange transportation.

Intermediaries fall into two classifications: those who take title to the product and those who do not. *Merchants*, who take title, include retailers, lumber yards, cooperative buying centers, jobbers, industrial distributors, distribution yards, wholesalers, reload centers, and home centers. *Agents*, who do not take title, include brokers and manufacturer's representatives. The type of product and customer will determine the type and number of intermediaries to use. As the number of intermediaries increases so does the length of the distribution channel. In general, the longer the distribution channel the lower your profit margin and the wider the distribution network.

Standard and Long Distribution Channels

Factor	Short channel	Long channel
Number of customers	Small	Large
Geographic concentration	High	Low
Order size	Large dollar value	Small dollar value
Complexity	High	Low
Product maintenance	High	Low

A number of factors (e.g., number of customers, geographic concentration) and order size should be considered when deciding on a short or long distribution channel. Typically, a longer distribution channel equates to lower profits, but it may make it easier to sell your product. A short channel typically requires more networking and work on the seller's part, which can translate to higher profits.

Market Research

If you are just entering the wood products market or are looking to expand your operations, you need to do some research on current and future aspects of the market that you are interested in. Market research is the systematic gathering, recording, and analyzing of data related to the marketing of goods and services. Initially, doing market research can be a daunting task as much of the easily

accessed market information comes from Wall Street and focuses primarily on markets controlled by larger corporate companies. Some methods for easy market research that will yield information pertinent for small and medium sized lumber companies are introduced in this chapter.

There are numerous sources for gathering the information needed to perform market research relative to your company. Market research is important in identifying trends that can open new opportunities for your business. It is true across all businesses that the companies that can identify and react to market trends tend to be leaders in their field. Focusing on your customers and competitors is a good start to performing market research. Other options for market research that can more precisely quantify market trends include subscription-based market reports, trade magazines, and trade associations. Developing a relationship with an academic institution that has a wood science program that provides some market information can also help you identify market trends. Numerous state extension specialists are also available for information regarding marketing and wood utilization questions.

The importance of doing market research cannot be understated. By doing market research you will enable your company to react to market changes faster, find new product ideas, service your customers better, and develop long-term selling opportunities. The underlying purpose of doing market research is to identify trends in the different markets that your company serves.

Talk to Customers

An easy way to start conducting market research is to talk to your current customers. They can provide information on changes in their product lines, which may be a trend in the entire market. Your customers can also communicate if they plan to increase or decrease output. Probably more importantly, your customers can provide input into the future of the markets that they are engaged in. Often your customers' attitudes toward the future will have a direct effect on your business. This information can provide you with some intuition into whether it is time to expand or change the current markets that you service.

Assessing Market Stability

The actions of your customers can be a good benchmark to how stable a specific market is. Increased purchasing of raw materials and equipment can imply that the market has potential for growth. Employee layoffs and sudden changes in management can suggest that they may fear the future of the market and are trying to reduce overhead costs.

Watch Competitors

To some degree, watching the actions of your competitors can provide insight into how healthy a market is. Take time to examine whether your competitors are introducing new products or eliminating existing products. If advertisements from your competitors are appearing more frequently in newspapers and trade publications, your competitors may know that the market is healthy and there are plenty of potential new customers.

Read Trade Publications

The problem with merely watching either your customers or your competitors is that there may be unseen factors driving their actions. Fortunately there are a growing number of information sources that provide quantitative information on wood product markets. Some subscription-based marketing publications that provide pricing information for the solid wood markets include Hardwood Review [28], Hardwood Market Report [27], Random Lengths [29], Crow's Market & Price Service (www.risiinfo.com), Lumber + Building Materials Daily [89], and Forest2Market [90]. In addition, these publications also routinely provide market forecasts for different segments related to the wood industry. Trade publications such as Northern Logger and Timber Processor, Independent Sawmill and Woodlot Management, Southern Lumberman, Wood & Wood Products, and Window & Door also routinely give market forecasts. Editorials and letters from readers in trade publications also offer some insight into what others think of various markets.

Many trade associations publish newsletters and membership directories that can provide information about what other companies are doing and where they are located. Newsletters published by trade associations often have a market outlook section along with important topics such as legislative issues that pertain to association members. While membership can be costly, it does provide valuable networking options. National and regional trade associations and trade and market publications are listed in Appendix A.

Access Information From Academic Institutions

Another source of information for market research is colleges and universities that have wood science programs or Cooperative Extension programs in the areas of forestry and forest products. Many academic institutions with wood science programs have faculty whose main focus area is marketing. There are currently 32 academic institutions identified by the Society of Wood Science and Technology as having programs in wood science or forest products (see list at www.swst.org). Some academic institutions have research centers that focus primarily on providing market research to wood-using companies. Depending on the policies of the research center, access to market research may be free or subscription-based.

Developing contacts at the academic institutions can often facilitate finding qualified candidates to work for your operation. Appendix A contains a list of centers and institutes that support the forest products industry.

Contact Government Agencies

The federal government and many state governments have specialists on staff to assist with the marketing and utilization of wood products. Contact information for the U.S. Forest Service as well as wood products extension specialists by state is listed in Appendix A.

Market Customization and Niche Marketing

Developments in communications (e.g., the Internet), strong domestic and international competition, and more sophisticated customers have ended the era of mass production and mass marketing. There is no "one size fits all" any more, and markets are moving to mass customization (producing goods that meet customers' unique needs at an industrial scale and at a reasonable cost). Consumers demand products customized to their specific needs. The success of a business will increasingly depend on its ability to (1) identify market niches that fit its core competencies, (2) successfully target these markets with promotion and the right distribution channels, and (3) position the company's brand in the minds of potential customers in a way that drives purchase behavior. This process is known as market customization (Figure 17).

Figure 17. Market customization process.

One particular market customization strategy that can yield good results for small or start-up businesses is niche marketing, which is a method for reducing competition and gaining more control over product prices. That is, in economic terms, with less competition, demand for a niche market product is less elastic. As such, the producer has more flexibility in setting price. If the producer raises prices there will be a less-than-proportional fall in the quantity demanded, the result being an increase in total revenues [91]. We see this strategy successfully applied in the niche beer market; thousands of microbreweries have sprung up across the country with specialty beers aimed at very specific tastes.

Mass marketing is the "shotgun approach," operating on the assumption that all customers have similar product needs. Niche marketing, however, recognizes that

the market is segmented into well-defined customer groups, each with its own set of needs that is best served by a more focused "rifle approach."

Producers of commodity products, like 2x4 framing lumber and 5/4 hardwood lumber, face strong competition from numerous other producers in a mass market. No producer has much control over the market price for its products, and none has enough production to be able to exert price leadership. They operate in a market structure approaching the economist's model of pure competition. As such, they are price takers, not price makers. In pure competition, demand for the products of the individual producer is price elastic; if a company tries to raise prices above the general industry level, they will lose business to competitors. A company can increase revenues if it drops its price below the general industry level. But a company may then get more orders than its capacity to fill and will soon raise prices back up to those of its competitors. In such a competitive environment, cost control is the single most important factor for profitable operations and survival.

The ideal niche market displays five characteristics.

- *Profitability*. The niche has adequate size and purchase power to be profitable.
- *Growth*. There is reasonable potential market growth.
- *Limited competition*. There is no competition from major players.
- *Competitive advantage*. The producer has the required resources, skills, and location to serve the market effectively and to do so better than its competitors.
- *Goodwill*. The producer can build enough loyalty among customers to defend and survive competition.

Although profitable niche markets may be discovered by accident, it is also possible for producers to be systematic in finding and developing niche opportunities. The following steps form the framework for deciding what to sell, where to sell it, to whom to sell, and at what price, so as to take advantage of a profitable market niche.

1. *Analyze the existing market*. Find out who the customers are, who the current players or competitors in the market are, what product or product lines and services are being offered, what prices are being charged, and what distribution channels are used in bringing products to customers. Information of this nature is often available from studies conducted by organizations such as the Center for Forest Products Business at Virginia Tech.
2. *Identify neglected or underserved market segments*. Determine if any segments in the existing market are currently neglected or underserved. Information may be obtained through personal observations, interviews with current market participants or consultants, trade publications, government publications, market information, or newspapers.

3. *Evaluate your strengths in serving identified segments*. Determine the resources and skills needed to be effective in satisfying the needs of perceived underserved or neglected market segments. Consider the raw material, equipment, skill, financial, and managerial resources required to be competitive. Also consider marketing requirements such as sales force size and distribution channel intermediaries. Additionally, determine the competition or rivalry, if any, to be expected in the market segments.
4. *Select the niche in which you have a competitive advantage*. Choose one or more market segments based on your strength, skills, location, and resources. Niche marketing can be risky as it may be temporary or may be attacked by competitors. Specializing in more than one niche may lower risk and increase the chances of success. How will your position in the market niche be protected?
5. *Develop a marketing program to meet the needs of this market*. For each niche chosen, determine the appropriate or best product, price, promotion, and distribution system to serve customers efficiently and profitably. Superior service can help build and retain customer loyalty.

Success in niche markets will not go unnoticed. Competitors will be attracted, each trying to make a better product, supply it at lower prices, or provide better service than the present niche occupant. The niche marketer should develop a close relationship with its customers, understand their requirements, find ways to help them do a better job or reduce their costs, and be responsive to their needs. Continuing attention to these factors will help guarantee lasting success in a niche market and help the producer avoid being tied to commodity markets.

Successful Niche Market Strategy Example

A family-owned business in Minneapolis, Minnesota, uses reclaimed wood from discarded trees in the "urban forest" to make items such as cutting boards, tablet computer holders, bottle openers, furniture, and decorative panels. The company marks each log with the zip code of the area from which the tree came and maintains this information throughout the manufacturing process to the finished product. "Wood from the Hood" has found a niche of customers who want to buy "local," from a sustainable source, and with clear identification with its origin.

Other examples of niche forest products include:

- Reclaimed wood from old buildings
- Athletic flooring systems
- Wooden golf clubs
- Proprietary grades for hardwood lumber
- Window grilles
- Barrel staves

Online Marketing

Online marketing has grown at a blazing pace; it now influences half of retail sales. More than three-quarters of U.S. residents have access to the Internet, and a growing number surf the Web on their smartphones. Rare is the company that does not have at least some online presence. From advertising to retail sales to product review websites, the Internet has revolutionized the way companies conduct business. It is an especially powerful tool for small and start-up businesses as it helps to level the playing field with other big players in the market. The days when only millions of dollars in advertising could control the message are gone. There are different components of an online marketing presence; each business must evaluate which ones are relevant and appropriate to its unique characteristics.

Websites

The first step in establishing an online presence is creating a website. The purpose of a website can range from promoting the company's brand, getting customer feedback, and providing product information to using it as another (or the only) channel of distribution by enabling customers to make purchases and conduct other transactions. However, while creating a website is relatively easy, maintaining and growing traffic to it is more challenging. A website must provide value to customers in the form of detailed product information, links to other resources, feedback mechanisms, and more. Some kitchen cabinet companies, for example, provide visitors with online tools that allow them to "design" their kitchen, with great visualization tools.

Email Marketing

Email is another growing marketing tool. Using email enables companies to send personalized messages to potential and current customers. Tailored messages or newsletters allow businesses to reach narrowly defined niches. The most effective way to reach customers using email is by allowing them to opt-in to periodic messages with promotions, coupons, or useful information. Potential customers fill out a form to provide consent and other useful information that facilitates the company to better tailor its email marketing efforts.

Online Promotions and Ads

As more people use the Internet, companies are spending more on placing ads online. Total spending on online advertising in the U.S. is projected to reach $37.6 billion in 2019, almost double its level in 2014 [92]. The most common type of online ad is that which appears when someone makes a query using a search engine (e.g., Google). A second type of online ad is sponsorships, in which

companies sponsor content in specific websites. One subclass of online ads is mobile marketing, in which messages and promotions are delivered to customers' cellphones. According to eMarketer, mobile advertising is expected to reach 14 percent of all spending in media advertising in 2015 [93]. A kitchen cabinet manufacturer, for example, provides a free smartphone application via its website for users to find recipe ingredient substitutes (e.g., how to substitute plain yogurt for buttermilk). The app's appearance reflects the company's brand and contains links to the company website.

Social Media

More and more companies are trying to harness the power of social media networks to generate word of mouth and increase brand awareness (see box below). Companies interested in using social media to support their marketing efforts can join an existing online community or create their own. Participating in existing social media has its challenges — most important, the company cannot control the environment, and presence must be earned by providing some value to the audience.

Using Social Networks to Market Your Product

The number of people participating in online social networks is growing at an exponential rate. As of 2014, Facebook had close to 1.4 billion active users [94], while Twitter had 284 million active users [95]. Professional networks such as LinkedIn or Research Gate are also thriving. Some companies consider an active participation in social media as an alternative to traditional advertising, but social media can serve to amplify traditional advertising rather than replace it. A cleverly planned and executed social media strategy can greatly improve awareness and the reputation of a business and its products, and generate favorable word of mouth. It is important to note that, contrary to popular belief, social media marketing is not free as there are costs and time associated with creating content and potentially paying consultants to help build and implement the social media strategy. Regardless of the social platform you use, the following recommendations can help in achieving a successful social media strategy.

- Closely monitor the conversations related to the product/company (or the competitors'); look for opinions, viewpoints.
- Identify influential individuals and their traits, and offer incentives to them to help you spread positive word of mouth.
- Use social media to spread the word about offers, sales, or events.
- Use social media to invite potential customers to help "shape" an offer or design.

Wood products industries have been very slow in adopting social media as a marketing tool. A survey of 600 wood products firms conducted by the market intelligence firm Random Lengths concluded that more than half do not use social media and do not have plans of doing so in the near future [96]. Predictably, those companies dealing directly with customers showed higher adoption rates, whereas mills showed very low adoption rates. Some reasons mentioned for this lack of acceptance are skepticism about return on investment, fear of exposing critical information, or, simply, lack of time.

Communicating the Environmental Attributes of Wood Products

Awareness of environmental issues is growing among American consumers. Proof is the explosion in "eco-labels" during the last decade. According to a Green Brands Survey, 73 percent of U.S. consumers say it is very important or somewhat important to buy from green companies [97]. A survey of manufacturers found that 81 percent of participants consider it very important or somewhat important to produce environmentally sustainable products [98]. Companies want to show their environmental credentials by promoting their products and processes as environmentally friendly; and virtually all major corporations have some sort of "environmental sustainability section" in their corporate responsibility website.

Some recommendations to communicate the environmental attributes of wood (based in part on [99, 100]) include the following.

- Connect your environmental message with a moral or emotional point, such as preserving the planet for our children.
- Use personal health and planet preservation (endangered species preservation) issues as leverage points.
- Use green colors, animals, and natural landscapes in your advertisements.
- Use a green label. Certify your operation by one of the recognized certification systems, such as the Forest Stewardship Council (FSC) or Sustainable Forestry Initiative (SFI), and use the logo in your ads. Alternatively, some industry associations have their own green labeling program, such as the Kitchen Cabinet Manufacturers Association's Environmental Stewardship Program (ESP) [101].
- Avoid making misleading environmental claims (see box on next page).

Green Advertising or Greenwashing?

Greenwashing is "the business practice of misleading consumers through 'green' marketing about the environmental benefits of using a product or service when no such benefits really exist" [102]. A study by TerraChoice found that 99 percent of more than a thousand consumer products surveyed were guilty of greenwashing. According to the same company, the "six sins of greenwashing" [103] are (1) hidden trade-off (the most common), which means basing a claim solely on one attribute, disregarding other potentially more important attributes; (2) providing no proof, making a claim that cannot be supported by a reliable third party or by information that is easily accessible; (3) vagueness, claims defined in a broad manner, in a way that that consumers usually misunderstand; (4) irrelevance, making a claim that is truthful but unimportant; (5) the lesser of two evils, claims that may be true within a category of products but not of the category as a whole; and (6) fibbing (the least common), which is simply making a false claim.

The Federal Trade Commission (FTC) prohibits deceptive messaging in advertising, including deceptive environmental claims. For more information and the rules and regulations regarding green advertising, and to make sure you are in compliance with the FTC's "Green Guides," visit business.ftc.gov/advertising-and-marketing/environmental-marketing. Try to identify the problems with the following statements (from the FTC website).

- "When you build with [BRAND] recycled plastic lumber, you demonstrate your commitment to the environment and sustainable living. [BRAND] recycled plastic lumber products are 100 percent plastic and generally contain over 90 percent recycled high density polyethylene (ReHDPE) material."
- "[BRAND] paper plates are made from 100 percent paper, a renewable natural resource. Our product is SFI certified, which means it is renewable, recyclable, and compostable."
- From a printed advertisement for a window brand: "50 percent savings guaranteed. Customer testimony: Our energy use dropped so much after installing your windows that [ELECTRIC UTILITY] thought our meter was broken!"

Research has repeatedly shown that products made of wood are by far superior to alternative materials (see box on next page); however, the forest products industry has not done a very good job of communicating these attributes to the public.

What Science Says About the Environmental Performance of Wood Products

Which of these alternatives produces less environmental impacts: engineered bamboo flooring vs. solid oak flooring, steel studs vs. softwood studs, a house made of concrete vs. a wood-frame house? Answering these questions is not easy. First, we need to consider the impacts of a product throughout its entire life cycle, from raw material extraction to disposal/recycling. Second, there are thousands of variables involved, and it is an intimidating task to keep track of all of them. Fortunately, there is a tool to determine the environmental impacts of any product, process, or activity in a scientific manner. Life cycle analysis (LCA) is a standardized approach of systematically accounting for the flows of materials and energy of a product associated with its life cycle. The environmental impacts are grouped into categories such as global warming potential, eutrophication potential, acidification potential, and ozone depletion potential.

The following table is an example of the results from a study that compared flooring of different materials, including solid pine. Results show that solid wood has the best environmental performance in seven of the nine impact categories.

Impact category (all units per m^2 of flooring)	**Linoleum**	**Vinyl**	**Solid wood**
Service life (years)	25	29	40*
Energy consumption (MJ equiv.)	13	29	-64*
Global warming potential (g CO_2 equiv.)	1,600	4,174	424*
Acidification potential (g SO_2 equiv.)	13*	31	24
Eutrophication potential (g phosphate equiv.)	1.7	1.3*	4.2
Ozone creating potential (g ethene)	2.5	0.9	0*
Ash waste (g)	555	801	198*
Sector specific wastes (g)	17.2	197	0*
Hazardous waste (g)	236	212	0*
Dust generated (g)	34.5	6.8	1.2*

Source: [104] as cited by [105]

* Denotes best performance.

Some sources for studies about the environmental performance of wood products using LCA are listed below.

- Consortium for Research on Renewable Industrial Materials (CORRIM) www.corrim.org/
- The American Hardwood Export Council (AHEC) www.americanhardwood.org/sustainability/life-cycle-assessment
- WoodWorks www.woodworks.org/why-wood
- Dovetail Partners Inc. www.dovetailinc.org/programs/responsible_materials/main_page

Chapter Questions

1. Who is your target customer?
2. List five reasons why your customer should purchase your product over others in the market.
3. Identify three methods to communicate with your target customer.
4. Draft an advertisement for your company.
5. Where is information available on your market and customer?
6. What will be your promotional message?
7. How will you physically get your product to your customer?
8. How will you calculate the price of your product?
9. Develop a “Total Product Diagram” for your company/product.

Acknowledgment

This chapter is based in part on work published by Robert L. Smith, Edward Cesa, and Patrick M. Rappold in “A Marketing Guide for Small and Medium Sized Primary Forest Products Processors” [106].

Chapter 6: Operations Management

Operations management is the set of value-creating activities in a company, in which value is defined by the customer. It includes the transformation of inputs to produce goods and services [107]. Meeting market demand requires a full understanding of the processes and concepts associated with operations management. Operations management comprises the activities listed in Table 7.

Table 7. Operations management activities.

Operations management	Operations design	Product development
		Manufacturing strategy
	Managing operations	Production planning
		Inventory management
		Quality and process control
		Maintenance

Product Development

Product development is one of the most important sources of growth for any company. It also has long been recognized as a source of competitive advantage. In the U.S., new products (those in the market for three years or less) account for about 28 percent of American companies' sales profits [108]. The wood products industry (NAICS code 321) spends only 0.6 percent of total sales on research and development; in comparison, the computer electronics industry spends 7.6 percent [109]. Given the losses in manufacturing capacity to imports and substitute materials, and as a consequence of the Great Recession, innovation and product development are more important than ever for the sustainability of the U.S. forest products industry.

The product development process consists of the steps taken to conceive, design, and commercialize a product [110]. Product development includes improvement to existing products, product-line extensions, new product lines, and new-to-the-world innovations. Successful companies are more likely to have some type of formal and well-structured product development process. People think of product development as a purely creative process, but, in fact, it involves specific steps, documentation, and improvement. Structured development processes make the decision process explicit, ensure that all important issues are included in the discussions, and are usually well documented, which helps as a future reference and to train new team members.

Approximately 25 to 45 percent of new product projects fail and do not make it to market, and about 46 percent of the resources spent on the development and launch of new products go to ventures that do not succeed [108]. The major causes

for new product failure are inadequate market analysis, product defects, lack of effective marketing effort, higher costs than anticipated, and competitive reaction [108]. In addition, product launches fail because of the inability to support fast sales growth, products falling short of claims, and no clear market for need for the product [111].

Every organization has a different product development process, some more structured than others. Furthermore, variations in product development processes can exist in the same organization for different types of development projects. There are also several frameworks for product development available, such as the Stage-Gate process by Robert G. Cooper [108], the New Product Development process by the Product Development & Management Association [112], and processes based on the Toyota product development system [113, 114].

Regardless of which process is adopted, some steps are needed for an effective product development project. Based on Ulrich and Eppinger [110], these steps are (1) planning, which includes opportunity identification, the project's mission statement, and allocating resources; (2) concept development, including generating alternative product concepts to satisfy a need in the market and selecting a few concepts for further development; (3) system-level design, which involves defining the product architecture, including its major subsystems and components; (4) detailed design with complete specifications of geometry and materials, and tooling design; (5) testing and refinement, in which the product is tested in its intended environment and refinements are made based on the results; and (6) production ramp up, including manufacturing the product with the intended production system, training the workforce, and correcting any issues before full production (Figure 18).

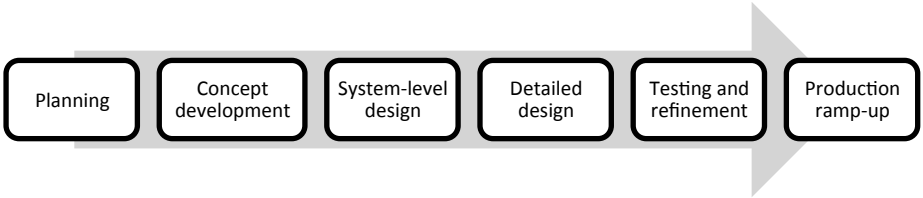


Figure 18. Basic product development process [110].

Manufacturing Strategy

Manufacturing strategy is a firm's approach to transforming inputs (raw materials) into outputs (finished products). The objective of a manufacturing strategy is to meet customer needs while allowing the firm to meet its business objectives. Manufacturing strategy decisions have a profound and long-term impact on manufacturing efficiency and flexibility, as well as costs and output quality [107].

In a manufacturing strategy, the company makes decisions regarding the components of the manufacturing system: machines, workstations, queues, material handling, and process plans. Decisions about the manufacturing strategy have direct implications for plant layout, which is the physical distribution of machines, material, material-handling equipment, people, and information. There are four basic manufacturing strategies (Table 8).

Table 8. Basic manufacturing strategies.

Product variety	Production volume		
	Low	Moderate	High
High	Process-oriented		Mass-customization
Moderate		Cellular production	
Low			Product-oriented

Product-Oriented Strategy

Also called continuous process, product-oriented manufacturing is used when the variety of products manufactured is low and the volume produced is high. Paper, lumber manufacturing, and solid wood flooring are typically manufactured using a continuous process. Figure 20 shows the layout of a typical medium-volume sawmill. Product-oriented factories are arranged around a product and use highly specialized and often automated equipment; operations are highly standardized and throughput times are very uniform. Some advantages of this system are very reliable timing of orders since cycle time is fairly constant, and quality is relatively easy to control and maintain since the product and the process are very standardized. Also, a less-skilled workforce is needed compared with other manufacturing systems.

Figure 19. Two modern softwood sawmills, each using a typical product-oriented process. Photo credits: Omar Espinoza (left) and María Fernanda Laguarda Mallo (right).

Perhaps the biggest advantage of product-oriented manufacturing is that the production cost per unit is low. This is explained by several reasons: highly specialized equipment has a high throughput so fixed costs are distributed over a large number of products; a less-skilled workforce is needed, lowering labor costs; and lower levels of in-process inventory are needed.

Since product-oriented operations consume raw materials and supplies in great amounts, quantity discounts are possible from suppliers. Routing, scheduling, and control of product-oriented plants are also simpler. On the other hand, product-oriented factories are not very flexible, and changes to product or production rate are very difficult and costly. For the same reason, stoppage of production lines is an expensive proposition. Very specialized equipment requires a large investment and is costly to maintain, and machinery modification is difficult. From a human perspective, repetitive and simple tasks increase boredom in the workforce, contributing to employee dissatisfaction and absenteeism.

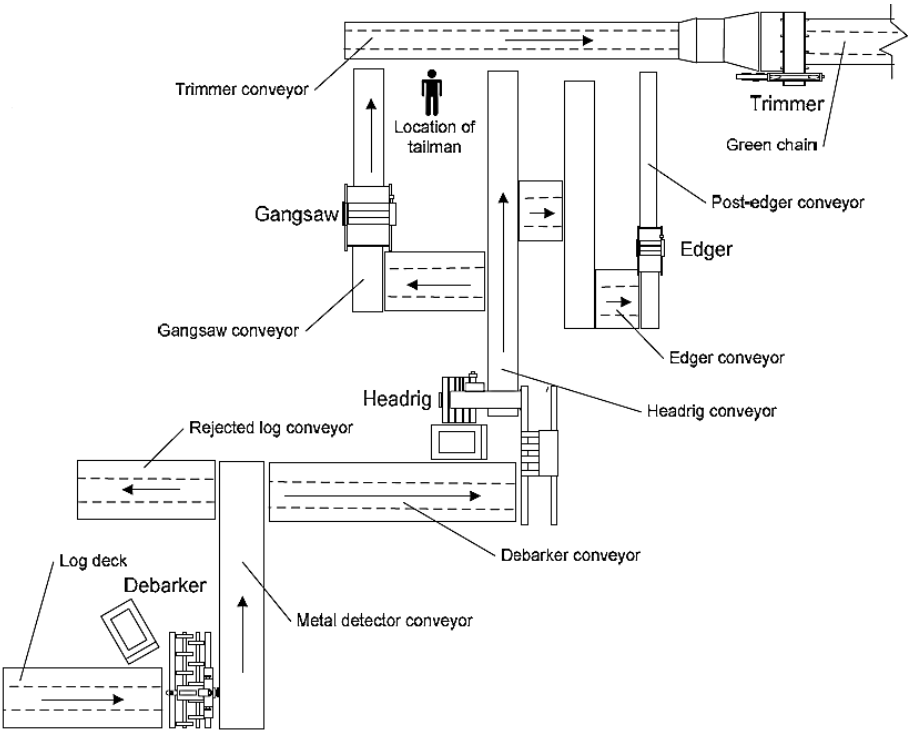


Figure 20. Process and layout of a typical medium-volume hardwood sawmill [115].

Process-Oriented Strategy

A process-oriented strategy, also called job-shop strategy, is appropriate when the variety of products manufactured is high (many different stock-keeping units or SKUs) and the volume produced of each product is low. A plant that adopts a process-oriented manufacturing strategy is organized in departments, with each one specializing in a specific function such as finishing or material preparation. Figure 21 illustrates a job-shop plant configuration. Custom cabinet shops and custom architectural millwork plants are typical examples of process-oriented settings. In a process-oriented factory, there is a lot of transportation of materials and people, and large variations in cycle times. Some advantages of this manufacturing strategy are that it allows the firm to respond to changes in demand (flexibility); general equipment is used, which requires less investment and is easier to modify and maintain; and there is no need to halt the entire plant when one functional department stops.

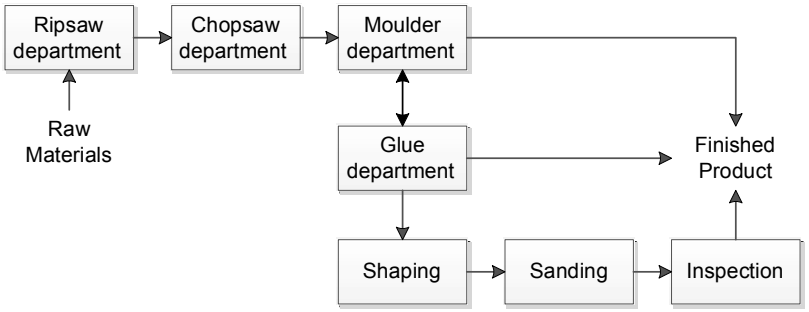


Figure 21. Layout for a process-oriented stair part manufacturing strategy.

From a personnel standpoint, a process-oriented strategy requires a more skilled workforce, responsibility and pride increase, and boredom from repetitive tasks is reduced [116]. The major disadvantages of a process-oriented strategy are that it carries high variable costs owing to the slow rate of production, the high level of skill required from workers, and usually high levels of raw material and in-process inventories. A process-oriented plant is very complex to manage, owing to the variety of inputs, outputs, and processes — tracing a particular work order becomes a difficult task, and quality is variable and difficult to control.

Figure 22. In stair parts manufacturing, transformation takes place in different machining centers, such as "gluing" and "turning." Photo credit: Omar Espinoza.

Cellular Production Strategy

A cellular production strategy combines the product- and the process-focused strategies, allowing some of the benefits of each system, namely to produce a large variety of products in short cycle times and at relatively low cost. This type of manufacturing strategy is appropriate when moderate levels of product variety and throughput are required. Cellular manufacturing is made possible by group technology — a set of techniques that cluster together parts and components with similar process needs into "families." Machines are arranged in "cells" capable of producing a family of parts, similar to a production line.

There are many approaches to classify the products and components into families, for example, by process sequence or geometry. Workers in a cell are organized in teams that have all the necessary skills to complete production of the family of parts assigned to that cell. Many of the advantages of cellular production derive from the fact that set-up times are lower than in a job-shop setting. By reducing set-up time, assets can be utilized to produce instead of being idle. Smaller batches are also more economical to produce, allowing the firm to make more customized products and be more flexible in responding to customer needs, and lower inventory levels are possible when batch sizes are small. A major advantage of cellular manufacturing is that working in autonomous teams in a cell enhances accountability and responsibility, reducing the need for control and improving quality, which is usually high. Cellular manufacturing is suitable for stair parts manufacturing, where a few product families (treads, rails, balusters, and newels) can be produced in cells or "mini-plants." Table 9 illustrates a possible grouping of stair parts by process needs, and Figure 23 compares a traditional process-oriented layout with a cellular layout.

Table 9. Product families in stair parts manufacturing.

Processes	Stair parts			
	Newels	Balusters	Rails	Treads
Rough mill	•		•	•
Double-end trimming	•			
Finger-jointing			•	
Clamp-carrier gluing	•			•
Radio-frequency gluing			•	
Turning	•	•		
Moulding			•	•
Sanding	•	•	•	•
Packing	•	•	•	•

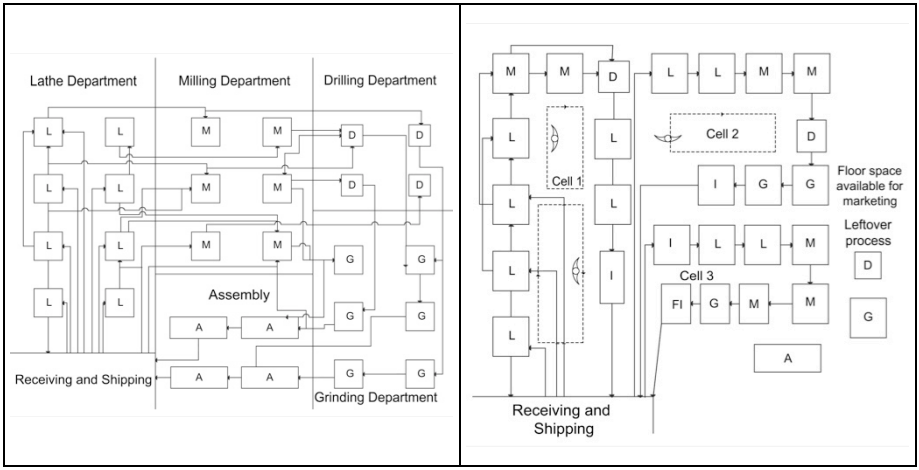


Figure 23. Traditional process-oriented layout (left) and cellular manufacturing layout (right) [117].

Mass-Customization Strategy

Increasing numbers of sophisticated customers are demanding customized goods, and companies are offering a growing number of choices. This presents manufacturers with the challenge of achieving seemingly contradictory goals: produce highly individualized products at a relatively low cost and in a short time frame. The manufacturing strategy that solves this trade-off between customization and efficiency is known as mass customization. Stanley Davis defined mass customization as production and distribution of customized products for mass markets [118]. Companies such as Dell and Toyota have demonstrated that mass customization is a strategy with considerable returns. Dell can assemble a

customized computer in less than a day, and Toyota can deliver custom-ordered automobiles in five days [107].

Mass customization has been proposed as an approach to improve the competitive position of U.S. wood manufacturers, particularly furniture makers, who have seen huge market erosion by imports during the last two decades [119, 120]. The reasoning is that customized furniture can provide domestic producers, who are close to the market, with a sustainable competitive advantage [120]. In the U.S., the kitchen cabinet and office furniture industries have leveraged some of the benefits of mass customization, and, coincidentally, the impact of low-cost imports on the market share of these two sectors has been lower. Market share of imports of nonupholstered furniture grew 21 percent from 2004 to 2008, whereas that of office furniture and kitchen cabinets grew by 5 percent and 2 percent, respectively. Some of the levels of mass customization are explained in Table 10.

Table 10. Levels of mass customization in the furniture industry [120].

Level of mass customization	Description
Popularizing	Limited number of furniture collections. Items sold off the shelf and positioned at low end of price structure.
Varietising	Broader range of furniture. Retailers sell select items off the shelf and rely on quick delivery for fast replenishment. Simple changes to a standard line, such as different colors, are offered.
Accessorizing	Standard core modules personalized by adding accessories and finishing options. Final assembly by the customer, retailer, or manufacturer.
Configuring	The customer can design furniture by selecting from a set of standard components or modules. Software tools are often used for this purpose.
Tailoring	Customer is closely involved in product design, with no predefined modules or components, with some limitations to ensure efficiency.
Servicing	Customer can develop a complete furnishing concept. A professional designer helps the customer add accessories, colors, or wallpaper matching the customer's taste.
Adjusting	Product is adjusted to customer requirements after use, for example, an adjustable chair that "evolves" as the child grows.
Monitoring	The evolving needs of the customer are monitored to know when to offer new products or services. New furniture matching the customer's evolving lifestyle can be suggested at certain moments.

Mass customization is not without its challenges. It requires technologically advanced manufacturing capabilities and a well-trained and motivated workforce. Mass-customization adopters need to implement sophisticated inventory management systems since inventories need to be kept at a minimum to avoid obsolescence and high costs. Companies need to establish close collaborations with their supply chain partners to ensure timely deliveries and avoid inventory stock-outs.

Production Planning

Production resources, such as materials, labor, energy, and time, are always limited, thus a firm needs to use them efficiently to meet customers' orders at a reasonable cost for the company and with a desired service level to customers. Production planning matches the available resources with demand. Well thought-out production plans allow the firm to minimize costs, keep changes to production rates at a minimum, and maximize customer satisfaction. Production planning has several levels depending on the planning horizon. Figure 24 illustrates the different stages of production planning and the time horizon for each phase.

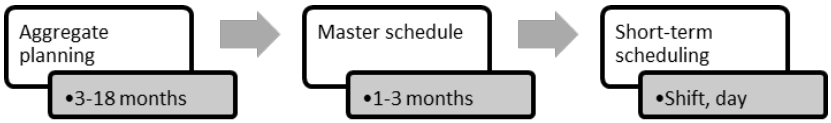


Figure 24. The different levels of production planning.

Aggregate Plan

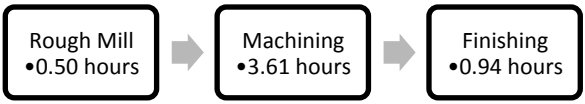
An aggregate plan is a mid-term plan for operations. In aggregate planning, production management plans the rate of output needed to meet demand over the following three to 18 months. An attempt is made to find the combination of monthly inventory and workforce that minimizes production costs during the planning horizon. The time unit used is typically one month. Critical inputs for aggregate planning are the sales forecast, inventory policies, staffing policies, and overtime policy. The units of aggregation used can be product lines or product "equivalents." The outputs of aggregate planning are production rate, workforce needed, and inventory levels. The aggregate plan informs decisions such as hiring or laying off workers, adding or subtracting shifts, adjusting working days or working hours, outsourcing production, and building up or depleting inventories.

Master Schedule

The master schedule uses the information in the aggregate plan and specifies what needs to be manufactured and when. The planning horizon for a master schedule is typically three months and the time unit used is one week. While the aggregate plan considers families of products, the master schedule deals with specific products. Typically, a master schedule (or part of it) is "fixed" in the short term (e.g., six to eight weeks), meaning that no changes can be made during that time, to facilitate planning. Existing orders are incorporated into the master schedule and comparisons are made between the output proposed and the existing capacity (in terms of labor, machine availability, and lead time). An example of aggregate and master planning is provided in the box on the following pages.

Aggregate and Master Planning in Door Manufacturing

A solid wood door manufacturer produces against firm orders. Its production process is illustrated in its simplified form in the following figure. The average time it takes a product unit to be processed at each step is listed in each box.



Two strategies can be adopted when developing an aggregate plan: (1) a chase strategy, in which the production output matches the demand for each period; and (2) a level strategy, in which the production output or the labor force is uniform for all periods. Assuming a chase strategy, the production equals the demand, as shown in the following table. The labor hours for each manufacturing area are simply the number of units to be produced multiplied by the time it takes for a unit to go through that section (e.g., for January the labor hours needed in the rough mill are calculated as 305 units x 0.5 hours). Labor needs are calculated dividing the labor hours by the total available hours in the period (e.g., in February the machining section would need to be staffed with six operators, resulting from dividing the labor hours calculated for that section and period, 1,102, by the total available hours in the period, 195).

Item	Jan.	Feb.	March	April	May	June
Demand (units)	305	305	305	289	289	289
Available hours	216	195	207	216	195	199
Available days	27	25	26	27	25	25
Production (chase strategy)	305	305	305	289	289	289
Labor hours						
Rough mill	153	153	153	145	145	145
Machining	1,102	1,102	1,102	1,044	1,044	1,044
Finishing	286	286	286	271	271	271
Total hours	1,540	1,540	1,540	1,460	1,460	1,460
Labor needs (operators)						
Rough mill	1	1	1	1	1	1
Machining	5	6	5	5	5	5
Finishing	1	1	1	1	1	1
Labor cost per hour (average)	$14	$14	$14	$14	$14	$14
Labor costs	$20,796	$20,796	$20,796	$19,705	$19,705	$19,705

This simplified example assumes that there is no inventory at the beginning of each period. In more realistic scenarios, available inventories need to be taken into consideration and discounted from the production needs. Labor needs can be compared with set policies to make decisions about hiring or layoffs, or resorting to overtime if the need exists. Obviously, when the costs associated with these actions are factored into labor costs, estimates would change. Different strategies can be formulated and compared when using a Microsoft Excel spreadsheet or specialized software.

Aggregate and Master Planning in Door Manufacturing (cont.)

Based on the aggregate plan, a master schedule for the month of January could look like this:

January					
Aggregate plan	**305 units**				**Total**
Week	**1**	**2**	**3**	**4**	
Door style 1		50		25	75
Door style 2	55		55		110
Door style 3		60		60	120
Total	55	110	55	85	305

A master schedule contains specific products or major subassemblies. Several challenges need to be addressed when putting together the master schedule — mainly achieving sometimes conflicting objectives, such as meeting customer deadlines, minimizing inventory, maximizing productivity, minimizing changeovers, and maximizing uniformity. As with the aggregate plan, this is an iterative process, where several versions of the master schedule are evaluated based on costs, impact on customer satisfaction, and resource availability.

Short-Term Scheduling

In short-term scheduling, the release of orders into the production system is planned. The short-term schedule translates the master schedule into specific job sequences and makes assignments for machinery, materials, and personnel. In short-term scheduling, demand (either firm customer orders or forecast) is prioritized and assigned to available resources. From this immediately follows that some sort of prioritization criteria should be used, such as to maximize utilization, minimize completion time, minimize in-process inventory, or minimize customer waiting time [107].

Inventory Management

Inventory is one of the most expensive assets of forest products companies. At the end of 2011, forest products companies (including the wood products, paper manufacturing, and furniture and related products sectors) had close to $140 billion in total inventories [121]. Some of the purposes of maintaining inventories at various points in the production cycle are to shield the manufacturing process from fluctuations in supply and demand, to buffer individual operations against equipment breakdowns, and to obtain financial benefits from quantity discounts and hedge against inflation. There are three basic types of inventories: raw materials inventory (e.g., lumber, parts and components), work-in-process inventory (e.g., subassemblies, unfinished case furniture), and finished goods inventory (e.g., prefinished solid wood flooring ready to ship, kiln-dry lumber). The costs associated with maintaining inventories are listed in Table 11.

Table 11. Costs associated with maintaining inventories.

Cost	Description
Ordering costs	Costs associated with placing the purchase order. These have been greatly reduced with the use of online-based ordering.
Holding costs	Its major components are financial costs, storage costs, and risk costs.
Stock-out costs	Costs incurred by not having the required item on hand when needed, either for sale to the customer or for starting a production run.
Cost of goods	Actual costs of acquiring the items.

Figure 25. Lumber is the costliest inventory item in many forest products companies. Photo credit: Omar Espinoza.

Carrying inventory is expensive, and the level of control required is not the same for all inventory items. Companies naturally will have a tight control of the most valuable items (e.g., imported hardwood species, finished cabinet doors and drawers) and will be less rigorous with those items that are not as critical (e.g., hinge screws for cabinet doors, packaging paper for finished products). The ABC classification system helps companies segregate inventory in a cost-effective way to manage it according to its importance. ABC analysis uses three inventory classifications according to the Pareto principle, which maintains that "relatively few factors account for a disproportionally high share of the occurrences of an event" [122]. Thus, companies should focus on those few items that are critical.

To classify inventory items, the annual cost per item is calculated and sorted from highest to lowest. Those items making up to about 70 to 80 percent of the total inventory value are classified as "A" items (these will typically represent only about 15 to 20 percent of the items); items that are 15 to 25 percent of the total value are "B" items (representing about 30 to 40 percent of the items); and items that are about 5 to 15 percent of the total value are "C" items (representing about 45 to 55

percent of the items). “A” items are more tightly physically controlled than “B” or “C” items, and the accuracy of the records is verified at a higher frequency. For example, “A” items are counted every month, “B” items on a quarterly basis, and “C” items every six months or once a year.

Quality and Process Control

Variation is a fact of nature. No two manufactured items are identical. However, quality is inversely proportional to variability, and customers perceive excessive variability. Thus, improvement of quality will require the reduction of process variability [123]. When variability is reduced, overall product performance improves, there is less need for inspection, and products with lower variability can potentially be sold at a premium [124]. The most important tool for the reduction of process variation is statistical process control (SPC). SPC is the “use of statistical tools to achieve process stability and improve capability through the reduction of variability” [123]. The primary technique of SPC is the control chart, which is a graphical representation of a process quality characteristic measured over time. This performance is compared with a set of limits to determine whether a process is in statistical control (Figure 26).

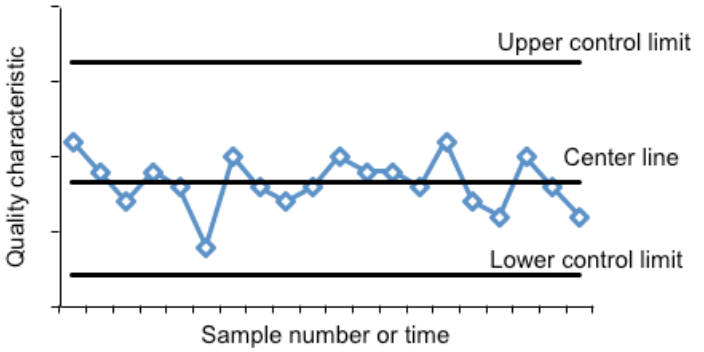


Figure 26. A basic control chart.

Any process has some inherent variability owing to “common causes” of variation, also called random variation, noise, or non-controllable variation. Common causes form a pattern and often follow a normal distribution. Normal variability is small and its reduction requires process redesign. On the other hand, non-normal variability is due to “special causes” of variation, also called “assignable” causes. Special causes result in significant departures from the pattern formed by common causes.

A control chart works by detecting special causes of variation. If the sample averages fall between the upper and lower control limits, it is concluded that only

common causes of variation exist and the process is considered in statistical control. If one or more points fall outside the control limits, it is said that special causes of variation exist and the process is considered out of statistical control and corrective action is needed.

Depending on the type of data, different options for control charts are available. The most common is the average and range chart (*x* and *R* chart), which uses measurable data such as the dimension of a furniture component or lumber thickness coming from a headsaw. Charts also exist for counted data, such as percent defective or proportions (*p* chart) and number of nonconformities (*c* chart). The steps to implement an *x* and *R* control chart are listed below.

1. *Select attribute to control*. It should be a critical quality characteristic or one that needs attention due to high defect rates.
2. *Conduct a trial study*. A sample is taken of 50 or more measurements (for example 10 samples of five units) in order to calculate the control limits.
3. *Calculate limits and centerline*. The centerline is the average of the process. The control limits are usually calculated at three standard deviations above and below the centerline.
4. *Implement chart*. Small samples (e.g., five units) are measured; the average and range are calculated and then plotted. If points are within the control limits, no action is taken; if points are outside the control limits, causes are investigated and corrective action is taken.

Maintenance

The mission of maintenance is to sustain the capability of the manufacturing system. It includes all of the actions to keep equipment in good working order so it delivers the expected level of performance and reliability. Companies can adopt two basic types of maintenance strategies: reactive maintenance, which occurs in response to equipment breakdown; and preventive maintenance, involving scheduled inspections and servicing. Two other categories that are adaptations or enhancements of these two basic types of maintenance strategies include predictive maintenance, in which sophisticated techniques and instruments are used to monitor machinery operation in order to detect early signs of failure, and autonomous maintenance, also known as total product maintenance (TPM), which is explained later in this section. Table 12 summarizes the four maintenance strategies.

Table 12. The four types of equipment maintenance.

Maintenance strategy	Description
Reactive	Fix equipment when it fails. Includes standby (machine is not used until fixed) and redundancy (machine capable of similar function is used while main machine is being repaired.
Preventive	Perform maintenance at scheduled intervals. Includes overhauls, replacements, and routine checks. Tools used include checklists, lubrication schedules, work orders, and equipment histories.
Predictive	Noninvasive action to monitor machine condition. Includes diagnostic monitoring using instruments such as vibration meters, heat sensors, and contaminant monitors.
Autonomous	Overall equipment improvement. Includes redesign and modification to improve equipment lifespan and safety.

The strategic importance of maintenance is difficult to overstate. Figure 27 compares preventive maintenance and breakdown costs. As preventive maintenance efforts increase, so do their costs, but more breakdown costs can be prevented. Breakdown costs include not only the cost of repair but also costs such as inventory to buffer against production disruptions from machine breakdowns, decreases in productivity owing to reduced employee morale, or costs associated with late deliveries. The optimal cost is achieved when no breakdowns occur and total costs equal preventive maintenance costs (dashed vertical line).

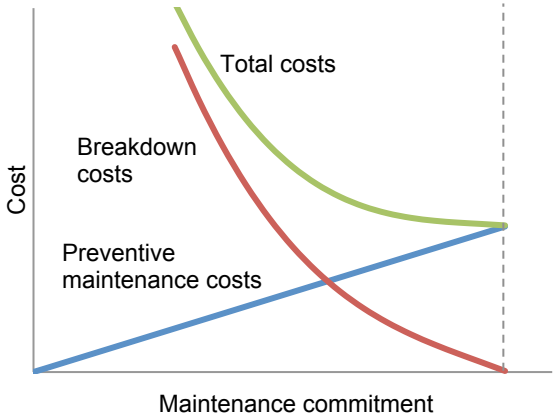


Figure 27. Maintenance costs [107].

Recent Trends in Operations Management

In part as a response to developments such as increasing competition from low-cost imports, the growing use of alternative materials, and the economic downturn

that started in 2007, U.S. forest products companies are improving their internal processes with initiatives such as ISO certification, quality awards, lean manufacturing, total quality management, Six Sigma, and supply chain management. It is increasingly common to find "continuous improvement" managers in manufacturing firms. Better quality, timely delivery, and improved control of manufacturing processes have been identified as important factors to improve the competitiveness of domestic firms [125]. Close to 60 percent of U.S. manufacturers have identified lean manufacturing and Six Sigma as the most common improvement methods [126].

Lean Manufacturing

Lean manufacturing (LM) is an improvement methodology developed by Toyota Motor Corporation of Japan. The main purpose of LM is to reduce various sources of "waste." In this context, waste is any activity that does not add value in the eyes of the customer (e.g., lumber drying is a value-adding activity, but lumber sitting in a warehouse only adds costs). LM maximizes value-adding by systematically eliminating waste. LM recognizes seven types of "deadly" wastes.

1. *Overproduction* is making more than is required by customer demand. Companies over-produce for several reasons, for example, to build buffers against demand and supply fluctuations or to protect against machine downtime. Overproduction is probably the most important type of waste, since it leads to other types of waste.
2. *Inventory* is the most visible type of waste. Raw materials, work-in-process, or finished goods inventory generates costs when it sits in a warehouse and does not add value from the customer's perspective. Very importantly, inventory hides other problems, such as scrap, excessive set-up times, late deliveries, and quality problems.
3. *Waiting* happens when people, goods, or information are inactive for excessive periods. Waiting can be caused by stock outs, processing delays, machine set-up, and capacity bottlenecks.
4. *Transportation* waste is the unnecessary moment of goods, people, or information. Potential causes are excessive distances and poor process sequencing.
5. *Over-processing* is using more process steps than is necessary. Poorly designed tools and products are common causes of this type of waste.
6. *Waste of motion* or unnecessary motion by employees, results from a poorly designed process or poor workplace organization.
7. *Product defects* lead to reprocessing, scrap, wasted time and resources, and, most importantly, unsatisfied customers.

Lean manufacturing is credited with improving the competitive position of American car manufacturers. In their book “Lean Thinking,” Womack and Jones [127] identify five steps to implement lean manufacturing.

1. *Specify value from the customer’s perspective*.
2. *Identify the value stream*. This means identifying all the steps needed to bring a product from development to market launch. One tool commonly used is the *value stream map*, a visual representation of the value stream, showing flows of materials and information. Special symbols are used to represent processes, transportation steps, information flow, inventory, etc. The map enables managers to more easily identify sources of waste.
3. *Create continuous flow*. This includes eliminating all sources of waste and establishing a one-piece flow instead of batch production. 5S (a structured approach to cleaning and organizing the workplace), U-shaped cells, set-up time reduction, and autonomous defect control are some of the tools used to achieve this goal.
4. *Implement pull production*. This means producing only what is needed, when it is needed, and in the quantity and quality required by customers. Production at all levels is triggered by customer demand, not by forecasts. Pull production minimizes over production and increases flexibility.
5. *Strive for perfection*. A culture of continuous improvement is created in which the current state is always assumed to be the worst. This step also ensures that improvements are sustainable. One of the tools used for continuous improvement are “kaizen” events — focused and structured improvement projects in which a cross-functional team works to solve a specific problem in a short time frame; typically five days (Figure 28).

Figure 28. Cross-functional team at an improvement event, also known as a "kaizen” event. Photo credit: Urs Buehlmann.

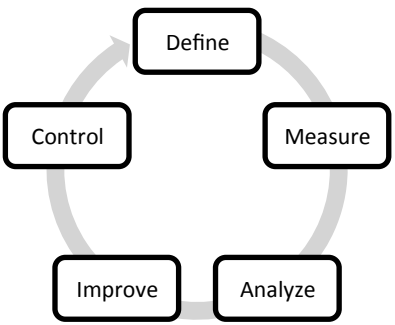
Lean Manufacturing at a Wood Components Manufacturer

Faced with the challenge of controlling costs and improving quality, a company that manufactures components for the wood window industry has streamlined its manufacturing operations by implementing lean manufacturing principles and tools. The company has implemented just-in-time deliveries of both raw materials from its suppliers and of finished products to its customers. Raw materials arrive on a daily basis using a "kanban" system (kanbans are inventory control cards used in a "pull" system to signal the preceding process to start producing parts for the next process). Wood components are shipped daily or more frequently to its customers. Finished components are placed in containers arranged in the sequence the customer is going to need them during assembly. The facility has a lead time of 41 hours and can replace components on an emergency basis in three hours. Batch sizes are very small, with a batch size of one item not uncommon. According to company managers, implementing lean manufacturing has allowed the company to expand its product diversity, reduce employee turnover, and remain competitive in a tough market.

Six Sigma

Six Sigma is a data-driven approach to improve business and organizational performance. It applies the scientific method to identify the sources of process variation and formulate actions for improvement [128]. Six Sigma was developed by Motorola in the early 1980s and became widely popular after it was adopted by General Electric. It is credited with great improvements in quality and cost savings. It is estimated that two-thirds of firms in the Fortune 500 list use Six Sigma to some degree [129]. The name Six Sigma is a statistical reference to the goal of achieving a process that yields only 3.4 errors or defects per million opportunities for defects.

At the core of Six Sigma implementation is the DMAIC problem-solving cycle (Figure 29), which provides a "gated" process for process improvement. Specific conditions are defined to end each stage and continue with the next [128]. Certain tools are typically used in each stage of the DMAIC process, examples are listed in Table 13.



- ***D**efine* goals of the improvement project, estimate impact. Write problem and objective statement and assemble team.
- ***M**easure* current state. Establish metrics using statistical tools.
- ***A**nalyze* current state and identify causes and opportunities for improvement.
- ***I**mprove*: implement solution.
- ***C**ontrol* process performance and monitor to sustain results.

Figure 29. DMAIC cycle [130].

Table 13. DMAIC tools [128].

DMAIC stage	Tools used
Define	Quality function deployment (QFD) Pareto analysis Suppliers, inputs, process, outputs, and customer analysis (SIPOC)
Measure	Descriptive statistics Run chart Process analysis
Analyze	Cause-and-effect diagrams (fishbone diagrams) Hypothesis testing Regression analysis
Improve	Force field diagrams Failure mode analysis
Control	Statistical process control (SPC) charts Checklists ISO 900x

In practice, Six Sigma and lean manufacturing are integrated in what is known as "Lean Sigma," in which the data-oriented techniques and laser focus on reducing process variation of Six Sigma are combined with the customer- and people-oriented approach of lean manufacturing [131].

Supply Chain Management

An important development in business management is the emergence of supply chain management (SCM). It can be defined as the ''strategic coordination of business processes within an organization and across businesses within the supply chain, with the objective of improving performance of individual organizations and of the entire supply chain" [132]. Companies adopting SCM integrate closely with their supply chain partners (suppliers, customers) in aspects such as logistics, information technology, quality management, and process flow. Companies such as Walmart and Apple owe their tremendous success in part to their ultra-efficient supply chains. Some factors that have contributed to the growth of SCM include the elimination of trade barriers, innovations in transportation such as containerization and intermodal shipping, and improvements in logistics management brought about in part by developments in information technology. Companies that successfully implement SCM experience improvements in quality, delivery reliability, flexibility, cost leadership, and design quality [133]. In the forest products sector, the kitchen cabinet industry has been notably successful in implementing SCM practices, with shorter lead times, increased product choices, and improved processes as a result.

Chapter Questions

1. Which of the manufacturing strategies does your operation most resemble? Is it appropriate given your product variety and production volume?
2. Do you have an aggregate production plan? If not, develop one.
3. Do you know how much it costs to maintain your current levels of inventory?
4. Do you measure process variability? Do you think you could benefit from reducing it?
5. Do you think your operation could benefit from applying lean manufacturing concepts? How?

Chapter 7: Financial Management

In the forest products industry, a business manages four basic resources: its physical resources (plant, property, equipment), its human resources (people), the natural resources that it uses (forests, land, timber), and its financial resources (how it allocates various forms of cash and credit). This chapter examines how a business measures the use of its financial resources.

The financial statements of a company can be compared to the score in an athletic event. They are an indication of the company's performance over a period of time and reflect the decisions a firm makes on how it allocates its resources. It is important to remember that firms are in business to make money, not products. Profit is the score in the game of business. Business owners need to recognize that they cannot do anything unless they remain profitable. Understanding and managing the company's financial resources is one of the most important activities of the business owner, and it often does not receive adequate attention.

Table 14. Financial management summary.

Financial management	Financial planning	
	Financial statements	Income statement
		Balance sheet
		Cash flow statement
	Financial ratios	Asset management ratios
		Leverage ratios
		Liquidity ratios
		Profitability ratios
	Break-even point analysis	
	Capital budgeting evaluation	Payback period
		Net present value
		Internal rate of return
	Sources of financing	

Financial Planning

Any business or organization needs to understand financial planning. In financial planning, given a strategy for operations and marketing, and assumptions of growth and external factors, sales projections are made for income and assets. The resources needed to achieve these projections are also estimated, and the sources of these resources are specified [63]. New ventures need to project financial statements for a number of accounting periods, typically three to five years into the future. The financial planning process is depicted in Figure 30, and some of its components are explained in the following sections.

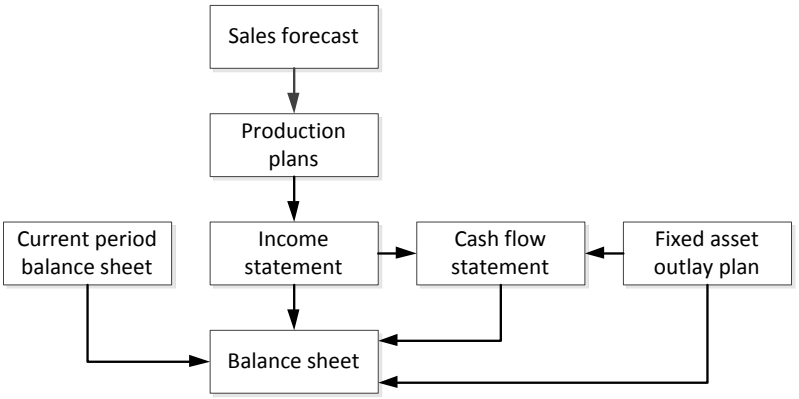


Figure 30. Financial planning process [134].

The financial planning process starts with a sales forecast for a given period. A sales forecast may be based on (1) analysis of external data, such as new housing starts, gross domestic product growth, or consumer confidence index; (2) internal data, which summarizes the sales expectations of the owners or salespeople; or (3) a combination of the two, which is the most common approach. Based on the sales forecast, the cash flows needed to support the sales projections can be estimated, such as outlays for inventory, manufacturing, and sales. The fixed assets and amount of financing needed to meet the sales forecast can also be determined.

Financial Statements

Financial statements reflect the financial situation of a company at a given time — showing the source of a business's monetary resources, where those resources went, and where they are now. The four key financial statements are the income statement, balance sheet, cash flow statement, and statement of shareholders' equity. The income statement shows the company's revenues and expenses over an accounting period. The balance sheet is a snapshot in time of what a company owns and owes. The cash flow statement reflects the movements of cash between the company and the outside world. The statement of shareholders' equity reflects changes in the interests of the company's shareholders over time. The income statement, balance sheet, and cash flow statement are explained in detail in the following sections; the statement of shareholders' equity is outside the scope of this publication.

Income Statement

The income statement (Table 15) reflects the profit performance of a business [135]. Firms use assets to generate other assets, and the income statement measures the difference between asset increases (revenues) and decreases (expenses). These revenues and expenses should be directly associated with operating the business. An income statement typically contains the following parts.

- *Sales revenue* is that generated from sales of products or services.
- *Cost of goods sold* are those costs associated directly with producing goods.
- *Operating expenses* are those incurred to support the firm's operations during one accounting period. Included are administrative personnel, product development, marketing expenses, and depreciation. The difference between operating expenses and cost of goods sold is that the former cannot be linked directly to the production of goods or services. Dividends paid to shareholders are not listed as expenses since they are not incurred to generate revenue.
- *Interest expense* is the interest the company pays for long- or short-term loans; *interest income* is what the business earns on interest-bearing accounts.
- *Income before income taxes* is what results from subtracting the cost of goods sold, operating expenses, and interest expense from sales revenue.

Table 15. Income statement.

Income statement
Sales revenue
(-) Cost of goods sold
= Gross profits
(-) Operating expenses
= Operating income (earnings before interest and taxes)
(-) Interest expense (and income)
= Income before income taxes
(-) Income tax expense
= Net income (or loss)

Balance Sheet

The balance sheet is a snapshot of a business's financial strengths and weaknesses for a reporting period [135]. It presents what the business owns (assets), what it owes (liabilities), and how much the shareholders have invested in the company (equity). The different components of a balance sheet are presented in Table 16. Total assets must equal total liabilities plus the shareholders' equity.

$$\text{Assets} = \text{Liabilities} + \text{Equity}$$

Table 16. Balance sheet.

Balance sheet	
Assets	Liabilities
Current	Current
Cash	Accounts payable
Marketable securities	Wages payable
Accounts receivable	Taxes payable
Inventory	Interest payable
Supplies	Long-term
Fixed	Equity
Land	Common stock
Plant	Preferred stock
Equipment	Paid-in capital in excess of par
Intangibles	Retained earnings
Assets = Liabilities + Equity	

Assets

Assets are all the things that the company owns, including property, equipment, materials, and cash. Assets are used by the company to generate other assets. Assets include the following, listed from the most liquid (cash) to the least liquid.

- *Current assets* are those that can be converted into cash within one accounting period or one year. Examples are cash, finished goods inventory, investments by the company in the form of bonds or share in other businesses, and money owed to the company by customers (accounts receivable).
- *Fixed assets* take longer than one year to be converted into cash, such as land, buildings, equipment, a truck fleet, etc.
- *Intangible assets* are not physical in nature but have value, such as intellectual property (e.g., patents, trademarks), brand recognition, and "goodwill."

Liabilities

Liabilities are all the obligations that the company owes to others, including money owed to suppliers, landlords, and banks; benefits to employees; or taxes owed. Liabilities include the following.

- *Current liabilities* include all those liabilities that are due within one year, such as credit card debt or money owed to suppliers (accounts payable).
- *Long-term liabilities* include debt that the company owes that is due in more than one year.

Equity

Equity, also known as capital or net worth, represents the money that would remain for the owners after selling all assets and paying all liabilities. Equity also includes the earnings or losses since the company started.

Cash Flow Statement

The cash flow statement, or cash budget, is probably the most important financial statement for new businesses [135] since it shows the ability of the company to meet its obligations and purchase assets, and thus reflects the business's viability. In some ways, the cash flow statement is similar to the income statement, but instead of reflecting revenues and expenses, it shows actual cash inflows and outflows [135]. While the last line in the income statement reflects the business's profit, the last line in the cash flow statement reflects the cash position of the business at the end of the accounting period. Examples of cash inflows are money received from selling products or services, cash from a financing institution in the form of loan proceeds or interest, or cash received for selling company stock. Examples of cash outflows are cash purchases, payments to suppliers, wages and salaries, rent, tax payments, purchases of fixed assets, dividends paid, payment of loan principal, or interest payments.

The cash flow statement (Table 17) is generally presented in three parts.

- *Cash flows from operating activities*. This section reconciles the cash flow statement with the income statement by adjusting the net income for any noncash items (e.g., depreciation, bad debt write-offs, prepaid expenses) and for cash used or received by other operating assets (or liabilities).
- *Cash flows from investing activities*. All of the cash outflows or inflows related to investment activities are listed here, such as the purchase of property or equipment, or investment in buying shares of other businesses. Inflows occur when the firm sells some of these investments.
- *Cash flows from financing activities*. If a company receives cash from selling shares or from a bank loan, these inflows are reported in this section. Outflows of cash include paying back a bank loan or paying dividends.

The last line of the cash flow statement is the net change in cash flow for the accounting period. It is important to note that a company can have a positive cash flow change and a net loss in the income statement, and vice versa. For a company in the early stages of operation, it is more important to have a positive cash flow.

Table 17. Cash flow statement.

Cash flow statement
Cash flows from operating activities
Revenue (cash sales and interest received)
(-) Expenses (cash payments and interest paid)
= Net cash from operating activities
Cash flows from investing activities
Cash from sale of long-term assets
(-) Cash payments for purchase of long-term assets
= Net cash from investing activities
Cash flows from financing activities
Cash from loans received
Cash received from issuing stocks
(-) Cash payments for repaying loan principal
(-) Dividends paid in cash
= Net cash from financing activities
Net change in cash and cash equivalents

Financial Ratios

Financial ratios measure the efficiency and profitability of a firm using its financial statements. It is important to note that financial ratios alone do not have any meaning; they are useful only when compared with something. A firm's financial ratios can be compared with those of other firms in the same industry at the same point in time or against industry averages. Ratios can also be compared over time for the same firm to evaluate the business's progress. There are four basic types of financial ratios: asset management ratios, leverage ratios, liquidity ratios, and profitability ratios.

Information Sources for Financial Ratios in Different Industries

- Almanac of Business and Industrial Financial Ratios [136]
- D&B Industry Norms and Key Business Ratios
- Risk Management Association's Annual Statement Studies: Financial Ratio Benchmarks [137]

Asset Management Ratios

Asset management ratios measure how effectively a business is managing its assets or, in other words, how fast it can convert assets into cash. Two commonly used asset management ratios are inventory turnover and collection period.

- *Inventory turnover* measures how many times the inventory is sold and replaced in a given period. In general, a higher value is desirable, as it would indicate the company is managing its inventory more efficiently. Low inventory turnover values may indicate excessive inventory (with its associated costs), but very high values may indicate frequent stock outs. The information to calculate this ratio is found in the income statement (cost of goods sold) and the balance sheet (average inventory of the current and the previous periods). Comparisons of this ratio between firms make sense only when they come from the same industry. The *average age* of the inventory can be obtained by dividing 365 by the inventory turnover ratio.

$$\text{Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Average inventory}}$$

- *Collection period* indicates the number of days a firm takes to collect an account receivable. Accounts receivable come from the balance sheet. This ratio should be evaluated in relation to the firm's credit policy. For example, a value of 28.1 for a company that extends 30-day credit to its customers shows a good collection performance.

$$\text{Collection period} = \frac{\text{Accounts receivable}}{\text{Average sales per day}}$$

Leverage Ratios

Leverage ratios reflect the degree to which other people's money finances the firm's operations. A company is highly leveraged if it uses more debt than equity. In general, debt carries a lower cost, but too much debt increases the risk of the company not being able to meet its interest and principal obligations, potentially leading to bankruptcy.

- *Debt-to-equity ratio* is the most common measure of leverage. It compares the debt and equity in a company's capital structure.

$$\text{Debt-to-equity ratio} = \frac{\text{Total liabilities}}{\text{Shareholders' equity}}$$

- *Debt ratio* measures the percentage of total assets that is financed by creditors. The higher this number, the higher the financial leverage of the firm.

$$\text{Debt ratio} = \frac{\text{Total liabilities}}{\text{Total assets}}$$

Liquidity Ratios

Liquidity ratios measure how capable the business is to meet its short-term obligations [135]. This is particularly important for a company in its early stages since the firm should be able to pay its bills to operate normally. On the other hand, too much liquidity is not desirable, as liquid assets do not normally earn high returns for the company. The two most important liquidity ratios are the current ratio and the quick ratio.

- *Current ratio* reflects the business's ability to meet its obligations in the short term. A desirable value is highly dependent on the industry, but a current ratio of 2.0 is generally considered acceptable. For industries in which cash flow is more stable and predictable, such as utilities, a lower current ratio could be acceptable.

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

- *Quick ratio*, also known as the *acid test ratio,* is similar to the current ratio but does not take into account the inventory, which in some cases cannot be converted into cash easily. A value of 1.0 is considered acceptable, but it depends on the industry.

$$\text{Current ratio} = \frac{\text{Current assets} - \text{Inventory}}{\text{Current liabilities}}$$

Profitability Ratios

Profitability ratios measure how efficiently the company uses its resources. It is very useful to compare a firm's profitability with that of its competitors and to monitor profitability over time. The most common measures of profitability are the gross profit margin and return on total assets.

- *Gross profit margin* reflects the share of sales that is available to cover administrative expenses. If the numerator is replaced by net income, this ratio becomes the net profit margin and measures the percentage of profit on sales.

$$\text{Gross profit margin} = \frac{\text{Sales} - \text{Cost of goods sold}}{\text{Sales}} = \frac{\text{Gross profits}}{\text{Sales}}$$

- *Return on assets (ROA)*, also known as *return on investment (ROI)*, measures how effectively the firm generates profits with its assets.

$$\text{Return on assets (ROA)} = \frac{\text{Earnings available for common stockholders}}{\text{Total assets}}$$

Break-Even Point Analysis

For any business, a very important piece of information is how many products it needs to sell to cover its cash obligations. This is called the break-even point and reflects the level of activity above which the company starts making a profit.

$$\text{Break–even point} = \frac{\text{Fixed costs}}{1 - \frac{\text{Variable costs}}{\text{Sales revenue}}}$$

- Fixed costs are found in the income statement under "General and Administrative Costs."
- Variable costs can be taken from the "Cost of Goods Sold."
- Sales revenue is self-explanatory.

Searching for Financial Statements of Publicly Owned Companies

It may be useful to look for existing companies' financial statements to better understand how the concepts in this chapter apply to real companies. All U.S. publicly owned companies are required by law to submit an annual 10-K report to the Securities and Exchange Commission. This report contains, among other useful information, financial statements, including the company's income statement, balance sheets, statement of cash flows, and statement of stockholders' equity. The financial statements are prepared according to guidelines known as generally acceptable accounting principles (GAAP) and are accompanied by notes that explain the information presented in the financial statements. This information is publicly available using the Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system at http://www.sec.gov/edgar/searchedgar/webusers.htm. There are a number of search options available, including company name lookup. Most companies also post their annual reports on their websites.

Capital Expenditure Evaluation

Small or start-up firms have limited resources; therefore, those resources should be spent wisely. The purchase of a costly piece of equipment, for example, will commit precious company resources for an extended period of time. Thus there needs to be a way to evaluate whether an investment will produce the returns that justify the expense. The three major techniques to evaluate capital investments are payback period, net present value, and internal rate of return.

Payback Period

Payback period is the most commonly used evaluation method in industrial environments because it is intuitive and easy to calculate. Payback period is simply the time it takes a business to recover an investment from the cash inflows

generated by the investment [93]. To calculate payback period, the cash flows from an investment are projected over a number of periods and then accumulated until the initial investment is met. A business would normally have a policy of making investments with a maximum payback period. It can decide whether or not to invest using payback period by comparing the project's payback period with a maximum acceptable value, say, one year. If the calculated payback period is greater than the acceptable value, the project is rejected.

Let's consider an investment that has the following cash flows: initial investment (year zero) of $800 and then positive cash inflows of $400 at the end of year 1, 2, and 3. The cash flows can be illustrated as shown in Figure 31.

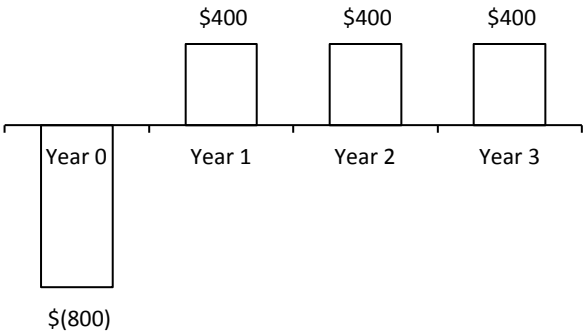


Figure 31. Cash flows of a hypothetical investment.

The initial investment is recovered (i.e., cumulative cash inflows equal total cash outflows) at the end of year 2, thus this investment has a payback period of 2. If the initial investment is $1,000 and the inflows are distributed evenly throughout the year, the payback period would be 2.5 years.

Net Present Value

Net present value (NPV) is the most robust technique used to evaluate capital investments as it takes into account the time value of money, which is an important consideration for long-term investments. A project's net present value is determined by subtracting the present value of cash outflows from the present value of cash inflows over the planning horizon.

$$\text{Net present value} = \text{Present value of cash inflows} - \text{Present value of cash outflows}$$

The selection criterion for a project is typically that it should be undertaken if the net present value is positive, meaning that cash inflows are greater than cash outflows. The idea behind net present value is that an investment project should be undertaken only if the net present value of the cash flows that the project generates are greater than the net present value of the costs [93]. The box below shows how to calculate present value.

Time Value of Money

The time value of money is an important consideration when long-term investments are being evaluated. A dollar today does not have the same purchasing power as a dollar 10 years ago. The same is true for a dollar today compared to a dollar five years from now. In order to compare investment options on a fair basis, cash flows need to be expressed in the same time frame.

$$\text{Present value} = \frac{\text{Future value}}{(1 + \text{discount rate})^{\text{n}}}$$

The discount rate is normally the cost of opportunity of the entrepreneur or the minimum return all investments must achieve to satisfy investors. Typically the discount rate is higher than the interest rate paid by the central bank, to reflect the higher risk involved in most investments.

Internal Rate of Return

Internal rate of return (IRR) is the preferred evaluation technique of financial managers [134]. It is the discount rate that makes the net present value of a project equal to zero. Its calculation is iterative but easy to make with spreadsheet software or a financial calculator. A project is undertaken if the IRR is greater than the cost of capital and is rejected if it is lower.

It is important to note that while the capital expenditure evaluation methods discussed inform the investment decision process, they should not be the only consideration in such decisions. It must be remembered that these quantitative methods focus on measurable quantities (cash flows), and thus their validity depends on the validity of the assumptions made when estimating those cash flows. Other factors should be considered in the investment decision such as (1) whether the investment is a strategic fit with the long-term goals of the enterprise; (2) market considerations related to competitors, customers, or suppliers; and (3) external factors, such as economic shifts, regulations, and social trends. The box on the following pages explains capital expenditure evaluation using Microsoft Excel.

Using Microsoft Excel to Evaluate Investment Options

A window manufacturer is considering the purchase of a new piece of equipment and is evaluating the two following investment options over a period of 10 years and with a cost of capital of 6 percent:

- Option A: An initial investment of $22,000, annual cash inflows from added productivity of $5,000, operation costs of $1,700, and a residual value of $7,500 at the end of the 10th year.
- Option B: An initial investment of $35,000, annual cash inflows from added productivity of $5,500, operation costs of $1,450, and a residual value of $17,000 at the end of the 10th year.

The cash inflows and outflows, as well as the net flow, can be entered in a Microsoft Excel spreadsheet as follows.

	A	B	C	D	E	F	G	H	I
1		Discount rat	6%						
2									
3	Year	Machine A				Machine B			
4		Cash Outflows	Cash Inflows	Net Cash Flow	Cumulative	Cash Outflows	Cash Inflows	Net Cash Flow	Cumulative
5	0	($22,000)		($22,000)	($22,000)	($35,000)		($35,000)	($35,000)
6	1	($1,700)	$5,000	$3,300	($18,700)	($1,450)	$5,500	$4,050	($30,950)
7	2	($1,700)	$5,000	$3,300	($15,400)	($1,450)	$5,500	$4,050	($26,900)
8	3	($1,700)	$5,000	$3,300	($12,100)	($1,450)	$5,500	$4,050	($22,850)
9	4	($1,700)	$5,000	$3,300	($8,800)	($1,450)	$5,500	$4,050	($18,800)
10	5	($1,700)	$5,000	$3,300	($5,500)	($1,450)	$5,500	$4,050	($14,750)
11	6	($1,700)	$5,000	$3,300	($2,200)	($1,450)	$5,500	$4,050	($10,700)
12	7	($1,700)	$5,000	$3,300	$1,100	($1,450)	$5,500	$4,050	($6,650)
13	8	($1,700)	$5,000	$3,300	$4,400	($1,450)	$5,500	$4,050	($2,600)
14	9	($1,700)	$5,000	$3,300	$7,700	($1,450)	$5,500	$4,050	$1,450
15	10	($1,700)	$12,500	$10,800	$18,500	($1,450)	$22,500	$21,050	$22,500

Note that the net cash flow for each investment option is calculated by adding the outflows and inflows algebraically. Also note that the cash inflow in the last year includes the revenue and the residual value obtained from selling the equipment at the end of the 10th year.

Payback Period. The payback period corresponds to the year in which the cumulative cash flows change from a positive to a negative value. For investment option A it is 6.7 years (6+[2,200/3,300]) and for investment B it is 8.6 years (8+[2,600/4,050]).

Net Present Value. Excel has built-in functions to calculate NPV given a discount rate and an array of cash flows. Very importantly, Excel assumes that the first value in the array contains a cash flow that occurs at the end of the first period, which means that investments made in year zero (right now) should be subtracted outside the formula. To calculate the NPV for each investment option, the following formulas (in bold) should be entered:

Using Microsoft Excel to Evaluate Investment Options (cont.)

- NPV for investment option A: **=NPV(C1,D6:D15)+D5 =** $6,476
- NPV for investment option B: **=NPV(C1,H6:H15)+H5 =** $4,301

Internal Rate of Return. Similarly, Excel can calculate the IRR using a built-in function for which the only argument (input) is the array of cash flows. It is important to note that if the cash flows are annual, then the IRR has also the same basis. The formula is entered as follows:

- IRR for investment option A: **=IRR(D5:D15) =** 11%
- IRR for investment option B: **=IRR(H5:H15) =** 8%

Based on the results, investment A is a better option for the firm because the investment is recovered faster and it has a higher net present value and a higher rate of return.

Sources of Financing

A financial management plan needs to include an explanation of the source of the funds to run or start the business. There are a number of options for new businesses to raise funds to finance operations or for existing businesses to fund expansion.

Personal Savings/Friends and Family

It is very unlikely that a lender or investor will completely finance a new venture. Most start-up funding for new ventures includes the personal savings of the founder or the founder's family. When a majority of the business is financed with personal savings, the founder has more control and ownership; however, this type of financing also is very risky since no matter how much planning is carried out, there is always risk involved. One especially risky and expensive way of financing new ventures is to get cash advances on a credit card, which should be avoided at all costs. A common source of new business financing is borrowing from friends or family, which can be in the form of debt or equity capital. Entrepreneurs are strongly encouraged to have written agreements with clear information about the amount owed, interests to be paid, and mode of repayment.

Bank Loans

Bank loans are the traditional funding method in which the venture returns the cash plus interest; however, most new businesses do not start with bank loans. Bank loans may require some liens on assets or intellectual properties, and personal guarantees of the business founders.

Venture Capital

Venture capital is equity financing for businesses that do not have access to traditional sources of funding. Venture capitalists focus on new companies with high potential for growth — they provide funds with a long-term vision. Since they take equity in the business, venture capitalists are typically more involved in the strategic management of the company. They are later stage investors, meaning that they invest in companies with proven revenue-generating capacity and with a proven technology.

One subclass of venture capitalists is known as "angels" — wealthy individuals in search of high-return investment opportunities. Angels typically invest in industries with which they have experience or are very familiar. They often associate with other investors and set up an angel association. One good resource for start-up capital is gust.com, an online platform where angel investors or associations and entrepreneurs can meet, with browsing tools for investment and funding opportunities.

Federal or State Government Financial Assistance

The U.S. Small Business Administration (SBA) has loan and grant programs aimed at small businesses for a number of purposes, such as short-term loans and cyclical working capital (CAPLines), loans for export activities, loans for rural small businesses, and several others [138]. The SBA has local offices in every state. For more information, visit www.sba.gov.

Other federal agencies also provide financial assistance to small businesses. For example, the Department of Agriculture has a number of loans and grants for rural and community development. Visit www.rd.usda.gov.

State governments also provide financial assistance for new enterprises. For example, the Minnesota Department of Employment and Economic Development provides financing programs and tax credits for starting businesses (mn.gov/deed/), and the Virginia Small Business Financing Authority has several programs for new and existing small businesses (www.vabankers.org/VSBFA).

Small Business Innovation Research and Small Business Technology Transfer Program

Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) is a federal program to assist small businesses to stimulate technological innovation and develop products with commercial merit. It funds high-risk product development based on technological innovation with a commercialization strategy.

Several federal agencies participate in funding this program: Department of Agriculture, Department of Commerce, Department of Defense, Department of Education, Department of Energy, Department of Health and Human Services, Department of Transportation, Environmental Protection Agency, NASA, and National Science Foundation.

Eligible businesses must meet certain criteria, such as having less than 500 employees, being located in the U.S., conducting research and development in the U.S., and having research facilities controlled by the company. The difference between the SBIR and the STTR is that the STTR requires the participation of a nonprofit research institution, whereas the SBIR does not. However, the applicant is always the small business. For further information about both programs, visit www.sbir.gov.

Chapter Questions

1. What is your estimate of annual sales and how did you arrive at this number?
2. Develop an income statement for your business.
3. What are the key factors that will impact your cash flow for the business?
4. What is your targeted gross margin on sales?
5. Identify key sources of financing for your business.

Chapter 8: Writing a Business Plan

You have identified a business opportunity. There is an attractive market segment you think you can satisfy with a product or service that you feel confident you can provide in a proficient manner. However, you need to raise capital to start the new venture. Unless you are borrowing from relatives or close friends (and often even in this case), this almost invariably means that you need to write a business plan.

A business plan is "a document that explains a business opportunity, identifies the market to be served, and provides details about how the entrepreneurial organization plans to pursue it" [139]. In a business plan, you will put in writing your strategy for all the aspects of business management covered in this guide, from identifying a need in the market to forecasting the financial performance of your venture. In this chapter, we explain how the different components of the business plan fit together and how to write a credible and attractive business plan. We also provide a list of resources that may help you in this important task. In Appendix B, we provide an example of a complete business plan for a wood products company.

Table 18. Business plan components.

Business plan components	Executive summary
	General company description
	Products and services
	Marketing plan
	Operational plan
	Management and organization
	Financial plan

Contrary to common belief, business plans are not only for raising money to start a new venture. Business plans can have a number of applications, some of which are listed below [135].

- *As a benchmark*. A business plan provides measurable indicators of success; therefore, an organization can use it to compare results with actual performance and establish corrective action. A business plan thus acts as a control tool.
- *As a planning tool*. A well-written business plan sets the direction of the company for the next few years and lists the actions to achieve the business's goals.
- *As a budget*. A financial plan that has been well thought out can be used as a budget that can be reviewed periodically to check actual and planned results and to formulate actions to close the gap between the two.
- *As a communication tool*. A firm can use a business plan to educate existing employees, newcomers, and external stakeholders on the goals and objectives of the organization and the major strategies to achieve those goals.

What Is Most Important in a Business Plan?

Research has been conducted on what importance investors place on the different components of a business plan during the initial screening phase [140]. During this stage investors decide which proposals are worthy of further consideration. The researchers interviewed investors and reported the number of times evaluation criteria were mentioned. We ranked the research results from those that are given greatest emphasis (rank 1) to the least important (rank 8). The financial considerations, market potential, and the background of the management teams are rated among the three top evaluation criteria by all investors.

Business plan component	Banker	Venture capitalist	Angel
Financial considerations	1	2	1
Market	2	1	2
Entrepreneur/management team	3	3	3
Strategy	4	4	8
Operations	5	7	7
Product/service	6	5	5
Business plan	6	5	6
Investor fit	8	8	4

Existing companies also write business plans, for example, when they are about to make a big strategic move, such as a merger or an acquisition. Companies that are planning to put themselves up for sale may hire external help to write a business plan and make it available to potential buyers. Corporations with several business units sometimes ask managers at each unit to write a separate business plan and then incorporate these plans into a single strategy for the entire corporation [141].

Nonprofit organizations also write business plans. A charity needs to raise funds, and a good way to demonstrate that the organization can make good use of those resources is a document stating goals, services to be provided, intended beneficiaries, measures of success, and resources needed. Government agencies may require a business plan from companies that want to sign a procurement contract, or a city or county administration may write a business plan as a strategic management tool.

There are many ways in which a business plan can be structured. Regardless of the format, a business plan should provide an overview of the business opportunity, a marketing plan, a financial plan, and an operations management plan. Each of the business plan components is explained in detail in the following sections. The box at the end of this chapter contains several resources for business plan writing.

Executive Summary

As the name suggests, the executive summary is a compressed version of the business plan. At a minimum, the executive summary should convey the new

venture's business goals, the market, the financial predictions, and the intended funding sources. Remember, potential investors are busy people and may have little time to completely review each business plan, thus they pay close attention to the executive summary. If it does not grab the reviewer's attention, the business plan will unlikely be the subject of further reading. Very importantly, write the executive summary *after* completing the other business plan sections; otherwise you risk ending up with a vague summary or trying to accommodate the plan to the summary [135]. Suggested contents for the executive summary are:

- The firm's mission and vision (see Chapter 3: Strategic Planning)
- A short description of the industry and business environment
- The business opportunity that the new venture is going to address
- The most important strategies for success (how is the new venture different from the competition?)
- A description of the management team
- The financial needs of the start-up, the anticipated sources of funding, and the projected returns

General Company Description

The general company description should contain an overview of the company, including:

- Brief history of the company and its accomplishments
- Customer segments the new venture is going to serve
- Products and services to be offered and their stage of development (in development, working prototype, in the market)
- Location of the company's facilities and its markets
- The new venture's business objectives
- Industry overview

The business objectives may include the desired market participation, the geographic scope of sales, and the anticipated level of sales and growth. Topics to cover for the industry overview may include industry size, growth trends, nature of the competition (is the industry fragmented or concentrated?), major players, sources of differentiation, and the competitive advantage of the new venture.

Products and Services

The products and services that the new venture is planning to offer are described in this section. Emphasis should be placed on how these products and services are

unique and satisfy the needs identified previously. Specifically, the following should be included [63, 142]:

- Physical description of product
- Benefits and uniqueness
- An objective comparison with competitors' products and services
- Product-line strategies within the planning horizon
- Regulatory issues (environmental, safety, etc.)
- Intellectual property issues
- Quality and warranty issues
- Marketing and technical support, including field support
- Production processes and required equipment

Some entrepreneurs provide a prototype or sample, conduct a demonstration, or offer testimonials from users or experts [135]. A common mistake when writing this section is assuming the reader will be familiar with the product or service and its technical aspects. It is good practice to avoid jargon and use simple and concise language.

Marketing Plan

The marketing plan is one of the most important sections of the business plan, as it describes how the company is going to manage the revenue-generating side of the business. The marketing plan is usually divided in subsections, described in the following sections [135].

Market Definition and Opportunity

The purpose of the market definition and opportunity section is to establish that demand exists for the products and services described in the previous section. Also, the markets and market segments to be served should be clearly identified and described here along with a description of the attractiveness of each segment. Market opportunities are usually analyzed using both secondary sources of information such as market research reports, industry statistics, and magazines and newspapers, and information directly collected by the firm, either through its sales force or some other method, such as the following [110]:

- Compiling "bug lists" (defects or improvement opportunities in products from the competition)
- Studying customers (e.g., videotaping the behavior of potential house buyers inspecting the kitchen)

- Making an existing product available in a new market or market segment
- Identifying market or societal trends (e.g., health concerns are an increasing interest in stand-up desks, or increasing energy prices leading homeowners to wood-fueled heating)

Competition and External Forces

The competition and external forces section is a description of the external environment and its likely effects on the company. It also includes an explanation of how the company intends to use these external forces to its advantage and actions needed to avoid negative influences. Particular emphasis is placed on the competition and its effects on the company's success, including names of potential competitors and their characteristics. External factors, such as regulation, subsidies, suppliers, and the community, should be addressed here.

To conduct the external forces analysis, Porter's "five forces analysis" framework may be useful [143].

1. *Threat of substitutes*. How likely are customers to switch to product substitutes? This is especially relevant to forest products companies, as substitute materials have been taking market share of products traditionally made from wood (e.g., steel studs, metal or plastic pallets, decking from wood-plastic composites, vinyl siding).
2. *Threat of new entrants*. How easy it is for new companies to join the industry? Are the barriers to entry (e.g., capital requirements, access to distribution channels, switching costs) high or low?
3. *Bargaining power of customers*. The power of buyers increases when they are few and large, when the firm produces an undifferentiated product, and when there is a threat that buyers will integrate backwards.
4. *Bargaining power of suppliers*. How powerful are suppliers to set prices and influence availability? The bargaining power of suppliers is inversely correlated to their number and directly correlated to their relative size.
5. *Rivalry among competitors*. Rivalry increases when there are many, small producers, fixed costs are high, customers can switch brands easily, and the barriers to exit are high.

Marketing Strategy

The marketing strategy section is the core of the marketing plan. The entrepreneurs should explain how they plan to use marketing tools in order to achieve the business objectives. Specifically, the following should be included.

- *The firm's approach to the "marketing mix"*:

- Product. Describe products and product lines and how they differentiate from the competitors'.
- Promotion. An explanation should be provided as to how the value proposition is going to be communicated to the target segments.
- Price. Pricing strategy choices include value-based and cost-based pricing, or penetration or premium pricing. Other issues to address are the price sensitivity of customers, the discount policies to be adopted, and competitors' pricing.
- Placement (distribution). Describe how the product or service is going to reach its intended market, including the use of the sales force, distribution channels, Internet sales, and company-owned stores.

- *The brand strategy*. The brand is a powerful communication tool, and it is a critical component of any marketing plan. The brand strategy and importance will depend to a high degree on whether the product is a consumer brand or a business-to-business brand.
- *The segmentation strategy*, including the size and growth prospects of the target segments and the geographic scope of the market segments.
- *The positioning strategy*, including the desired position of the product or company in the marketplace (cost leader, technology-focus, or highest quality), and how the firm intends to achieve that position. Very importantly, it should be conveyed that the intended positioning strategy is realistic and defendable.

Market Research

In the market research section, the writers describe the methods and results of formal or informal market research conducted to understand the nature and size of the market to be served. This information is important to enhance the credibility of the sales forecast and the reviewer's understanding of the market.

Sales Forecasts

The projections for sales for the planning horizon are presented here, including trends, growth, and seasonal behavior. Sales forecasts can be of different types depending on how they are structured and presented. Some common kinds are by period, by product or service, by customer or customer segment, and by market share. Common methods to forecast sales include the following [63].

- *Sales force estimates*. Sales personnel are close to the market and they have knowledge of market conditions and thus can make a good prediction of sales.
- *Expert opinion*. This is a very common method in the forest products industry. Industry "experts" are consulted as to their thoughts on the direction of a specific market. Association meetings, trade shows, and academia are potential sources of this information.

- *Time series analysis*. There are a variety of techniques to forecast sales based on historical sales. A major weakness of these methods is that the underlying assumption is that market conditions in the forecast period are going to mirror those in the past.
- *Market tests*. This method is appropriate for new product categories in which producers may want to reduce risk by first testing how the intended market receives the new product.

Business plan writers may decide to include supporting materials to add credibility to the market research and sales forecast. Support materials include market research reports, statistics, brochures, letters of support, etc.

Operational Plan

The operational plan section describes how the new venture is going to convert inputs into products and services that it intends to deliver to the market. Specific topics to address include the following.

- *Product development*, including actions to develop new products and services to maintain a competitive advantage.
- *Manufacturing strategy*, including plans for production start-up, approach for production planning and control, outsourcing strategy (many new ventures resort to outsourcing in the early stages), and inventory needs and management. It is common to include a description of the production process.
- *Supply strategy*, including the sources for key materials, the anticipated costs, logistics issues, terms of purchase, and external influences that may affect supply (positively or negatively).
- *Labor requirements*, including workforce availability, salaries and benefits, approach to management, union relationships (if relevant), anticipated additions to personnel, and skills and training needs.
- *Machinery and maintenance*, including machinery and equipment needs, potential vendors, capabilities and limitations, and approach to maintenance.
- *Facilities location*, including justification for location, costs, and access to qualified labor and services.

It is important that this section of the plan be consistent with the predictions of growth included in the forecast. If a significant increase in sales is anticipated at some point on the planning horizon, the required additions in manufacturing capability and all that they entail should be reflected here, especially if this added capacity will require additional financing. The external forces that impact the manufacturing strategy should also be discussed in this section, for example, how changes in technology may impact the manufacturing strategy, the effect of anticipated regulations on the business operations, or the effect of price and

availability of resources used by the firm on its profitability (e.g., increasing use of wood biomass for energy may impact fiber availability for certain engineered wood products).

Management and Organization

The importance of the management and organization section cannot be overstated. Research shows that investors consider the experience, background, and skills of the management team among the most reliable predictors of a new enterprise's success [140], and some indicate that they review the résumé section first [139]. Thus an effort should be made to describe what specific aspects of the entrepreneurs' past experience suggest that they are going to be successful in the future. The following questions should be answered in this section.

- Who is needed to start and run the new venture?
- What are the skills and competencies needed in those running the business?
- Which are the critical functions and roles?
- How is authority going to be divided among the principals?
- How is the organization going to change as it grows?
- What steps are planned to search, attract, retain, and compensate employees?

In this section, the names and backgrounds of those who will play a key part in the business success should be included: founding entrepreneurs, investors, key personnel, advisory board, and directors. Also provide a description of how the organization is going to be structured (e.g., by function, by product, or a combination). An organizational chart is typically included, although at this point a high level of detail is not required. The reporting relationships among the key members as well as the compensation levels should be clear.

This section should also contain a description of the policies and strategies regarding personnel. Specifically, some details should be provided as to the plans to find and attract key personnel, the timing of these hires, and the compensation philosophy.

Financial Plan

In the financial plan, the business plan authors should "formulate a credible and comprehensive set of projections of the business financial performance" [135] over a three- to five-year period. Projections are typically made on a monthly or quarterly basis for the first two or three years and then annually for the last two or three years. Owing to the importance and difficulty of this section, it is sometimes advisable to seek professional help from someone with an accounting background.

Very importantly, the assumptions on which the financial projections are made, such as tax rate, collection period, increases in selling prices, and interest rates, should be carefully listed as footnotes or as a separate subsection.

A financial plan should contain the following elements [135, 142].

- *Capital requirements*, including current and projected requirements and their uses. Capital requirements include machinery, tooling, supplies, office equipment and furnishings, and other capital acquisitions. Working capital, such as wages, salaries, inventory, receivables, and reserves for taxes, should also be included. Most items should come from previous sections of the business plan.
- *Funding strategy*, including anticipated sources of funding for the new enterprise. It should be specified what percentage of the funding will come from the entrepreneurs, the investors, financial institutions, and government loans and subsidies.
- *Current and projected financial statements*. A detailed explanation of these statements can be found in Chapter 7.
  - Balance sheet. Current (if already operating) or pro forma (if starting a business).
  - Cash flow statement. This is the most critical statement for a starting business since it demonstrates the ability of the firm to pay its bills and, hence, its viability.
  - Income statement. Profit potential and ability to repay debt should be emphasized in this statement. Since revenues are calculated based on a sales projection, special care should be placed on demonstrating the feasibility of such projections.
- *Other elements*:
  - Break-even analysis. Some business plans include a break-even analysis to show when or at what level of sales the new venture is expected to become profitable. A detailed explanation of how to make such analysis can be found in Chapter 7.
  - Business ratios. Since the information in the financial statements carries little meaning when considered in isolation, the data from different financial statements are sometimes combined into business ratios. Some investors may even require specific ratios as part of the business plan. A detailed explanation of how to calculate these ratios is presented in Chapter 7.
  - Sensitivity analysis. This analysis describes how changes in certain critical parameters, such as interest rates, foreign exchange rates, or a government subsidy, impact the financial projections.

It is of utmost importance that preparers use well-documented and reliable data to make financial projections [135]. As indicated earlier in this chapter, investors consider the financial plan the most important evaluation criteria in a business plan,

and they may consider it worthwhile to check the validity of the information presented. Also, since any forecast carries a level of uncertainty, it is a good practice to present financial projections using different scenarios, for example, making projections for a “conservative” and a “full potential” scenario. Finally, as mentioned previously, special care should be taken to ensure that the projections in the financial plan are consistent with other parts of the business plan. If the management and organization section anticipates a number of hires during the planning horizon, the financial plan should reflect those increases in expenses. Similarly, if the operational plan anticipates the purchase of an important piece of equipment at some point during the project (and perhaps the sale of old equipment), the corresponding inflows and outflows of cash should be incorporated in the projected financial statements.

Final Remarks

Keep the following recommendations in mind when writing a business plan.

- It is important to convey a sense of excitement and enthusiasm for the new venture and to capture the reader’s interest early in the document [135]. Remember, the business plan must “sell” a business opportunity as a good investment and a worthwhile risk.
- It cannot be overemphasized that the plan should avoid too much jargon and should not assume the reviewers are familiar with the technical aspects of the business idea. If you want to include technical details to show that you know what you are doing, use an appendix.
- Make sure all of the components of the business plan are consistent. Avoid contradictions at all costs. Also, make sure all the information used in the projections and industry analysis comes from reliable sources and is verifiable.
- Avoid wild or unfounded assumptions of market size and competition. Nothing will diminish the credibility of your business plan more than claiming no competition or risk for the new venture, or projecting market size too optimistically [144].
- Try to get feedback on the plan from experienced people that you trust.

A poorly written business plan and sloppy presentation will discourage potential investors to continue reading. It is highly advisable to ask someone to proofread the document before sending it to a potential investor. Some general style suggestions for writing business plans include the following.

- Use direct, concise language. Avoid long narrative; use short paragraphs and bullets, where appropriate.
- Avoid using the same phrase or idea repeatedly in the document.

- Make the business plan easy to read and avoid the use of jargon. A very common mistake is to assume the reader knows about the technical aspects.
- Depending on the purpose of the business plan, use the fewest number of pages possible. Most plans range from 10 to 40 pages.
- Do not use a planning horizon of more than five years; longer periods are not credible. Also, use more detail for your predictions for the near future (two or three years) and more aggregated terms for later years.

Resources for Writing a Business Plan

There are a wealth of online and print resources for business plan writing. Here are a few:

- Hundreds of free sample business plans and a template for business plan writing. www.bplans.com/
- The Small Business Administration's complete guide to starting a business, including business plan writing. www.sba.gov/category/navigation-structure/starting-managing-business/starting-business/
- A Planning Guide for Small and Medium Size Wood Products Companies, by Jeffrey L. Howe and Stephen Bratkovich. na.fs.fed.us/spfo/pubs/misc/keys/wp_planning_guide.pdf
- Forest Products Business Planning Guide, by Dawn Gardner and Randy Johnson. cusp.ws/wp-content/uploads/2014/05/ForestProductsPlanningGuide.pdf
- How to Write Business Plans for Forest Products Companies, by Ed Pepke. ir.library.oregonstate.edu/xmlui/handle/1957/12299
- A Marketing Guide for Small and Medium Sized Primary Forest Products Processors, by Robert Smith, Edward Cesa, and Patrick Rappold. http://www.na.fs.fed.us/pubs/forest_products/marketing_guide_na-tp-02-07cd.pdf
- The Ernst & Young Business Plan Guide, by Brian R. Ford, Jay M. Bornstein, and Patrick T. Pruitt.

Chapter Questions

1. Using this chapter and the example in Appendix B, develop a complete business plan for your company.
2. Have your business plan reviewed by professionals for their thoughts and feedback.

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Appendix A: Useful Links

National Trade Associations

American Forest and Paper Association
1101 1K St., NW, Suite 700
Washington, DC 20005
Tel.: 202-463-2700
www.afandpa.org

American Hardwood Export Council
1825 Michael Faraday Dr.
Reston, VA 20190
Tel.: 703-435-2900
www.ahec.org/index.asp

Architectural Woodwork Institute
46179 Westlake Dr., Suite 120
Potomac Falls, VA 20165-5874
Tel.: 571-323-3636
www.awinet.org

Forest Products Society
15 Technology Parkway South, Suite 115
Peachtree Corners, GA 30092
Tel.: 855-475-0291
www.forestprod.org

Hardwood Distributor's Association
P.O. Box 1921
Fort Worth, TX 76111
www.hardwooddistributors.org

Hardwood Federation
1111 19th St., NW, Suite 800
Washington, DC 20036
Tel.: 202-463-2705 Fax: 202-463-4702
hardwoodfederation.wildapricot.org

Hardwood Manufacturers Association
665 Rodi Rd., Suite 305
Pittsburgh, PA 15235
Tel.: 412-244-0440 Fax: 412-244-9090
www.hmamembers.org

International Wood Products Association
4214 King St.
Alexandria, VA 22302
Tel.: 703-820-6696 Fax: 703-820-8550
www.iwpawood.org

Maple Flooring Manufacturers Association
111 Deer Lake Rd., Suite 100
Deerfield, IL 60015
Tel.: 888-480-9138 Fax: 847-480-9282
www.maplefloor.org

Moulding and Millwork Producers Association
507 First St.
Woodland, CA 95695
Tel.: 530-661-9591 Fax: 530-661-9586
www.wmmpa.com

National Hardwood Lumber Association
P.O. Box 34518
Memphis, TN 38184-0518
Tel.: 901-377-1818
www.natlhardwood.org

National Lumber and Building Material Dealers Association
2025 M St., NW, Suite 800
Washington, DC 20036-3309
Tel.: 202-367-1169
www.dealer.org

National Wood Flooring Association
111 Chesterfield Industrial Blvd.
Chesterfield, MO 63005
Tel.: 636-519-9663
www.woodfloors.org

National Wooden Pallet and Container Association
1421 Prince St., Suite 340
Alexandria, VA 22314-2805
Tel.: 703-519-6104 Fax: 703-519-4720
www.nwpca.org

North American Wholesale Lumber Association
330 North Wabash, Suite 2000
Chicago, IL 60611
Tel.: 312-321-5133 Fax: 312-673-6838
www.nawla.org

Society of Wood Science and Technology
P.O. Box 6155
Monona, WI 53716-6155
Tel.: 608-254-2769
www.swst.org

Wood Component Manufacturers Association
P.O. Box 662
Linstrom, MN 55045
Tel.: 651-332-6332 Fax: 651-400-3502
www.wcma.com

Regional Trade Associations

Allegheny Hardwood Utilization Group
P.O. Box 133
Kane, PA 16735-0133
Tel.: 814-837-8550
www.ahug.com

Appalachian Hardwood Manufacturers
P.O. Box 427,
High Point, NC 27261
Tel.: 336-885-8315 Fax: 336-886-8865
www.appalachianwood.org

Great Lakes Timber Professionals Association
P.O. Box 1278
Rhinelander, WI 54501
Tel.: 715-282-5828
www.timberpa.com

Intermountain Forest Association
2218 Jackson Blvd., #10
Rapid City, SD 57702
Tel.: 605-341-0875 Fax: 605-341-8651
www.intforest.org

Lake States Lumber Association
P.O. Box 8724
Green Bay, WI 54308-8724
Tel.: 920-884-0409
lsla.com

Mid-America Lumbermen's Association
P.O. Box 419264
Kansas City, MO 64141-6264
Tel. 816-561-5323 Fax: 816-561-1249
www.themla.com

Mountain States Lumber and Materials Dealers Association
9034 East Easter Pl., Suite 103
Centennial, CO 80112
Tel.: 303-793-0859 Fax: 303-290-9137
www.mslbmda.org

Northeastern Loggers Association
P.O. Box 69
Old Forge, NY 13420
Tel.: 315-369-3078 Fax: 315-369-3736
www.northernlogger.com

Northeastern Lumber Manufacturers Association
272 Tuttle Rd.
Cumberland, ME 04021
Tel.: 207-829-6901 Fax: 207-829-4293
www.nelma.org

Northeastern Retail Lumber Association
585 North Greenbush Rd.
Rensselaer, NY 12144
Tel.: 518-286-1010 Fax: 518-286-1755
www.nrla.org

Northwestern Lumber Association
5905 Golden Valley Rd., #110
Minneapolis, MN 55422
Tel.: 763-544-6822
www.nlassn.org

Penn-York Lumbermen's Club
130 South Union St., Suite 200
St. Olean, NY 14760
Tel.: 716-373-1000 Fax: 716-373-1001
www.pennyork.org

Southeastern Lumber Manufacturer's Association
200 Greencastle Rd.
Tyrone, GA 30290
Tel.: 770-631-6701 Fax: 770-631-6720
www.slma.org

Southern Forest Products Association
6660 Riverside Dr., Suite 212
Metairie, LA 70003
Tel.: 504-443-4464
www.sfpa.org

Southern Pine Inspection Bureau
P.O. Box 10915
Pensacola, FL 32524-0915
Tel.: 850-434-2611 Fax: 850-434-1290
www.spib.org

Virginia Forest Products Association
220 East Williamsburg Rd.
Sandston, VA 23150-0160
Tel.: 804-737-5625
www.vfpa.net

West Coast Lumber and Building Material Association
177 Parkshore Dr.
Folsom, CA 95630
Tel.: 916-235-7490 Fax: 916-235-7496
lumberassociation.org

West Coast Lumber Inspection Bureau
P.O. Box 23145
Tigard, OR 97281
Tel.: 503-639-0651 Fax: 503-684-8928
www.wclib.org

Western Hardwood Association
P.O. Box 1095
Camas, WA 98607
Tel.: 360-835-1600 Fax: 360-835-1910
www.westernhardwood.com

Western Red Cedar Lumber Association
1501-700 West Pender St.
Vancouver, BC Canada V6C 1G8
Tel.: 604-891-1262 Fax: 604-687-4930
www.realcedar.com

Western Wood Products Association
1500 SW First Ave., Suite 870
Portland, OR 97201
Tel.: 503-224-3930 Fax: 503-224-3934
www.wwpa.org

Trade and Market Publications

American Lumber and Pallet
P.O. Box 1136
Fayetteville, TN 37334
Tel.: 931-433-1010 Fax: 931-433-1081
www.amlumber.com

Crossties
115 Commerce Dr., Suite C
Fayetteville, GA 30214
Tel.: 770-460-5553
www.rta.org/crossties-magazine

Crow's Market Report
4 Alfred Cir.
Bedford, MA 01730
Tel.: 781-734-8900 Fax: 781-271-0337
www.risiinfo.com

Hardwood Market Report
P.O. Box 2633
Memphis, TN 38088-2633
Tel.: 901-767-9126 Fax: 901-767-7534
www.hmr.com

Hardwood Review
P.O. Box 471307
Charlotte, NC 28226
Tel.: 800-638-7206 Fax: 704-543-4411
www.hardwoodreview.com

Lumbermen's Equipment Digest
P.O. Box 1146
Columbia, TN 38401
Tel.: 800-477-7606 Fax: 931-388-3564
www.lumbermenonline.com

National Hardwood Magazine
5175 Elmore Rd., Suite 23
Memphis, TN 38134
Tel.: 800-844-1280 Fax: 901-373-6180
www.nationalhardwoodmag.com

The Northern Logger and Timber Processor
P.O. Box 69
Old Forge, NY 13420
Tel.: 315-369-3078 Fax: 315-369-3736
www.northernlogger.com

Pallet Enterprise
10244 Timber Ridge Dr.
Ashland, VA 23005
Tel.: 804-550-0323 Fax: 804-550-2181
www.palletenterprise.com

Pallet Profile Weekly
10244 Timber Ridge Dr.
Ashland, VA 23005
Tel.: 804-550-0323 Fax: 804-550-2181
www.palletprofile.com

Random Lengths
P.O. Box 867
Eugene, OR 97440-0867
Tel.: 541-686-9925
www.randomlengths.com

Sawmill and Woodlot Management
P.O. Box 1149
Bangor, ME 04402
Tel.: 207-945-9469 Fax: 207-945-9874
www.sawmillmag.com

Timber Processing
P.O. Box 2268
Montgomery, AL 36102-2268
Tel.: 334-834-1170
www.timberprocessing.com

Wood Products
P.O. Box 1400
Lincolnshire, IL 60069
Tel.: 847-634-2600 Fax: 847-634-4374
www.woodworkingnetwork.com

Wood Markets Monthly International Report
Suite 603, 55 E. Cordova St.
Vancouver, BC Canada V6A 0A5
Tel.: 604-801-5996 Fax: 604-801-5997
www.woodmarkets.com

Federal Assistance

U.S. Forest Service Northern Region
P.O. Box 7669
Missoula, MT 59807-7699
Tel.: 406-329-33511 Fax: 406-329-3347
www.fs.usda.gov/r1

U.S. Forest Service Rocky Mountain Region
740 Simms St.
Golden, CO 80401
Tel.: 303-275-5350
www.fs.usda.gov/r2

U.S. Forest Service Southwestern Region
333 Broadway SE
Albuquerque, NM 87102
Tel.: 505-842-3392
www.fs.usda.gov/r3

U.S. Forest Service Intermountain Region
324 25th St.
Ogden, UT 84401
Tel.: 801-625-5605
www.fs.usda.gov/r4

U.S. Forest Service Pacific Southwest Region
1323 Club Dr.
Vallejo, CA 94592
Tel.: 707-562-9240 Fax: 707-562-9130
www.fs.usda.gov/r5

U.S. Forest Service Pacific Northwest Region
1220 SW 3rd Ave.
Portland, OR 97204
Tel.: 503-808-2438
www.fs.usda.gov/r6

U.S. Forest Service Southern Region
1720 Peachtree Rd. NW
Atlanta, GA 30309
Tel.: 404-347-4095 Fax: 404-347-1781
www.fs.usda.gov/r8

U.S. Forest Service Alaska Region
3301 C St., Suite. 202
Anchorage, AK 99503
Tel.: 907-743-9467 Fax: 907-443-9479
www.fs.usda.gov/r10

U.S. Forest Service Northeastern Area State and Private Forestry – Mid-Atlantic
180 Canfield St.
Morgantown, WV 26505
Tel.: 304-285-1530 Fax: 304-285-1505
www.na.fs.fed.us

U.S. Forest Service Northeastern Area State and Private Forestry – Midwest
1992 Folwell Ave.
St. Paul, MN 55108
Tel.: 651-649-5246 Fax: 651-649-5238
www.na.fs.fed.us

U.S. Forest Service Northeastern Area State and Private Forestry – New England and New York
271 Mast Rd.
Durham, NH 03824
Tel.: 603-868-7716 Fax: 603-868-7604
www.na.fs.fed.us

U.S. Forest Service Northeastern Area State and Private Forestry – Eastern Hardwood Region
301 Hardwood Lane
Princeton, WV 24740
Tel.: 304-487-1510
www.na.fs.fed.us/werc

U.S. Forest Service Forest Products Laboratory – Forest Products Marketing Unit
One Gifford Pinchot Dr.
Madison, WI 53726-2398
Tel.: 608-231-9200 Fax: 608-231-9592
www.fpl.fs.fed.us/research/units/fpmu/

U.S. Forest Service Northern Research Station
241 Mercer Springs Rd.
Princeton, WV 24740
Tel.: 304-431-2700 Fax: 304-431-2772
www.fs.fed.us/ne/princeton

U.S. Forest Service Northern Research Station
359 Main Rd.
Delaware, OH 43015
Tel.: 740-368-0030 Fax: 740-368-0152
www.fs.fed.us/ne/delaware

U.S. Forest Service Northern Research Station
1992 Folwell Ave.
St. Paul, MN 55108
Tel.: 651-649-5000 Fax: 651-649-5140
www.ncrs.fs.fed.us

U.S. Forest Service Pacific Northwest Research Station
1220 SW 3rd Ave.
Portland, OR 97204
Tel.: 503-808-2100
www.fs.fed.us/pnw

U.S. Forest Service Sitka Wood Utilization R&D Center
204 Siginaka Way
Sitka, AK 99835
Tel.: 907-747-4308 Fax: 907-747-4294
www.fs.fed.us/pnw

U.S. Forest Service Southern Research Station (Brooks Forest Products Center)
1650 Ramble Rd.
Blacksburg, VA 24061-0503
Tel.: 540-231-4016 Fax: 540-231-1383
www.srs.fs.usda.gov/usfr

Exporting Assistance

Foreign Agricultural Service
1400 Independence Ave. AG Stop 1047
Washington, DC 20250-1047
Tel.: 202-720-0638 Fax: 202-720-8461
www.fas.usda.gov

U.S. Department of Commerce
1401 Constitution Ave., NW
Washington, DC 20230
Tel.: 202-482-0375
www.commerce.gov

Environmental Organizations

U.S. Environmental Protection Agency
1200 Pennsylvania Ave., NW
Washington, DC 20460
Tel.: 202-272-0167
www.epa.gov

U.S. Green Building Council
2101 L St., NW, Suite 500
Washington, DC 20037
Tel.: 800-795-1747
www.usgbc.org

University Research Centers

Biomaterials and Wood Utilization Research Center
West Virginia University
P.O. Box 6125
Morgantown, WV 26506
Tel.: 304-293-7601
wdscapps.caf.wvu.edu/BioMatWURCtr

Center for Environment and Natural Resource Policy
University of Minnesota
1530 Cleveland Ave. N.
St. Paul, MN 55108
Tel.: 612-624-7286
enrpolicy.forestry.umn.edu

Center for Forest Business
University of Georgia
180 E. Green St.
Athens, GA 30602-2152
Tel.: 706-542-6819
www.ugacfb.com

Center for Forest Products Business
Virginia Tech
1650 Ramble Rd.
Blacksburg, VA 24061
Tel.: 540-231-7107
www.cfpb.vt.edu

Center for International Trade in Forest Products
University of Washington
P.O. Box 352100
Seattle, WA 98195-2100
Tel.: 206-543-8684
www.cintrafor.org

Center for Supply Chain Research
University of Minnesota
111 Church St. SE
Minneapolis, MN, 55455
Tel.: 612-626-7239
www.isye.umn.edu/cscr

Forest Bioproducts Research Institute
University of Maine
5737 Jenness Hall, Room 213
Orono, ME 04469
Tel.: 207-581-1431
forestbioproducts.umaine.edu

Forest Products Center
University of Tennessee
2506 Jacob Dr.
Knoxville, TN 37996-4570
Tel.: 865-946-1129
wood.tennessee.edu

Forest Products Management Development Institute (FPMDI)
University of Minnesota
2004 Folwell Ave.
St. Paul, MN 55108
Tel.: 612-624-0770
fpmdi.cfans.umn.edu

Forest Resources Institute
Stephen F. Austin State University
P.O. Box 6109
Nacogdoches, TX 75962
Tel.: 936-468-3301
www.fri.sfasu.edu

Forest and Wildlife Research Center
Mississippi State University
201 Locksley Way
Starkville, MS 39759
Tel.: 662-325-2243
fwrc.msstate.edu

Louisiana Forest Products Development Center
Louisiana State University
Room 227, School of Renewable Natural Resources
Baton Rouge, LA 70803
Tel.: 225-578-4527
www.lfpdc.lsu.edu

Natural Resources Research Institute
University of Minnesota
5013 Miller Trunk Hwy.
Duluth, MN 55811
Tel.: 218-720-4294
www.nrri.umn.edu

NorthStar Initiative for Sustainable Enterprise
University of Minnesota
1954 Buford Ave
St. Paul, MN 55108
Tel.: 612-624-2648
northstar.environment.umn.edu

Olympic Natural Resources Center
University of Washington
1455 S. Forks Ave.
Forks WA 98331
Tel.: 360-374-3220
www.onrc.washington.edu

Oregon Wood Innovation Center
Oregon State University
119 Richardson Hall
Corvallis, OR 97331-5751
Tel.: 541-737-4212
owic.oregonstate.edu

Schilling's Lab
University of Minnesota
2004 Folwell Ave.
St Paul, MN 55108
Tel.: 612-624-1761
schillinglab.cfans.umn.edu

Sustainable Innovation Management
Virginia Tech
1650 Ramble Rd.
Blacksburg, VA 24061
Tel.: 540-231-7107
sim.sbio.vt.edu

Timber Mart-South Center for Forest Business
University of Georgia
Athens, GA 30602-2152
Tel.: 706-542-2832
www.tmart-south.com

Urban Forest Ecosystems Institute
California Polytechnic State University
San Luis Obispo, CA 93407
Tel.: 805-756-1111
ufei.calpoly.edu

Value Added Wood Products Manufacturing
North Carolina State University
Campus Box 8003
Raleigh, NC 27695
Tel.: 919-515-5581
www4.ncsu.edu/~pmitchel

Appendix B: Business Plan for The House of Pine

This sample business plan is included in this publication with express permission from Palo Alto Software Inc. Names, locations, and numbers may have been changed, and substantial portions of the original plan text may have been omitted to preserve confidentiality and proprietary information.

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Table of Contents

1. Executive Summary

Producing and selling furniture is a $12 billion industry. The focus of the industry is on the affluent customer who can spend upwards to $3,000 on furniture purchases. In Richmond, there are fifteen furniture stores that are competing for these customers with deep pockets. Those customers who can't afford these high prices are left with a poor selection of inferior products.

In the Richmond Metro area, there are approximately 50,000 residents with modest incomes that do not have a furniture store to cater to their needs for affordable quality furniture. This income demographic has grown tremendously over the past five years but has not been responded to by the area furniture stores. Targeting customers with modest incomes is good business. They are expected to make up half of metro population by 2020 — making them the fastest-growing segment of the city's housing market.

There are three modest-income housing renovation projects underway in Richmond with a combined total of 1,500 units that will be sold as affordable housing.

As the Richmond Metro section revives, The House of Pine will offer customized, ready-to-finish pine furniture that's hand-made and surprisingly affordable. We offer:

- **Truly Custom Furniture**: An unfinished furniture piece that is crafted for the customer. We'll customize any piece or create a whole new piece from a customer's rough sketch.
- **Heirloom Quality Furniture**: The furniture is made to last for generations. It's hand crafted, so each piece is unique.
- **Handmade from Quality Pine**: Every piece is made by a professional craftsman, from the finest pine available. Every piece of pine is checked for grain and texture before it's used.

Mission

The House of Pine's Mission is simple. The customer gets what he/she wants; furniture (one piece or a whole house full) that fits the customer's space, taste, budget and style preference, from top to bottom!

Keys to Success

- Offer our customers affordable quality furniture that will last.
- Customize any piece as requested by a customer.

- If customizing a piece won't quite work, create a whole new piece from scratch, exactly to the customer's specifications.

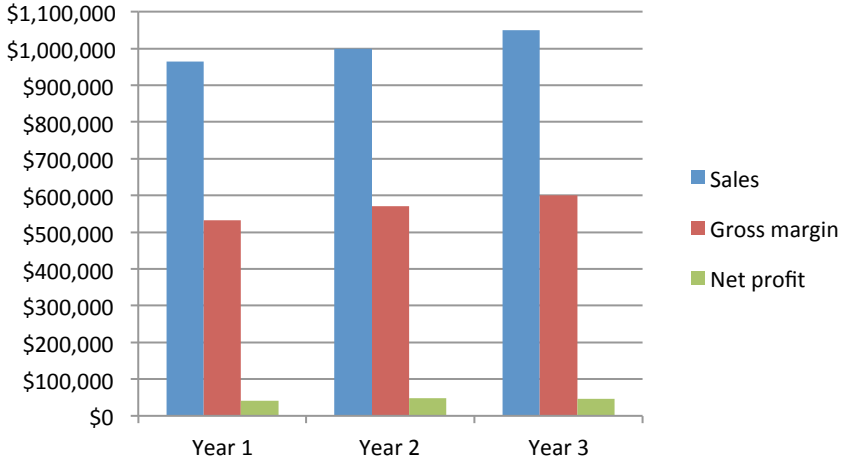

Chart: Highlights

2. Company Summary

The House of Pine will offer customized, ready-to-finish pine furniture that's handmade and surprisingly affordable. Our target customers are young families and young adults with modest incomes who are looking for the same selection and quality that the high-end customer receives. Each piece is handcrafted from the finest pine and built to last for generations.

Company Ownership

The House of Pine is owned by Richard Putnam. Richard has over 10 years of experience in furniture manufacturing.

Company Locations and Facilities

The House of Pine will be centrally located in the industrial section of the Richmond Metro area.

Start-up Summary

The House of Pine's start-up costs consist mostly of furniture manufacturing equipment and transport containers. Richard Putnam will invest $50,000. In addition, he will secure a $130,000 loan.

START-UP REQUIREMENTS	
Start-up Expenses	
Legal	$1,000
Stationery etc.	$200
Insurance	$1,000
Rent	$2,000
Expensed Equipment	$60,000
Total Start-up Expenses	**$64,200**
Start-up Assets	
Cash Required	$5,800
Start-up Inventory	$50,000
Other Current Assets	$0
Long-term Assets	$60,000
Total Assets	**$115,800**
TOTAL REQUIREMENTS	**$180,000**

START-UP FUNDING	
Start-up Expenses to Fund	$64,200
Start-up Assets to Fund	$115,800
Total Funding Required	**$180,000**
Assets	
Non-cash Assets from Start-up	$110,000
Cash Requirements from Start-up	$5,800
Additional Cash Raised	$0
Cash Balance on Starting Date	$5,800
Total Assets	**$115,800**
Liabilities and Capital	
Liabilities	
Current Borrowing	$0
Long-term Liabilities	$130,000
Accounts Payable (Outstanding Bills)	$0
Other Current Liabilities (interest-free)	$0
Total Liabilities	**$130,000**
Capital	
Planned Investment	
Richard Putnam	$50,000
Other	$0
Additional Investment Requirement	$0
Total Planned Investment	$50,000
Loss at Start-up (Start-up Expenses)	($64,200)
Total Capital	**($14,200)**
Total Capital and Liabilities	**$115,800**
Total Funding	**$180,000**

3. Products and Services

The House of Pine will offer wood products for the bedroom, living and dining room, and the storage room:

- Beds
- Dressers
- Chest
- Armoires
- Entertainment centers
- Bookcases
- Tables
- Chairs
- Benches

4. Market Analysis Summary

In the Richmond Metro area, there are approximately 50,000 residents with modest incomes. They are expected to make up half of the metro population by 2020 — making them the fastest-growing segment of the city's housing market.

It is estimated that the Richmond Metro area will need 10,000 units of affordable housing in the next seven years. Currently, there are three renovation projects that represent 1,500 new housing units. Next year, two new construction projects will be completed offering another 1,000 units of affordable housing. Another 1,000-unit project, to be located in the Garden Meadows section downtown, is currently in the planning stages.

There are changes occurring around the State University, located downtown that will also impact the revival of the Richmond Metro area. Two off-campus housing projects will be completed mid-year that will add an additional 2,000 family housing units to the university area.

Market Segmentation

The growth of affordable housing in the Richmond Metro area is critical to the success of The House of Pine.

We will aggressively market our target customers who live in the Metro area:

- Young working families: 17% of total market.
- Students: 27% of total market.

- Young adults: 56% of total market.

MARKET ANALYSIS							
Potential Customers	**Growth**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**CAGR***
Young Working Families	12%	3,000	3,360	3,763	4,215	4,721	12.0%
Students	10%	5,000	5,500	6,050	6,655	7,321	10.0%
Young Adults	10%	10,000	11,000	12,100	13,310	14,641	10.0%
Total	**10.34%**	**18,000**	**19,860**	**21,913**	**24,180**	**26,683**	**10.3%**

*CAGR = Compound Annual Growth Rate

5. Strategy and Implementation Summary

The House of Pine will focus on the modest income furniture customer who lives in the Richmond Metro area.

Competitive Edge

Most of Richmond's fifteen furniture stores are dispersed throughout the city adjacent to affluent or suburban communities. The stores downtown are high end and offer no affordable products to the Metro residents.

The primary reason for the price of the furniture is the type of wood that is used. A bedroom set made of pine can cost a customer $400. The same set made in oak or maple will cost $800. The profits are higher by focusing on the more expensive wood. When using pine, many manufacturers improve their profits by using cheaper construction techniques. The resulting poor quality of these products has added to a popular misconception that pine is an inferior wood.

The Richmond furniture stores offer a very limited selection of styles in pine. Most products are selected to maximize the store's profit, not the customer's satisfaction, since it is believed the customer has few options.

The House of Pine will build its furniture to last generations and will offer the customer all the popular styles.

Sales Strategy

We will advertise in the university daily student newspaper as well as the Metro area advertising flyer. In the advertisements for the store opening, we will have a 20% off coupon. We will continue this discount for the first month of operation.

The metro area also has six community organizations that send out weekly flyers to all community residents. We will advertise in these flyers.

SALES FORECAST			
	Year 1	**Year 2**	**Year 3**
Sales			
Furniture	$964,000	$1,000,000	$1,050,000
Other	$0	$0	$0
Total Sales	$964,000	$1,000,000	$1,050,000
Direct Cost of Sales	Year 1	Year 2	Year 3
Furniture	$432,000	$430,000	$450,000
Other	$0	$0	$0
Subtotal Direct Cost of Sales	**$432,000**	**$430,000**	**$450,000**

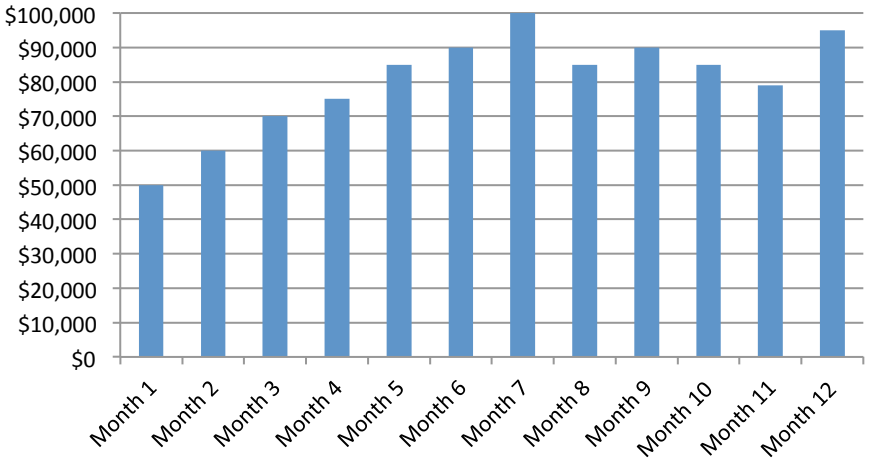

Chart: Monthly sales

6. Management Summary

The store's owner, Richard Putnam, has worked in the furniture manufacturing industry for over ten years. This experience began at Ingram's Fine Furniture, where he worked for five years. Within three years, he reached the position of shift manager. Most recently, Richard was the operations manager at Wasserman Furniture Manufacturing.

Richard is an excellent staff supervisor and will do well managing the staff of The House of Pine.

Personnel Plan

The House of Pine will have the following staff members:

- Manager
- Assistant manager
- Office manager/accountant
- Checkers (1.5)
- Production staff (5)
- Stockers (1.5)

PERSONNEL PLAN			
	Year 1	**Year 2**	**Year 3**
Manager	$36,000	$40,000	$45,000
Assistant Manager	$36,000	$39,000	$43,000
Office Manager/Bookkeeper	$36,000	$39,000	$42,000
Checkers	$32,400	$35,500	$40,000
Production Staff	$120,000	$130,000	$140,000
Stockers	$39,600	$43,000	$46,000
Total People	**9**	**9**	**9**
Total Payroll	**$300,000**	**$326,500**	**$356,000**

7. Financial Plan

Break-even Analysis

BREAK-EVEN ANALYSIS	
Monthly Revenue Break-even	$69,767
Assumptions:	
Average Percent Variable Cost	45%
Estimated Monthly Fixed Cost	**$38,502**

Projected Profit and Loss

PRO FORMA PROFIT AND LOSS			
	Year 1	**Year 2**	**Year 3**
Sales	$964,000	$1,000,000	$1,050,000
Direct Cost of Sales	$432,000	$430,000	$450,000
Other Production Expenses	$0	$0	$0
Total Cost of Sales	**$432,000**	**$430,000**	**$450,000**
Gross Margin	$532,000	$570,000	$600,000
Gross Margin %	55.19%	57.00%	57.14%
Expenses			
Payroll	$300,000	$326,500	$356,000
Sales and Marketing and Other Expenses	$60,000	$60,000	$60,000
Depreciation	$11,424	$11,424	$11,424
Leased Equipment	$0	$0	$0
Utilities	$9,600	$9,600	$9,600
Insurance	$12,000	$12,000	$12,000
Rent	$24,000	$24,000	$24,000
Payroll Taxes	$45,000	$48,975	$53,400
Other	$0	$0	$0
Total Operating Expenses	**$462,024**	**$492,499**	**$526,424**
Profit Before Interest and **Taxes**	$69,976	$77,501	$73,576
EBITDA	$81,400	$88,925	$85,000
Interest Expense	$11,917	$10,001	$8,002
Taxes Incurred	$17,418	$20,250	$19,672
Net Profit	**$40,641**	**$47,250**	**$45,902**
Net Profit/Sales	**4.22%**	**4.72%**	**4.37%**

Projected Cash Flow

PRO FORMA CASH FLOW			
	Year 1	**Year 2**	**Year 3**
Cash Received			
Cash from Operations			
Cash Sales	$723,000	$750,000	$787,500
Cash from Receivables	$198,158	$248,400	$260,278
Subtotal Cash from Operations	**$921,158**	**$998,400**	**$1,047,778**
Additional Cash Received			
Sales Tax, VAT, HST/GST Received	$0	$0	$0
New Current Borrowing	$0	$0	$0
New Other Liabilities (interest-free)	$0	$0	$0
New Long-term Liabilities	$0	$0	$0
Sales of Other Current Assets	$0	$0	$0
Sales of Long-term Assets	$0	$0	$0
New Investment Received	$0	$0	$0
Subtotal Cash Received	**$921,158**	**$998,400**	**$1,047,778**
	Year 1	**Year 2**	**Year 3**
Expenditures			
Expenditures from Operations			
Cash Spending	$300,000	$326,500	$356,000
Bill Payments	$539,935	$627,157	$637,580
Subtotal Spent on Operations	**$839,935**	**$953,657**	**$993,580**
Additional Cash Spent			
Sales Tax, VAT, HST/GST Paid **Out**	$0	$0	$0
Principal Repayment of Current	$0	$0	$0
Borrowing			
Other Liabilities Principal	$0	$0	$0
Repayment			
Long-term Liabilities Principal	$19,992	$19,992	$19,992
Repayment			
Purchase Other Current Assets	$0	$0	$0
Purchase Long-term Assets	$0	$0	$0
Dividends	$0	$0	$0
Subtotal Cash Spent	**$859,927**	**$973,649**	**$1,013,572**
Net Cash Flow	**$61,231**	**$24,751**	**$34,206**
Cash Balance	**$67,031**	**$91,782**	**$125,988**

Projected Balance Sheet

PRO FORMA BALANCE SHEET			
	Year 1	**Year 2**	**Year 3**
Assets			
Current Assets			
Cash	$67,031	$91,782	$125,988
Accounts Receivable	$42,842	$44,442	$46,664
Inventory	$51,700	$39,895	$43,895
Other Current Assets	$0	$0	$0
Total Current Assets	$161,573	$176,118	$216,547
Long-term Assets			
Long-term Assets	$60,000	$60,000	$60,000
Accumulated Depreciation	$11,424	$22,848	$34,272
Total Long-term Assets	$48,576	$37,152	$25,728
Total Assets	**$210,149**	**$213,270**	**$242,275**
	Year 1	**Year 2**	**Year 3**
Liabilities and Capital			
Current Liabilities			
Accounts Payable	$73,700	$49,563	$52,658
Current Borrowing	$0	$0	$0
Other Current Liabilities	$0	$0	$0
Subtotal Current Liabilities	$73,700	$49,563	$52,658
Long-term Liabilities	$110,008	$90,016	$70,024
Total Liabilities	**$183,708**	**$139,579**	**$122,682**
Paid-in Capital	$50,000	$50,000	$50,000
Retained Earnings	($64,200)	($23,559)	$23,691
Earnings	$40,641	$47,250	$45,902
Total Capital	$26,441	$73,691	$119,593
Total Liabilities and Capital	**$210,149**	**$213,270**	**$242,275**
Net Worth	**$26,441**	**$73,691**	**$119,593**

Business Ratios

Business ratios for the years of this plan are shown below. Industry profile ratios based on the Standard Industrial Classification (SIC) code 5712, Furniture Stores, are shown for comparison. The following is an explanation of the plans divergence with industry ratio profile.

- Sales Growth — will start below the industry average but will be closer to the average after the third year of operation.
- Accounts Receivable — is slightly below average due to the low use of credit for purchases (25%).
- Inventory — is below the industry average because 20% of the furniture will be built to order.
- Long Term Assets, Long Term Liabilities, and Expense of Sales — are higher because The House of Pine builds furniture on site.

RATIO ANALYSIS				
	Year 1	**Year 2**	**Year 3**	**Industry**
Sales Growth	n.a.	3.7%	5.0%	6.2%
Percent of Total Assets (Total Assets = 100%)				
Accounts Receivable	20.4%	20.8%	19.3%	21.0%
Inventory	24.6%	18.7%	18.1%	38.8%
Other Current Assets	0.0%	0.0%	0.0%	21.7%
Total Current Assets	76.9%	82.6%	89.4%	81.5%
Long-term Assets	23.1%	17.4%	10.6%	18.5%
Current Liabilities	35.1%	23.4%	21.7%	44.9%
Long-term Liabilities	52.4%	42.2%	28.9%	13.7%
Total Liabilities	87.4%	65.4%	50.6%	58.6%
Net Worth	12.6%	34.6%	49.4%	41.4%
Percent of Sales (Sales = 100%)				
Gross Margin	55.2%	57.0%	57.1%	37.6%
Selling, General & Admin. Exp.	52.%	52.3%	52.8%	20.8%
Advertising Expenses	6.2%	6.0%	5.7%	4.4%
Profit Before Interest and Taxes	7.3%	7.8%	7.0%	1.6%
Main Ratios				
Current	2.19	3.55	4.11	1.82
Quick	1.49	2.75	3.28	0.76
Total Debt to Total Assets	87.4%	65.4%	50.6%	58.6%
Pre-tax Return on Net Worth	219.6%	91.6%	54.8%	3.8%
Pre-tax Return on Assets	27.6%	31.6%	27.1%	9.2%
Additional Ratios				
Net Profit Margin	4.2%	4.7%	4.4%	n.a.
Return on Equity	153.7%	64.1%	38.4%	n.a.
Activity Ratios				
Accounts Receivable Turnover	5.63	5.63	5.63	n.a.
Collection Days	57	64	63	n.a.
Inventory Turnover	10.73	9.39	10.74	n.a.
Accounts Payable Turnover	8.33	12.17	12.17	n.a.
Payment Days	27	37	29	n.a.
Total Asset Turnover	4.59	4.69	4.33	n.a.
Debt Ratios				
Debt to Net Worth	6.95	1.89	1.03	n.a.
Current Liab. to Liab.	0.40	0.36	0.43	n.a.
Liquidity Ratios				
Net Working Capital	$87,873	$126,555	$163,889	n.a.
Interest Coverage	5.87	7.75	9.19	n.a.
Additional Ratios				
Assets to Sales	0.22	0.21	0.23	n.a.
Current Debt/Total Assets	35%	23%	22%	n.a.
Acid Test	0.91	1.85	2.39	n.a.
Sales/Net Worth	36.46	13.57	8.78	n.a.

Good business practices are key for the long-term success of any business. Within this book you will find all the information needed to start a small forest products company, from business planning to financial management. Included is a sample business plan that readers can use as a guide for the preparation of their own business plan.

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