

**STRATEGIC ANALYSIS OF  
A FACTORY BUILT HOME OPPORTUNITY  
IN WESTERN CANADA**

by

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## ABSTRACT

A strategic analysis was completed to determine the feasibility of initiating a factory-built home manufacturing facility in Western Canada. We completed an industry analysis, internal analysis, an opportunity analysis and provide a recommendation on how to proceed. The results indicate a factory built facility is economically feasible if a market of 60 houses per year can be established. The competitive advantages of factory built homes over on-site homes indicate a better quality home can be produced for 30% to 40% less cost. The value-chain analysis indicates the margin can be most significantly increased during the marketing, sales and engineering phase. The profitability of a firm improves as the size of the factory increases and if it continues to operate at capacity. The factory built home construction opportunity is very promising. A recommendation to pursue this opportunity is suggested.

**Keywords:** factory-built; modular homes; feasibility; strategic; Western Canada; home construction

## DEDICATION

To the woman who helped me through grade 12 and my motivator in life. To Zachary an inspiration to everyone around him.

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## GLOSSARY

- Factory-built housing** Homes built in factories under the CAN/CSA A277-90 standard similar to regular on-site home construction. Encompasses a wide range of homes that include: pre-engineered, panelized, modular and manufactured. The level of completion before the home leaves the factory varies according to the type of homes, as well as its size and design, and covers everything from 'packages' of pre-cut lumber to virtually finished homes ready for move-in on the day of arrival on the building site.
- Manufactured homes** These are lower cost homes that can be transported down the highway. In Canada they follow the CSA Z240 building standard. In the United States they follow the HUD standard. These homes are a product of the factory built housing industry. They represent one of the least expensive, but decent types of housing. Manufactured homes evolved from earlier versions of housing trailers, the mobile home.
- On-Site Home Construction** Traditional method of home construction in Canada. The tradesmen move to each site and set the foundation, frame the house, and then install the windows, plumbing, HVAC, gas and electrical on-site in the subdivision.
- R-2000** An energy efficiency initiative that promotes the use of cost-effective energy-efficient building practices and technologies. The R-2000 Standard demands a high level of energy efficiency, beyond what building codes require. The standard is voluntary for builders and nation wide in scope. An R-2000 standard will achieve energy-efficiency of approximately 40 percent above building code requirements, and will use at least 30 percent less energy than conventional new homes. R-2000 homes incorporate an advance fresh air ventilation system and environmentally improved building products and materials. (Natural Resources Canada, website, <http://oee.nrcan.gc.ca/residential/personal/new-homes/r-2000/standard/current/compliance.cfm?attr=4>, September 5, 2006).
- Housing Industry** Includes residential homes and may include log homes, lumber framed homes and manufactured homes.

# 1 INTRODUCTION

## 1.1 Problem Statement

This project will be a strategic analysis of the feasibility and potential of a factory-built home manufacturing facility in the south/southwest of British Columbia. 'Exzact-Built' will be working in alliance with a company that has been in operation for ten years and is a leader in Ready to Assemble building systems. The company possesses extensive experience in automated home construction techniques, but has not been able to grow the business to produce or sell more than twenty homes a year. To utilize the economies of scale associated with their construction method they need to be constructing more than sixty homes per year. This paper will conduct a strategic evaluation of the housing industry accessible to Exzact-Built, followed by an industry analysis of the home construction industry, an internal operational feasibility analysis of Exzact-Built, an opportunity analysis, and offer a recommendation. This chapter will begin by describing the company, the business area, the buyers and outline the purpose and content of each chapter.

## 1.2 Overview

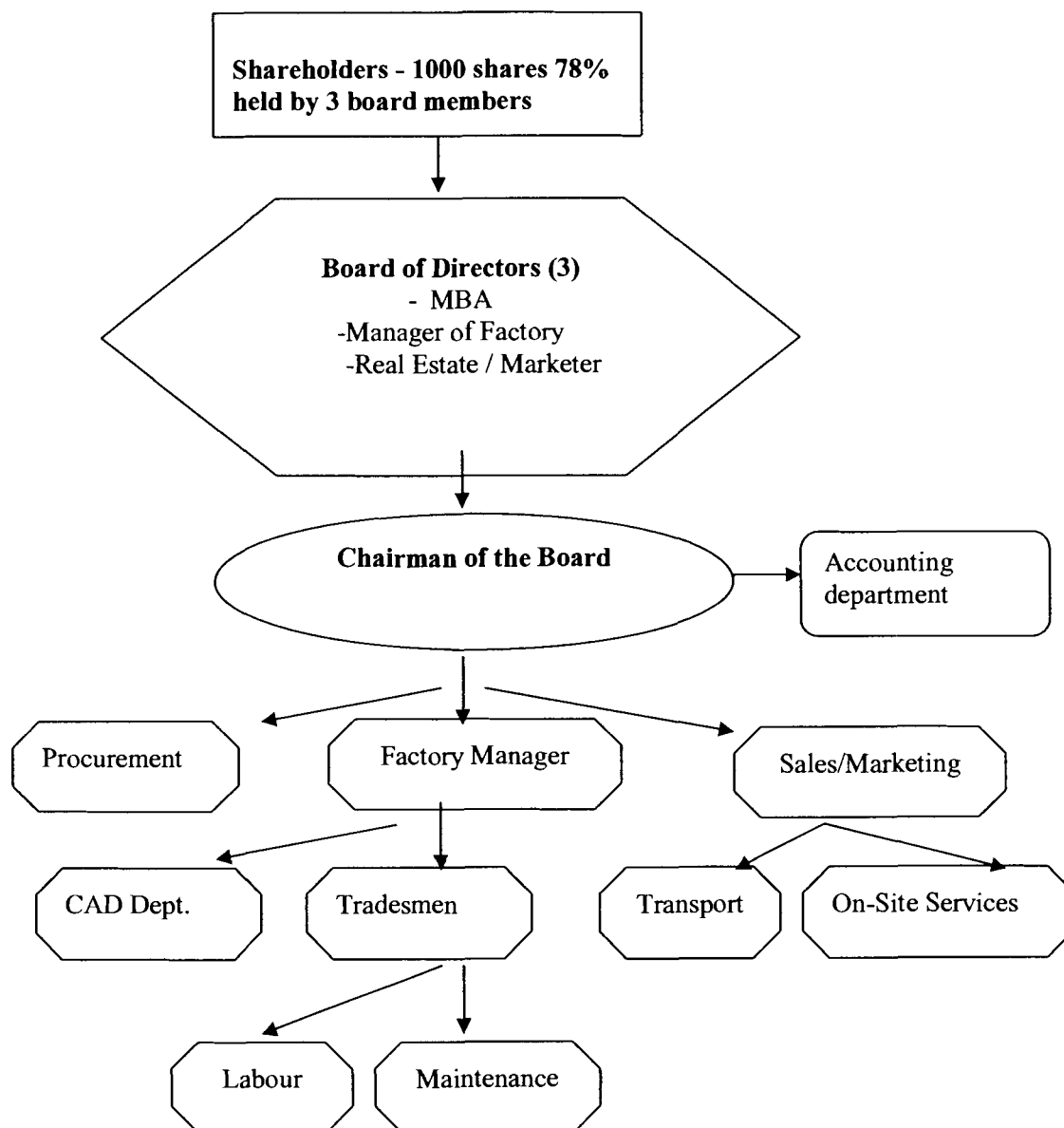
The demand for homes in Western Canada is increasing and the home construction industry is having difficulty keeping up. The population is continuing to increase because of the many economic opportunities in the mining, oil and gas, and forest industries. This is creating pressures in the home construction industry to produce. Several companies are at capacity and new ones that start up are similarly stressed.

### **1.3 Company Structure**

Exzact-built – is a privately owned company with three major shareholders contributing 78% of the equity. Being privately owned the company has flexibility and is able to re-invest profits into the company, without having to report quarterly revenues.

The firm is ready to be established in 2006. The shareholders include three individuals: a forester with a Master of Business in Industrial Management, a businessman who has previous managed three panelized home construction companies, and ideally we need an entrepreneur with real estate and marketing expertise. The three major shareholders would comprise the board of directors and one of them would be elected the Chairman of the Board. The Chairman would have at least four direct reports that would include the: accounting department, procurement, factory manager, and a sales/marketing person. The company structure is further illustrated in Figure 1.

Figure 1: Corporate Structure



Source: Author

### 1.4 Business Area

The home construction business area is currently dominated by on-site home builders. These builders move their equipment and labour from one building site to the next and incur many recognized inefficiencies including: excessive development costs and inspections, over specified designs, difficulty accessing available skilled labour, the theft of equipment from the

job-sites, inefficient construction and waste of materials, and a shortened work year due to seasonal weather changes (Woodbridge and Associates, 2003). The traditional on-site method still dominates home construction industry in Western Canada. However, in recognizing the limitations associated with on-site building, the factory built method that is becoming a more popular alternative. The factory built method of home construction is common in Europe, the United States and Eastern Canada. However it is relatively new in Western Canada. There are a number of different factory-built systems that provide a home in varying degrees of completion. These include on-site with no engineered products, pre-cut, panelized, modular and factory-built.

There are five levels of integrating on-site and factory built lumber framing methods for single-family home construction. These levels include: site built, precut, panelized, modular and manufactured housing. The lowest level of manufacture complexity is the on-site construction method where no engineered products are used. Most on-site builders are beyond this level as they purchase engineered trusses from specialized factories. The next level is pre-cut homes. This involves on-site works but the major building components are prepared in a factory and shipped to the building site as a package ready for assembly. These components may include framing materials, doors, windows, roofing, and siding. This method enables a reduction in waste, but an experienced on-site builder is still required to put the parts together. Additional skilled labour is still required to go to the site including plumbing, HVAC, cabinets, and windows.

Panelized homes are the next step in construction complexity. From pre-cut to panelized there is an efficiency gain by reducing the time on-site to frame a house. This increase in construction completion does not speed the future steps, but it speeds the framing phase and enables less skilled labour to be used. Panelized homes may include the installation of windows, doors and siding. A reduction in materials waste is realized, but there are increased transport costs from the factory to the building site relative to the pre-cut method. These costs are

associated with a transport truck not able to carry as many square feet of pre-panelized walls as it can pre-cut lumber ready to assemble into walls.

Modular home construction involves a fully framed house that is constructed off-site and delivered in three dimensions. The modules can be combined to make multi-story homes, while a typical two story home consists of four to five modules. When the modules arrive on the lot they are ready for assembly on the foundation. Insulation, vapour barriers, plumbing, wiring, siding and other construction details are mostly completed in the factory. Interior finishing is well advanced including drywall, trim, flooring and cabinets. The advantages are the amount of time spent on-site and the varieties of skills required on-site are dramatically reduced. However, some features and custom upgrades are best done on-site, such as brick siding and some hard surface flooring.

A manufactured home is the most complete option when it arrives from the factory. The purchaser is often able to move-in the same day or a few days after it arrives on the site. Built in sections, manufactured homes are available in many designs and layouts, with a wide selection of standard and custom features. The on-site skills required are reduced to a crane and a small crew to position the home on the foundation and hook-up the utilities and services.

There have been at least three different studies completed to compare the costs of factory built manufactured housing to on-site building. They all concluded that manufactured housing was thirty to forty percent less expensive than on-site building methods (forty percent less cost – Woodbridge and Associates, 2003; thirty percent less cost – CMHC, 1991; thirty-four percent less cost – CMHC, 1999).

### **1.5 Buyers**

Globally there is a broader range of individuals that are increasingly purchasing manufactured or factory built homes. Factory built homes comprised eighty percent of the construction in Sweden, and Japan, thirty percent in United States and only fifteen percent in



Canada (Woodbridge and Associates, 2003). The increasing trend indicates there is an opportunity to establish a firm that will capture the trend in the market. Traditionally in Western Canada the majority of consumers who have been purchasing on-site built homes and manufactured homes have been in the lower income strata of the population. Typically these are either first time buyers or retirees. Both groups of buyers have been attracted to manufactured housing because of its affordability and ease of maintenance. New trends, however, are arising due to changing consumer demographics, changing perceptions about manufactured homes, and discernible improvements in product quality and design. Manufactured homes are being re-branded as factory built homes and are built to a better standard than some on-site homes. For example, factory built homes are marketed as first prize in 'Show of Homes' contests at the annual fair in Vancouver (PNE; Pacific National Exhibition). As buyers realize the quality advantages the market continues to grow.

## **1.6 Outline**

The project will follow the strategic analysis framework proposed by Boardman, Shapiro and Vining (2004). Chapter 2 presents an industry analysis of the home construction industry in which ExZact-build will compete. Chapter 3 will be an internal analysis to evaluate operational feasibility. Chapter 4 will be an opportunity analysis. Chapter 5 will provide a recommendation.

## 2 INDUSTRY ANALYSIS

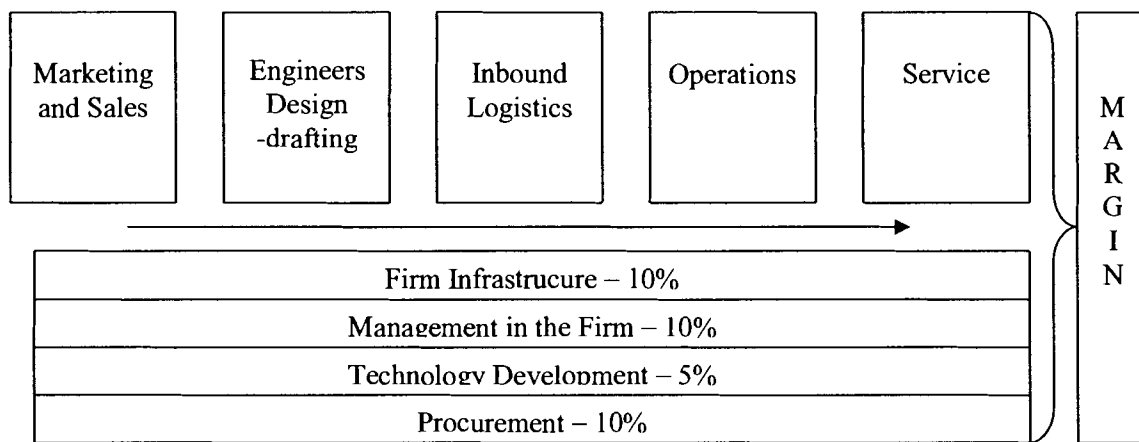
An overview of the factory built home industry will provide an understanding of the factors that impact businesses competing in the industry. In this section we will review the value chain, the supply chain, key success factors, SWOT analysis, industry attractiveness, competitor analysis, and competitive advantages and disadvantages.

### 2.1 Value Chain Analysis

Value chain analysis is a systematic approach for breaking down business functions into strategic areas through which value is added and competitive advantage can be derived. There are two components to a value chain analysis: the industry value chain and an organization's internal value chain. This analysis will consider the internal value chain and the functions as defined by Porter (1985).

The value chain from Porter categorizes the generic value-adding activities of an organization. The 'primary-activities' include: inbound logistics, operations (production), outbound logistics, sales and marketing, and service (maintenance). The 'support-activities' include: administrative infrastructure management, human resources management, research and development and procurement (refer to Figure 2). The ultimate goal is to maximize value creation while minimizing costs.

**Figure 2: Value Chain of a firm in the factory built home industry**



Source: Adapted from Porter, 1985.

Profit margin (margin) is gained during the construction of a home. However a customized home will typically result in a greater margin. A generic house has the lowest margin that is typically near twenty percent, while custom additions will individually often have a two hundred percent margin. Several custom features can increase the overall margin on a house from twenty percent to forty percent. Customization is associated with innovation that is initiated by the marketing and sales efforts, and the engineers and drafting departments. The logistics, operations and services may be more comparable between firms and may add competitive advantage, but not as dramatically as an effective sales and marketing department. The infrastructure of a firm, including management, technology development and procurement will decrease the cost of a factory built home by thirty to forty percent. To maximize value the factory built home manufacturer needs to focus on a highly effective sales and marketing department coupled with a strong engineering and drafting department.

## 2.2 Supply Chain Analysis

Companies earn revenues and make profits by selling products and services that are of value to their customers. The value created by the factory built home builder is shared with their

suppliers in the form of payments for raw materials and services. The customer benefits from their purchase and shares in the value by gaining an attractive and comfortable home to reside in. The value that the builder is able to capture is returned to the shareholders in the form of profits.

The process of converting a bare lot in a subdivision into a housing unit involves several different trades and suppliers (refer to Figure 3). The on-site and factory built home-builders are in the middle of the supply chain process. The raw materials for a home will be sourced from a mine and the forest. These raw materials are then processed at a manufacturing facility that will become the wholesaler (e.g. sawmill). They may sell directly to the homebuilder, but in most cases they sell to a retailer who distributes the product. The home-builder then purchases from the retailer (e.g. Home Depot). The home-builder buys all of the different products (for over thirteen trades) and brings it all together at a factory and/or the building lot. Certain trades need to act in sequence (e.g. the foundation is first, then framing, roofing, heating, painting, and installing carpets). The final step in the supply chain is the sale of the home to the customer (refer to Figure 3). The home builder is in the middle of the supply chain, however there are many opportunities for them to move left or backwards on the supply chain (Woodbridge and Associates, 2003).

**Figure 3: Supply Chain in Home Construction**

Raw Materials	Wholesalers	Retailers	On-Site or Factory Built Home Builders				Buyer
Logging -Mining  -Lumber, Steel, Lime and Aggregate	-Mills process the raw materials and sell as Wholesalers	Retailers- Home Supplies Eg. Home Depot, Lowe's, Rona	Foundation	Roofing Framing Windows Siding Electrical Plumbing Heating	Cabinets Flooring	Transport (if Factory Built)	Customer

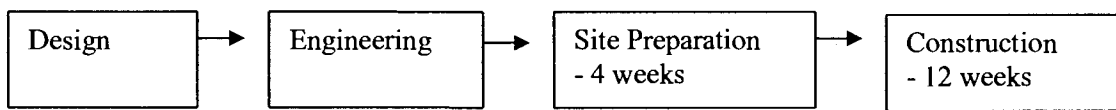


Source: Author

Arguably on-site home construction and factory built homes are two different industries, with the primary difference being the location of the work. On-site home construction moves

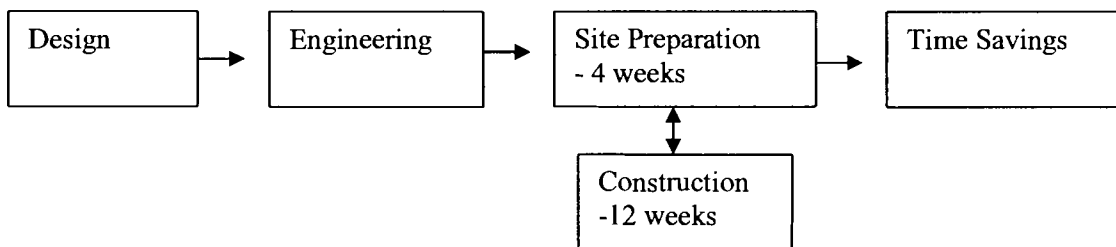
around to each building site. These moves extend the construction period and add to the overall cost. A factory built home shortens the duration of home construction. Figures 4, and 5 display the time savings that can occur when a buyer selects a factory built home instead of an on-site one. The savings exist because the site preparation and construction can occur at the same time in factory built home construction.

**Figure 4: Time Line for On-Site Home Construction**



Source: Author

**Figure 5: Time Line for a Factory Built Home**



Source: Author

## 2.3 Industry Overview

### 2.3.1 Key Success Factors

The success of a factory built home manufacturer relies on several variables. If any one of these variables is not considered the success of the firm will be compromised. These factors include:

- the location of a factory in a suitable climate
- location of a factory near skilled tradesmen and labour
- operational efficiencies of a factory
- transportation access to a market on main trucking and railway routes
- ability to market the product (Woodbridge and Associates, 2003)

The location of a factory in a dry climate near tradesmen and unskilled labour is preferred. A dry climate reduces the detrimental effect of moisture on lumber products used for construction. Moisture can induce warp and wane to lumber that will reduce the quality of construction. A home built in a dry climate has a tighter fit and improves the company's ability to market a high quality home.

Labour costs account for approximately seventeen percent of construction, and thirty one percent of overall project costs (Woodbridge and Associates, 2003). Therefore any increase in labour costs will have a dramatic impact on the profitability of a factory built home. The location of a factory near skilled tradesmen and labour is essential for success. Factories farther away from labour will have to pay more to attract efficient and quality workers. As well the availability of labour is essential to complete and deliver a home on time.

Operational efficiencies in a factory can drastically affect the profitability of a business. Efficiencies are usually gained when a task is repeated by an individual. Several operational strategies can also be incorporated into a factory between stations. Most factory built home facilities have between five and ten stations. Utilizing a 'pull' rather than a 'push' strategy can be effective at reducing inventory and managing costs.

Transportation will generally contribute two to five percent towards the price of a home, depending on the distance from the factory to the market. A factory is best located at the hub of major transportation routes with access to trucking, railway and an international port. Location in a hub of industrial activity improves the ability of a trucking company to find a 'back-haul' for any delivery. Trucking companies can significantly reduce rates if they are being paid to transport goods in both directions. The location of a factory in a remote location reduces the ability to negotiate on transportation costs. Access to railway provides a potentially less expensive option for longer hauls and for accessing international ports. The access to an international port will enable foreign markets to be accessed.

Marketing of factory built homes is essential. The marketing will typically need to access several markets, in a diverse number of regions. Diversity across markets will provide strength and should reduce the impact of economic downturns.

### **2.3.2 Strengths, Weaknesses, Opportunities, and Threats (SWOT)**

The SWOT analysis of the industry considers factors that may affect the industry. An examination of these factors provides insight into how the industry may change.

The strengths of the industry are the access to a greater geographic market and the ability to build a home for a reduced cost. Building in a factory and then shipping a completed home on truck, rail, or ship opens a tremendous market to the factory built home company. The on-site home builder is not able to move his crew, tradesmen, and equipment much greater than 150 kilometers without decreasing efficiencies. The factory built home company's strength is the ability of their employees to work at the same site, develop supplier efficiencies, manage inventory, and continually improve operational efficiencies. The ability to improve operational efficiencies and reduce building costs enables the factory built home builder to be more price competitive.

The weaknesses in the factory built home construction industry are the belief or stigma that the homes are for low income earners, the difficulty to access serviced residential lots that permit factory built homes, and the need to build several homes at once to maintain operational efficiencies. This type of housing evolved from housing trailers or mobile homes. These earlier housing forms were associated with some negative product quality and low income, low status buyers. Through the years, however, the industry has evolved with quality enhancing innovations, design improvements and elaborate finishing. The factory built home is a traditional home similar to what is built by the on-site builder, but many buyers have not realized this. This creates a difficult environment to promote sales. Another weakness is that many land developers will not permit modular homes to be put on their lots. This is associated with their belief the

homes are lower quality and they will decrease the residual lot values. As well there may be a preference towards builders they are associated with. The final weakness is the need to maintain several units under construction in the factory to realize the economies of scale of the factory. When the housing market softens and the factory is not running at capacity there are several actions that can be taken to scale back, but ultimately there are high fixed costs of operating a factory when compared to maintaining a mobile crew.

The opportunities for selling factory built homes escalate in strong housing markets when there are not sufficient on-site home builders available. This is currently occurring in most regional centers in British Columbia and Alberta. The ability of the factory built home builder to access most of these markets from a single facility creates a tremendous opportunity.

A very large issue is that many builders of on-site homes use trades who can work in other segments of the construction industry. So it is not only maxing out the capacity of existing builders that creates this situation but several other significant factors including reduced numbers entering construction trades and high demand for trades by several large infrastructure projects including the Olympics and the oil sands related activity, as well as a hot commodities market.

The threats to the industry include substitute construction methods that are examined in section 2.4.5 and the stability in the housing market. A decrease in demand in the housing market would increase the supply of on-site home builders. A decreased housing market may also erode the profit margins and result in factories operating at below operational efficiencies and potentially at a loss.

## **2.4 Industry Attractiveness (Porters 5 Forces)**

A framework for evaluating industry strategy as influenced by five forces was developed by Michael Porter (Porter, 1979). The benefit of utilizing this framework is derived from the improved ability of a business manager to understand the industry context in which they operate.



We know that different industries can sustain different levels of profitability; part of this difference is explained by the five forces.

#### **2.4.1 Rivalry – moderate to high**

Rivalry in the housing industry is high. There is a concentration of several competitors in each regional market of varying sizes, experience and ability. Each company is jockeying for position and needs to maintain a base level of work to sustain itself. Once they attain this level they are more prone to increase the price of their homes.

The housing industry is primarily based on cost, but several niche markets exist that are based on differentiation. The differentiation may be the cost of construction (manufactured homes to custom log homes) or the type of building materials used for framing (lumber, logs, brick, and steel are the most common). The traditional home builders in western Canada are completing construction on-site using lumber for framing. They are geographically limited by the ability to move their employees from site to site. The restriction on movement creates regional rivalry, and provides power to strategically placed builders. Depending on the concentration in a regional market, the rivalry could vary from intense to light.

Home construction has extensive building regulations that builders must comply with in any 'developed' country. The building regulations enable the low cost producers to market themselves as meeting required quality, health and safety standards. This increases rivalry among the low cost producers. However the companies focusing on differentiation strategies such as custom homes or log homes will operate in environments with less rivalry as their products are more unique.

The forecast for the next two years (2006-2007) indicates there will be a declining number of housing starts in Canada and the United States. A decreased market will increase the rivalry among the existing builders. These conditions will also precipitate fights for expansion minded builders (Porter, 1979).

The switching costs between builders are low. If a builder comes on hard-times or creates an error part way through a project, a buyer can switch builders with relatively low costs. The potential to lose existing buyers to a competitor part way through a project increases the rivalry among builders.

The fixed costs associated with becoming a builder are relatively low. A builder can start a business and sub-contract out most trades where large assets are needed. The low fixed costs reduce the barrier to entry, and as a result many small businessmen can easily enter the market. As well the exit costs are low for a home-builder, which enables a person to enter the market during the good times and then leave.

When the concentration of home-builders is high, a condition called the 'perfect market' develops and the economic rents are lower. However, the low exit costs enable companies to leave the market until the demand increases. When the concentration of builders is low, they should be able to extract greater rents, however the low barriers to entry usually limit the duration this situation will exist. The instability of the housing market and inability of a home builder to predict when they will be able to sell and how much they can get reduces the number of builders in the market. Many builders will get out of the industry when the markets are low, and several will enter when the market improves. This fluctuation in the competition increases rivalry as the entry and exit costs are relatively low.

In the United States the housing industry is more mature and there are some large factory built home companies. The top 15 home builders in the United States (US) account for 15% (3.2 billion FBM) of framing lumber consumed annually in new residential starts in the US, and the top five consume about 10% of the framing lumber (Woodbridge and Associates, 2003). Consolidation of the lower cost manufactured home sector has been on-going in the United States, but it really picked up speed in the mid 1990's.

In the last 15 years, about 150 companies have been acquired or merged. "Most of the consolidation is confined to the top 10 builders who are acquiring companies. In 1992, 8

percent of the market share was with the top 10 percent of builders, and in 2004 it was more than 21 percent, and it is growing (Ahluwalia,G., 2004).

This trend has previously occurred in Japan and Sweden where almost all homes are built by larger companies in factories and not by the on-site builder (Woodbridge and Associates, 2003). In Canada the consolidation is not as evident. There are several (more than 20) home builders in each major city (Edmonton, Calgary and Vancouver). However with the increased presence of factory built home companies a consolidation is expected to begin. The pace of this consolidation may increase as the number of housing starts decreases, rivalry increases, and the under capitalized builders exit the industry.

#### **2.4.2 Barriers to Entry – moderate to high**

The home construction industry has barriers to entry that vary with the type of unit being constructed and the region where it is needed. The strength of the different barriers to entry fluctuates geographically with growth rates. Markets that are growing quickly will have fewer barriers to entry than markets on the decline. The benefit of factory built housing is the ability to transport the homes to the market. The homes should be transportable up to 1500 kms. Any city within this radius should be accessible by the factory. This is different from the on-site builder who is constrained to the local market and has about a 150 km radius around their marshalling town.

The experience curve is one of the greatest barriers to entry. The experience curve is a combination of elements including: economies of scale, the learning curve for labour, and capital-labour substitution (Porter, 1979). Home construction is a complicated process that a person needs experience with to attain a high level of operational efficiency.

New entrants will have difficulty establishing all facets of a supply chain. A major supply problem facing a new entrant is sourcing qualified labour. A home construction project needs to follow a tight timeline where about 13 different tradesman who require specific materials

and supplies need to act one after another. For example the drywall cannot be completed until the house is framed, the windows are installed, the roof is on and there is a heating system operating. To develop this supply chain of materials and co-ordinate the delivery to the site is difficult until the contractor is established and they have the purchasing power or relationships.

Suppliers providing materials to construct a house often have backorders on their inventory. When these situations develop a new entrant is often the last to receive their order as suppliers will typically be loyal to their longer term clients and ship their orders first. This could leave the new entrant short on supplies. Another difficulty is developing a supply chain of materials from the lowest cost suppliers, and ensuring they are delivered just-in-time to minimize the costs of inventory.

In the manufactured home industry there are a concentration of companies that have a established market share and relationships that provide them preferred access to new development lots. This position can effectively block out new entrants from competing.

The on-site builder has low fixed costs and as a result several persons start up their own business building homes, however, land costs and housing supplies need to be funded by the builder. These costs limit the ability of a builder to start several homes at once. This barrier can be eliminated if the builder can receive the capital prior to constructing the home.

Fixed costs for the factory built home-builder are much higher than the on-site builder and are significant barriers to entry. The factories typically need to have a 20,000 ft<sup>2</sup> to 100,000 ft<sup>2</sup> building to benefit from the economies of scale needed to compete. Within the factory the complexity of equipment needed is highly variable between companies.

Government regulations are not a major barrier to new entrants. The regulations have standardized the home construction industry. A government approved home provides assurance to the buyer that they will be purchasing a quality-built and safe home to live in. This effectively reduces the concerns for a buyer when he purchases a home from a new entrant; as long as the

home is government certified as safe and an occupancy permit is satisfied, the buyer will have confidence in what they have purchased.

### **2.4.3 Buyer Power – low**

Overall the power of the buyer is low when they are purchasing a single home, and they will have little clout when dealing with a fragmented builder network. If the builders were more closely networked with dealerships and retailers the buyers may have more leverage. If the buyers were purchasing several homes they would be able to increase their power.

Buyers are seeking the highest quality and lowest price in their home. Although many buyers have difficulty differentiating between the qualities of different builders, they can easily differentiate according to price. These benefit the buyer if they are making their decision based on a homogenous product. However, when buying a differentiated product or a custom home, their negotiation power decreases.

Buyer power also increases when there are several alternate opportunities to select from. This will typically occur when the housing market is poor, or builders have built more homes than needed.

Buyers have limited power to affect price when the supply of builders and homes cannot keep up to the demand. In 2006 there are regions where there are several builders working at capacity and unable to accept new projects (eg. Alberta and British Columbia). In these regions the buyers have reduced power and prices are escalating. Alternatively where there are few homes being built (eg. New Brunswick), the buyers should have more power.

Buyers who have the ability to buy their own lot and build their own house have increased power. The home builders will realize they will have to be more flexible when negotiating if they want to make a sale to this category of buyer. The home builder should only enter into negotiations with this type of buyer if they are willing to decrease their position, or if

they can provide a better service. An example of a better service would be the ability to provide a house more quickly and of better quality.

#### **2.4.4 Supplier Power - moderate**

Raw material suppliers have low power in the housing industry. These raw materials are needed in the building of most homes and include: lumber, carpet, concrete, roofing, tile, plumbing pipes and other building supplies. These materials are also needed in many industries other than housing. Suppliers of these materials are vulnerable to the many companies in existence offering similar products and substitutes, but it bears mention that there has been significant consolidation in this industry over the last 25 years, which increases supplier power. In addition, in smaller regional centres, suppliers may charge more because buyers have fewer options and builders may be reluctant to go outside in search of better prices. This affects on-site builders in those regions differently and provides a highly relevant competitive advantage to factory built homes in those markets.

The cost of switching suppliers would be low when building most homes except for custom projects. Most building supplies are standard, and have to meet national standards. Whether building supplies are bought from one company or another should have little bearing on the success of the home-builder if they meet the criteria and timeliness needed.

The number of home construction suppliers has been growing across North America. The major big-box stores are aggressively expanding across the continent to supply the home construction industry and initiating consolidation. Companies including Home Depot, Rona, and Lowes are the three of the big home-builder suppliers. Where they exist and consolidation of the smaller niche suppliers has occurred the supplier power is relatively high. However if there is a cluster of smaller niche companies that can compete against the big box stores, the supplier power is decreased. A variety of suppliers increases competition and reduces supplier power. These conditions exist as long as the cluster of niche suppliers is maintained in a region.

The power and supply of labour and tradesmen is also a consideration. The problems in the labour market in Western Canada are an extreme example where the supplier of labour has the power. The conditions in Vancouver are expressed by Peter Simpson, CEO of the Greater Vancouver Home Builders Association,

We've got to do everything we can to increase the pool of skilled labour here. If it means going to Europe to recruit the workers with skilled crafts, that's a good idea. We have to look at all the options. Simpson says the shortage has reached the point where some B.C. companies have raided others for skilled labour. "We've always had a problem with theft of materials from the jobsite," he says. "Now, we've got a problem with theft of bodies - workers, basically." Simpson says some employers are going to rival companies' jobsites and hiring away their employees. The raiding companies are paying wages well over the market standard and providing cash signing bonuses (Simpson, 2006).

Similar problems occurred during the spring of 2006 in Alberta. There were examples of tradesmen working on a site requesting wage increases up to 3 times during the construction of a single house. The prime contractor in this example had already pre-sold the house and was not able to increase his revenues, but if he had not paid the tradesmen the increased wage he would not have been able to complete the house. In this case the contractor raised the wage and had to take it out of his expected profits. Similar examples of increased supply costs are occurring throughout the industry as persons jockey to maximize economic rents during a boom in the cycle.

The power of the suppliers increases based on the demand for their product. Shortages in the labour market in Western Canada create an inability for suppliers to increase their production, and ultimately maintain their own power.

#### **2.4.5 Threat of Substitutes – low to moderate**

There is no threat of the home industry being substituted. Rather the threat is in the selection of building materials and framing methods. Most common construction materials around the world include: brick, lumber, concrete. In North America the most common material

used for a residential home is lumber and this will not be substituted unless the price of lumber were to skyrocket relative to the other materials.

Methods of home construction that factory built homes could be substituted for include:

- On-Site Wood Frame
- Bearing masonry
- Monolithic concrete cast on site
- Light panel open framing
- Stressed skin box panels
- Composite panels with rigid insulation
- Permanent formworks using rigid insulation
- Sandwich panels
- Prefabricated concrete panels
- Light woodframe panels assembled by automation
- Manufactured modules with structural steel edges (CMHC, 1991).

Most of these methods are not common in western Canada. The majority of residential homes are being built using on-site wood frame construction methods.

The substitution of the single family house with multi-family housing complexes has been initiated by retiring baby-boomers. The demand for homes may shift towards smaller units that are more easily maintained. Home builders limited to the single family housing units will need to adapt. A factory built home build that constructs modules or panels will be able to adapt from single family units to multi-family units.

Log Homes are a substitute to the traditional methods of construction, but they are very expensive and only serve a limited market. Logs homes are not feasible in all areas. The raw materials don't always exist and the costs of transporting a log home to distant sites limits the ability for the log home industry to substitute for lower cost lumber, brick and concrete buildings.

Do-it-yourselfers can build their own home, but they will typically have to sub-contract several trades during construction. The relative impact of the do-it-yourselfer taking away opportunity from builders is a minor concern, but the overall industry is not negatively impacted as all the supplies are going to be coming from similar sources.



Globally, the extremes of weather limit the successful types of home construction materials to lumber, concrete and brick. Recent extreme environmental events in locations around the world including: China, India, Indonesia, Pakistan and Iran have resulted in consideration of alternate building construction techniques. Several earthquakes in recent months have killed thousands of people and a recent one in May 2006 also left 250,000 persons homeless because their homes collapsed. Potentially there is an opportunity to substitute some of the concrete and brick construction methods primarily used in these countries with homes built with lumber. The lumber framed house is becoming a preferred construction method in more areas because it is more resilient to earthquakes and lasts longer relative to the concrete home construction methods that have historically been used (CMHC, 1999).

#### **2.4.6 Summary of Porters Five Forces**

As an industry goes through the stages of growth, decline and rejuvenation a shakeout of key players is inevitable. Such a shakeout will result in the competitive environment being dominated by fewer firms that are often larger and vertically integrated. These firms are likely to have strategic positioning ranging from marketing a commodity style home to marketing a custom built home. "Commodity style producers will prepare to survive in a highly competitive market serving the low end of the market within which product substitutions will be easy and profit margins will be low. The specialized manufactured housing producers will, on the other hand, create unique niches for themselves by offering greater value to consumers through heavy investment in innovative and creative marketing efforts." (Nkonge, 2000).

The domestic market in western Canada enables these companies to develop and refine their niche locally while maintaining economic rents. This will enable them to gain experience that could provide the toolset to position themselves for future overseas ventures.

## 2.5 Competitor Analysis

### 2.5.1 Local Competitors

A number of competitors exist in British Columbia and Alberta. These companies have experience in local and export markets and are well established. The Canadian Standards Association (CSA) certifies the companies meet the local building code requirements. In Canada there are “approximately 70 CSA-certified housing manufacturers right across Canada, with the greatest number of factories in Quebec and Alberta” (<http://www.cmhi.ca>). A review of these companies indicates the factories typically occupy a building between 20,000 square feet to 100,000 square feet in area, and employ between 20 and 200 persons.

In Western Canada, the competition includes several companies that usually have one, but sometimes more factories, and a large network of sales consultants to serve homebuyers throughout their trading area. Many of these companies are focused on building construction site, or oil and gas camp buildings that are not used for residential purposes. This change in focus reflects the current demand and growth in the resource industries. The list of companies includes, but is not limited to:

- Accent Homes
- Alta Fab – construction site buildings – Alberta
- Atco – construction site buildings – Alberta
- Britco Homes – manufactured and factory built Vancouver and Princeton
- Chateau Building Products – Vancouver
- Greensmart – factory built – Alberta / British Columbia
- Lindal – factory built homes – Vancouver and Seattle
- Moduline – manufactured homes– Princeton, Kamloops
- Northern Trailer – construction site buildings – Kamloops
- Starteck Homes –
- Shanko – construction site buildings – Alberta
- Simon and Co – Prince George
- Triple M Housing
- Viceroy – factory built homes – Vancouver and Ontario
- Winton Global – Prince George

The existing companies have orders and waitlists of about 12 to 24 months for the delivery and installation of a new home. This demand has enabled them to increase prices and

potentially improve their profit. Offsetting the potential for increased profits is the competition for labour, and tradesmen that has raised wages, as well as the increasing costs of construction supplies and transportation costs.

Existing companies could increase their production if they could source more tradesmen and labour and if their factory is large enough. However many of their sites have bottlenecks that limit capacity and would require significant capital investment to overcome. Many of these companies are maximizing their capacity and then turning away potential buyers as their queue becomes too long of a wait. Other companies are expanding by setting up new site operations, or buying one of the competitors. A new competitor could position successfully in the market by improving on the strategic weaknesses of the competition. This would require comprehensive knowledge of the existing competitors, who are mostly privately owned and are not willing to share their information. The industry is small enough that some managers have worked at several operations and are aware of the limitations each have. At the current time the existing factories are operating at capacity and the prices are increasing. This provides a new entrant the ability to position themselves in the industry.

### **2.5.2 Global Competitors**

The acceptance of factory built home manufacturing is more recognized and accepted in Europe, the United States and in Eastern Canada. Factory built homes comprised eight percent of the construction in Sweden and Japan, thirty percent in the United States and only fifteen percent in Canada (Woodbridge and Associates, 2003). This indicates there are established competitors in the export markets.

The costs of production for competitors in global markets will vary significantly. The prime variables are the cost of labour, the cost of the raw materials and the transportation costs. In Europe the advantage is the factories are near the market and the transportation costs to this market limit the access from western Canadian firms. In the United States their relatively

reduced labour costs, and access to a potential market that is 10 times the population of Canada enables them to build larger facilities with greater operational efficiencies. The websites for the facilities in the United States and Europe suggest their factories are partially automated and capable of internally providing most components necessary in home construction. The factories will build their own kitchen cabinets, engineer their own trusses, and construct their own windows. The list of competitors is extensive, however, an abbreviated list includes:

- Centex – United States
- Quantum Homes- Washington
- Pulte – United States
- Champion – United States
- Wasau – United States
- Fleetwood – United States

## 2.6 Competitive Advantages in the Industry

An analysis of 9 different methods of home construction by CMHC in 1991 provides a comprehensive analysis of the advantages and disadvantages of factory built homes within the housing industry. The advantages relative to factory built home construction include the following:

- Geometry is not limited by road clearance as a home can consist of several units that can be assembled on-site.
- Construction quality is better as it has to resist handling and transport
- Excellent sound proofing as a result of construction quality and double walls which are created once two modules are placed side by side or on top of each other.
- Site work is reduced to a simple operation of hooking up and finish work (taping of gypsum board joints/painting/flooring/etc...)
- One system differentiates itself in the *Single Detached [housing] Unit* category and that is the Factory Built Modular Home. Not only does the latter represent the most economical solution, but it is also the best system as pertains to technical and qualitative criteria. (CMHC, 1991).

Other advantages include that factory built homes were completed at a lower cost relative to the other methods of single detached models built on-site. Three surveys have been identified that indicate factory built homes can be built for 30% to 40% less cost than a traditional on-site home

(Woodbridge and Associates, 2003; CMHC, 1991; CMHC, 1999). The reduced costs are associated with:

- Over-specified design (~10%)
- Excessive development costs and inspections (~15%)
- Inefficient construction and waste of materials (~15%) (Woodbridge and Associates, 2003)

The evaluation of the firms in the factory built housing industry suggests the most successful firms are not necessarily the largest. However, all successful firms have in place a very effective management group dedicated to the pursuit of excellence.

## 3 INTERNAL ANALYSIS

Evaluation of the industry analysis provides insight into how which critical elements need to be considered prior to establishing the factory home competitor.

### 3.1 Process

#### 3.1.1 Site Location

The location of a factory is critical to the success of a factory built home business. Ideally the factory needs to be near a hub of suppliers, labour and the market. The access to the market will need to include highway and railway transport, and potential for access to a port facility.

Access to several suppliers should enable you to reduce the costs of goods sold. In BC and Alberta there are hubs of suppliers occurs near communities with greater than a million persons and to a lesser extent where there are more than 65,000 persons. The only cities with greater than 1 million population are Vancouver, Edmonton and Calgary. The cities greater than 65,000 population include Red Deer, Lethbridge, Prince George, Kamloops, Kelowna, and Nanaimo (<http://www.citypopulation.de/Canada,> 2006).

Site location is also a consideration to ensure that transportation costs are minimized. Factory built homes can be transported long distances. However, the costs escalate, particularly if the home consists of more than a single module. There are instances where homes have traveled several thousand kilometers on land from a factory in southern, Alberta to a site northern Alaska, but this is considered uncommon. (source: <http://www.cmhi.ca/MediaInformation/Facts%20and%20Figures.pdf> ). Long distances are more common when homes are traveling

through a port facility. There are common occurrences of homes being shipped from British Columbia to Pacific Rim countries including (Japan, Korea, and India) and from eastern Canadian factories to Europe.

Highway regulations are a consideration near a factory. In Canada the provincial highway regulations vary inter-provincially and between provinces. In British Columbia you are able to ship 4.4 metre wide homes on most highways, and limited where you can ship a 5 metre (16.4) foot wide home (Source <http://www.th.gov.bc.ca/cvse/ctm/section3permitsgeneral/bulletin25.pdf>, Dec, 2006). Although in Canada there are areas where you can transport up to 23.2 metre (or 76 feet) long by 6.1 metre (or 20 feet) wide, or a contiguous 142 square metre (1520 square foot) home to be transported on a single truck. If this wider unit were to be placed on a foundation with a basement the buyer would have an above average sized home of over 3000 square foot home.

The selection of a site in Alberta on a major highway between Calgary and Grande Prairie will provide flexibility to access most of the market. Within British Columbia the site will need to have unrestricted transport access to Highway 5 between Hope and Jasper. The Trans Canada highway #1 between Revelstoke and Banff has height restrictions through the existing tunnels. However alternate routes from Hope to Jasper along Highway #5 enables greater flexibility between British Columbia and Alberta.

### **3.1.2 Human Resources**

Human resources are assets that need to be developed to ensure success. Aptitude, attitude, average wage, previous experience and education are all consideration when hiring. A hiring process will be established where the supervisory and tradesmen positions are more critically evaluated than the labour positions. The human resources person will be able to make independent decisions when hiring a junior person, but supervisory staff that will need to be interviewed by more than one person.

Depending on the size of the factory, the administrative staff will include: general manager, factory manager, marketing and sales person, receptionist, procurement and accounting. The tradespersons in the factory could be hired or sub-contracted. The tradespersons will include: cabinet makers, roofers, electricians, plumbers, heating and ventilation technicians, window installers, welders, and timber framers. The labour persons should be employees rather than contracted. This should encourage them to stay longer and learn more skills. Skilled labour is necessary to reduce the reliance on the tradespersons and to improve operational efficiencies. If the factory is located near a hub of suppliers, it should also be located near a hub of labour.

### **3.1.3 Site Capital Investment**

Capital investment at the work site will be needed to develop an efficient factory built home facility. The work site will need to be at least 2 acres in size to ensure there is sufficient room to work on several homes at different stages of construction simultaneously. The work site will need to have all top-soil removed and replaced with gravel. Concrete will then need to be poured and a building constructed. The concrete inside the factory needs to have a smooth finish. This will enable the building units to be moved between stations on rollers. The use of rollers reduces the dependence on the crane and will increase productivity as it decreases any downtime spent moving units between stations.

An enclosed and secure building is necessary to realize the operational efficiencies associated with a factory built methodology. One of these efficiencies is the time saved by the construction persons at the beginning and end of each day. In a factory all of their tools and equipment can be left out in the evening and they do not need to be concerned with theft. This is different relative to on-site builders who need to setup their equipment every morning and take it away in the evening to avoid tools or equipment being stolen. This may add thirty minutes to an on-site builders day, which in turn reduces their productivity by 5% (based on a 10 hour day).



Common buildings used as a factory include: lumber framed, combination cinder-block with aluminum siding, and steel framed fabric buildings. A 20,000 square foot building with a concrete floor will cost between \$400,000 and \$1,000,000 to construct and service. In addition to the cost of a lot, there is an investment involved in setting up the facility.

Once the building and lot are constructed there is equipment that needs to be considered. Cranes are needed to lift and put the components together. The purchase or construction of jigs is needed to improve operational efficiencies and quality when constructing floors, walls and trusses. Power saws, edgers and finishing tools are needed for construction and wood finishing. Tools and equipment for the tradesmen are also needed. The amount of capital investment can be reduced if there are trades available to work under contract. They could then be expected to bring their own tools and equipment.

### **3.1.4 Lumber and Other Construction Materials**

Suitable quality construction materials at an appropriate price must be available. These materials will need to be accessed from a supplier near to the factory to minimize any delivery costs or time lost. Delivery costs were identified as a detriment for some factories that were located far from suppliers. As well the ability to minimize inventory of materials will reduce the operating costs of the factory. Construction materials will include hundreds of items: Lumber and other engineered wood products typically account for 40% of the material costs, and the other materials make up the remaining 60% (Woodbridge and Associates, 2003). Other materials will include plumbing supplies, tubs, showers, toilets, cabinets in the kitchen and bathroom, electric wiring and fixtures, windows, roofing, heating and ventilation for the furnace, flooring, appliances, and finishing material.

### **3.1.5 Energy**

Access to electricity is mandatory, but not considered a hurdle as far as costs applied to the process. The equipment used in the factory does not have high demands on electricity. The largest piece of equipment is a crane and forklift. Air compressors are needed, as well as power and hand tools like drills and saws. A factory in British Columbia or Alberta may need to be heated in the offices between November and May depending on its location. Heating of the factory should not be required during the year in most geographical locations.

### **3.1.6 Management**

Management will need to focus on several keys to success. These will all need to be monitored daily and in larger factories there will be individuals responsible for each factor. The key factors include:

- Supply of raw materials and building products
- Procurement of supplies
- Inventory levels
- Costs of good sold – within are the costs of labour
- Design improvement
- Cash flow and accounts receivable
- Supply of tradesmen
- Operational efficiencies of a factory
- Quality control and assurance
- Marketing and sales of the product
- Timeliness of delivery, and
- Customer service.

A manager that is successful in managing all of these factors should have a successful facility.

### **3.1.7 Marketing and Sales**

There will need to be an emphasis on customer service – working with customers to satisfy their needs and values. Marketing and sales will need to be across a broad range of geographic regions. The marketing materials can be consistent with a similar product used in each region. However the sales will need to rely on a network of representatives.

## **3.2 Activity Analysis**

Activities in the factory are separated into phases. The initial phase in any home is the construction of the floors and frames. This is typically followed by the exterior walls, interior walls, roof and ceiling, mechanicals or utilities and finishing.

### **3.2.1 Floors and Frames**

The floors are built on specialized jigs, using graded 2x6, 2x8, or 2x10 floor joists. Engineered joists are often utilized for primary support beams. Code-approved plumbing and copper wire are run through the floor. Insulation is typically applied, and then floor decking is both glued and mechanically fastened to create a solid, quiet floor.

### **3.2.2 Exterior Walls**

All exterior walls would use 2x6 studs on 16" centers. The walls are constructed on jigs, insulation installed in all cavities, and drywall or vinyl-over-gypsum attached with special adhesives and mechanical fasteners. Exterior walls are finished with OSB or fiberboard before siding is applied. This method of construction ensures tight fit and high energy efficiency.

### **3.2.3 Interior Walls**

Interior walls use either 2x4 studs, placed on 16" or 24" centers. Drywall or vinyl-over-gypsum is attached with adhesives and mechanical fasteners. Drywall is mudded and sanded multiple times for a smooth finish, then two coats of primer are applied.

### **3.2.4 Roof and Ceiling**

Engineered trusses are purchased from a certified manufacturer. Ceiling drywall is attached using special adhesives that eliminate the need for nails, while providing even greater stability. The ceiling is primed and finished, and the entire roof system is attached to the home, and fastened to every interior and exterior wall. A blanket of insulation is blown in, decking is

fastened to the trusses, and soffit ventilation is completed. Finally the shingle underlay, sealants, and shingles are installed.

### **3.2.5 Mechanicals**

Kitchen and bath plumbing is completed as much as possible, ready for site hook-up and finishing. Electrical work is also completed as much as possible, typically with the electrical panel box ready for site hook-up. Heat and return air systems are finished. All electric, water lines, and drain systems are tested and inspected again.

### **3.2.6 Finishing**

A strong, well-built house is now just about structurally complete. The buyer customizes their home with a wide range of options, including:

- exterior doors and vinyl siding
- exterior colours, shutters, and lighting
- flooring choices, including linoleum, wood laminates, or carpet
- appliances to meet your specific cooking and laundry needs
- interior trim, moulding, and door styles
- multiple cabinet styles and colours
- kitchen and bath countertop and backsplash materials and colours

## **3.3 Corporate Strategy**

### **3.3.1 Business Strategy**

The firm will be in the factory built home market, constructing homes that will be permanently secured to a concrete foundation. These homes will need to be Canadian Standards Association (CSA) certified for transport, but once they arrive on site they will need to be reclassified under the National Building Code and applicable provincial building codes.

Exzact Build should not be in the modular home industry constructing modular homes that are CSA certified and are restricted in many residential neighbourhoods. This industry is dominated by a few firms that are extensively integrated both vertically and horizontally. These firms have well established networks that will be difficult to compete with when the housing

market slows. However, in the short term there is an opportunity to access this market, generate some positive cash flow and then exit. The existing firms are at capacity and have up to two year waiting lists for homes. They have fixed capacity in their factories, and the cost of expanding restricts their ability to respond. This creates an opportunity for a new entrant to gain some market share.

The short term strategy will be to opportunistically enter this market. The advantage of having a short term strategy is that the company can begin with homes that are less complicated to construct, and that do not require a large capital investment. The experience gained in construction can be applied when our long term target market is identified. This short term strategy enables operational efficiency gains and generates cash flows required to access into the target market.

In the US the manufactured housing industry attempts to achieve a twenty-five to thirty per cent price differential (sometimes called the seventy-five percent rule) between manufactured homes and site built homes (CMHC, 1999). The buyers are willing to purchase the manufactured homes provided the price point is sufficiently below an on-site built home. Relative to factory built homes we do not foresee this as a need. Our target market is the residential home buyer, not the manufactured home buyer. This should enable a potential price premium rather than a price discount. The factory built home will be marketed as an exclusive quality and well designed home.

To enable a home to be considered exclusive there will need to be marketable features. Some companies are advertising premium windows, energy efficiency, healthy homes (low emission paints), premium insulation, high quality finishing, tight fit and quality finish.

### **3.3.2 Positioning Strategy**

The positioning strategy describes where the product will be located in the market. The strategy is to market a high quality product that will enable Exzact Build an opportunity to charge

a price premium. The financial margins should be greater in this part of the market. This would include the more expensive modular home market, and preferably in the middle to upper custom home residential market. As well, realtors in the resource communities in the north (i.e. Fort St John) suggest this market should be accessible to the factory built home builder if the stigma associated with modular homes can be overcome (pers. comm. Annette Reader, Century 21).

The location of the factory is a significant variable in the positioning strategy of the firm. To be successful the factory must be able to easily transport the product to the key markets, have to access labour, and be near a cluster of related suppliers. A factory in western Canada needs to be located near major highways going north to-south and east-to-west for the firm to access the resource communities in the north and the urban growth markets in the southwest quarter of BC and Edmonton. The location also needs to be near a community with greater than 65,000 population to satisfy the need for a supply of skilled tradesmen and a cluster of related services.

Access to Calgary and Vancouver from the same factory will not be expected due to highway restrictions on the Trans Canada Highway between Salmon Arm and Banff. The restrictions require a home to be shipped an extra 500 kilometre north via Jasper. This extra distance would likely make competition against any local Calgary firm uneconomic if the factory is based near Vancouver and vice versa. A factory should then locate in a position to access Calgary and Edmonton and Fort McMurray, or to access Vancouver, the Okanagan and Fort McMurray via the Yellowhead highway.

The strategy in the first three years will be to establish a local market and sales. Beyond this time frame an effort should be made to market and export the product to the Pacific Rim countries. This is in consideration of research by CMHC in 1999 that noted there has been little success in exporting to the Pacific Rim by Canadian Industry. With further comments suggesting Western Canadian manufacturers are not organized from a strategic or marketing point of view to develop a position in the US market (CMHC, 1999). The US market is further extended from our

outlook with the decrease in currency exchange from about 30% in 1999 to 10% in 2006, and a decrease in their housing market from 2.2 million homes in 2005, down to 1.6 million homes forecast for 2007 (CHMC, 2006).

### **3.3.3 Competitive Business(Unit Strategy)**

The firm's emphasis will be on customer service and a high quality product. This is supported by a CMHC study that indicated quality and service were the two most important factors for competing in the manufactured housing industry (CMHC, 1991).

To enable the strategy to be implemented we will need to build 'spec' homes for viewing. These may be 400 square foot homes that display the quality of construction and finish the buyer should anticipate. These will enable the purchaser to view the product they are considering and should help reduce any stigma associated with factory-built homes being a lesser quality product. Excellent customer service is required to establish the firm in the market. This can be accomplished through timely response to customers questions and timely delivery of their purchase. A high quality product can be demonstrated through the selection of finishing materials that are included in the homes. These will include top quality windows, doors, roofing, flooring and appliances.

Quality management techniques in the factory will include primitive methods such as checklists for employees through to becoming a fully certified ISO 9001 factory. A successful marketing strategy would recognise that market access relies on the adaptation of housing systems to local conditions, including building codes, legal codes and standards, and economic requirements (Fazio et al. 2000). A recommended approach would involve the development of a Quality Seal that would cover critical aspects of marketing requirements, such as system evaluation and testing, standard accreditation and branding.

### 3.3.4 Vertical Integration

The vertical integration concept is critical to consider because of the improvements that can be made by channeling the inputs for manufacturing, and the ability to minimize costs and improve co-ordination of marketing and sales.

“Channel activities are traditionally performed by different institutions to move goods from producers to ultimate consumers. The traditional channel institutions include manufacturers, wholesalers and retailers. Manufacturers are traditionally furthest from the consumers, while retailers are closest. In many industries, channel activities may be vertically consolidated as a result of mergers, acquisitions or expansions of the activity scope and expertise of individual member institutions. Regardless of how such consolidations are achieved, they ultimately reduce the number of institutions between the producer and the consumer, minimize channel fragmentation and tighten control of marketing the effort” (Nkonge, 2000)

Initially the ability to vertically integrate will be limited; however the opportunities will increase with the scale of the firm. Existing competitors in the market are integrated both backwards and forwards. There are an increasing number of manufacturers having their own dealerships or retail facilities. Almost all have their own installers while others have established real estate development and financing subsidiaries.

The forward integration into marketing and sales will be the first focus for management. This forward integration is necessary to ensure coordination between the customer and the manufacturing facility. Marketing literature suggests that as “ascendant channel institutions consolidate their leadership of an industry, management activities become better streamlined. This, in turn, makes them more efficient. The efficiency eventually improves profitability and stockholder equity as the inherent skills and the economies of scale of such institutions translate into operating efficiencies” (Nkonge, 2000). This forward integration will satisfy the goal of improving profitability and enable us to better control and ability to deliver one of the functional unit strategies of excellent customer service.

Backwards integration possibilities are not as urgent as there are currently many suppliers that can satisfy the firm’s needs. However as the scale of the firm increases there will be opportunities to have in-house shops for windows, cabinets, trusses. With backward



integration into these components of construction the firm will be able to improve the timeliness of product delivery. This will assist in delivering upon the strategy of excellent customer service. We would also be integrating backwards on the value chain and internalizing the value gained from product design and manufacture.

Further backwards integration with a forest products supplier will decrease the costs of raw materials. Vertical integration with a forest products company similar to Weyerhaeuser, Tolko, Canfor would be feasible. Discussions have occurred with some of these companies. However, they are reluctant to become involved in the home construction market as they prefer to stay within their core competency of supplying home and building materials, and leaving the construction of homes to the builders.

“Vertical integration was very common in the United States during the maturing of the mobile home or manufactured home industry. The manufacturers were able to assert firmer control on the industry as they progressively integrated vertically. For example, the manufacturers aggressively acquired smaller channel members in increasing numbers. Manufacturers initiated and guided most of the positive change in the industry. It, thus, stands to reason, that as the same manufacturers extend their power and de facto control of the distribution channel, the quality of products and service provided to the customers should improve” (Nkonge, 2000).

On a more general level, experience and strength that firms gain increases their viability for entry into international markets.

An evaluation of vertical integration within the Canadian manufactured homes industry indicated greater profitability within companies that concentrate on manufactured homes (median profitability of 5.0%) than those that also do site work (median of 1.7 to 4.4%; CMHC, 1999). The additional costs associated with site works included marketing, selling, transportation and installation activities. The costs imposed a burden for these firms that reduced their profitability. Firms that tended to limit their work to manufacturing homes reported the highest return on assets (median of 15.3%; CMHC, 1999).

Conventional marketing wisdom suggests that integrated firms will be exposed to a broader array of risks. Manufacturers that vertically integrate by acquiring down-channel

members will be moving from their respective core competencies. This is one of the keys to success that Woodbridge and Associates (2003) recommended to avoid as this development is likely to increase incidence of managerial mistakes. When this occurs it is likely to result in a period of instability and/or failures among individual firms are likely to occur as they adapt incipient organizational complexity and learn to manage the new forms of risks (Nkonge, 2000).

### **3.3.5 Horizontal Integration**

Horizontal integration occurs when a company expands in to different products that are similar to current lines and at the same level in the value chain. This can be achieved by internal expansion or external expansion through merging and acquisition of firms offering similar products and service. The advantages of horizontal integration include economies of scale or scope, and increased market power. Horizontal integration is a strategy commonly used by factory-built home builders. An example is a firm that constructs modular homes for residential use and then expands their market by entering into the construction of schools and hotels using modular technology, or industrial camps. There are several examples of school and hotels or other commercial buildings being composed of 1 to 150 or more units that are built off-site in a factory. The potential for this market to be accessed is more likely for the modular firm as they are able to operate within their core competency. The horizontal integration requires adjustment of specifications and engineering standards for the units produced, but enables a firm to maintain and expand their market. The larger firms in western Canada have horizontally integrated and have apparently been able to stabilize production in their factories and queue up 24 months of orders. This should position these companies to re-invest in their infrastructure and provide them long term stability and success.

## 4 OPPORTUNITY ANALYSIS

A common practice in the development of opportunities and a marketing strategy is determining if the market for a product has a clearly definable core customer base. This refers to the customers who fit the profile of the type of consumer that the marketer must satisfy to remain successful. When this core group accounts for more than fifty percent of the sales of a product category, it has a critical impact on the approaches taken in developing strategies for competing in the particular market (Nkonge, 2000). A successful firm will be able to identify and penetrate this market. This section will review the existing geographic markets and the opportunities within them.

The major market for Canadian factory-built homes is in Canada. Approximately 15% of the product is destined for the US market. A smaller percentage goes to other international markets, such as the United Kingdom, Poland, and southeast Asia (source: <http://www.cmhi.ca/MediaInformation/Facts%20and%20Figures.pdf>).

### 4.1 Domestic Market

The home construction industry includes single family and multi-family (condominium/townhouse) projects where people will reside for several months of the year. This industry includes the building constructed for the purpose of a second home or a leisure home.

In Canada the home building industry in 2005 constructed 225,481 units (CMHC, 2006a). In 2006 the forecast is for 236,500 units to be built and in 2007 the market is forecast to decline by 2.3% (CMHC, 2006a). Anything over 200,000 units per year is considered very strong (TD Bank Mr. Alexander, August 2006). Within Western Canada the two provinces with the strongest market are British Columbia and Alberta. Together they should average about

75,000 to 80,000 housing starts per year, of which just over half should be single detached houses. In Western Canada most of these homes will be built using soft-wood lumber products.

**Table 1: Provincial Housing Outlook Total Housing Starts**

	2005 Actual	2006 Forecasts	2007 Forecasts
Maritimes	12,094	11775	11050
Quebec	50,910	45,000	40,000
Ontario	78,795	75,000	68,500
Manitoba and Saskatchewan	9,368	8,400	8,600
Alberta	40,847	45,000	41,000
British Columbia	34,667	37,000	34,900

Source: Adapted from CMHC,2006

The average selling price of homes in Canada is expected to increase by 15% between 2005 and 2007 (refer to Table 2). More regionally the housing prices in Alberta and BC have increased by between fifteen and forty-four percent in 2006 alone (Globe and Mail, 2006).

The market of interest to a firm in western Canada would be the housing starts in Alberta and British Columbia. These look steady, particularly when considering that in Alberta about ten percent of the residents (350,000) live in factory built homes (source: <http://www.cmhi.ca/MediaInformation/Facts%20and%20Figures.pdf>). In addition to the residential home market many of the manufacturers are currently supplying buildings to the industrial camps developed for mining and oil and gas exploration opportunities that are rapidly expanding in BC, Alberta and in the Territories. These conditions have put most of the manufacturers at operating capacity and created waitlists for homes to be built.

**Table 2: National housing starts and prices**

	2005 Actual	2006 Forecasts	2007 Forecasts
Total housing starts (units)	225,481	222,200	204,100
Total single-detached houses	120,463	116,700	105,600
Total multiple housing units	105,018	105,500	98,500
Average MLS® selling price (\$) Land and Building	249,365	277,200	290,600

Source: adapted from CMHC, 2006b.

The resource-based communities in northern Alberta, British Columbia, and in the Territories include fast growing communities of Fort McMurray, Yellowknife and Whitehorse. These communities and several others in the region are growing due to the employment opportunities in the oil, gas, and mining industries. In these communities the home construction markets have projected growth of 3000 homes in the next couple years. However, these communities lack sufficient qualified local builders and tradesmen to construct them. The homes in some of the communities are selling for \$150 to over \$200 per square foot (source: [www.mls.ca](http://www.mls.ca), October 2006). These market conditions provide a favourable opportunity for a factory-built home builder to sell their product and generate a profit.

In these communities many of the workers are required to work remotely and require industrial camps for accommodation. These camps may house 1 to over 300 persons and are typically built in factories and then shipped to the site. The industrial camp market has been discussed as an opportunity to expand and diversify through horizontal integration.

## 4.2 Global Market

This analysis of global markets will consider what exists in Japan, United States, Europe, China and other areas. Globally the home construction industry is thousands of times larger than what exists in Canada. Historically the Canadian industry has been focused with on-site home construction, which cannot be exported. However, in the past 15 years there has been

an increase in the number of factory-built homes. Where homes are built inside a factory, transported to a site and installed. This change in technology or concept has created an export market for Western Canadian home builders.

Total exports of Canadian prefabricated buildings increased in 2002 for the fifth straight year. Exports of prefabricated buildings totalled \$604 million in 2002, compared to the \$561 million in 2001. At that time, the US dominated as the primary destination for Canadian exports accounting for 70 percent of all prefabricated building exports. Unfortunately this data is 4 years old, but it is relevant as it indicates there is an export market accessible to Canadian home builders.

#### **4.2.1 Japan's Home Construction Market**

Japan is among the world's largest housing markets and easily accessible to Western Canadian firms through the ocean ports. The Asian monetary crisis resulted in a decreased level of housing starts that in 2002 hit the lowest level in 19 years. Housing starts have since rebounded and the number of starts is consistently increasing. Accessing the Japanese market will be difficult and should not be considered without previously establishing a network (pers. comm. B. Hyashi, Nexbuild homes, 2006). Available housing start information between 2002 and 2006 includes the following:

- Year 2002 housing starts in Japan – 1.15 million – the lowest level in 19 years (Nelson, R, 2005)
- Year 2003 housing starts in Japan – 1.16 million (Nelson, R, 2005)
- Year 2004 housing starts in Japan – 1.19 million – the share of wood framing in total starts, an important market indicator for Canadian home builders, also rose to 45.5% of total housing starts. (Nelson, R, 2005)

#### **4.2.2 United State's Home Construction Market**

The home construction industry in the United States is about 30% larger than what exists in Japan. In 2002, Canada exported millions of dollars of pre-manufactured homes to the United States. The top states where prefabricated buildings were delivered and that were easily accessible from Western Canada include: Washington (ranked #1 at \$36,381,000), and California (ranked #9 at \$15,618,000) (Statistics Canada, 2002). Oregon and Idaho do not rank in the top 20 states as they did not receive more than \$8,800,000 of buildings from Canada in 2002. Recently housing starts in the United States decreased in 2006, but remain strong relative to the recent past (2002). Housing start information in the recent years includes the following:

- Year 2002 housing starts in the US– 1.71 million (highest figure since 1986 at the time) The US West and Midwest most easily accessed by Western Canadian companies, grew by 3 per cent to 426,000 units and 346,000 units respectively. (US Census Bureau, 2006)
- Year 2006 housing starts in the US– 1.98 million, which is below the 2005 forecast of 2.16 million. (US Census Bureau, 2006).

**Table 3: Canadian Exports of Prefabricated Buildings to the Top 20 US Market (Thousand of dollars)**

Rank	State	2001	2002
1	Washington	37 230	36 381
2	Maine	21 881	31 422
3	Pennsylvania	15 514	28 233
4	New York	32 444	27 731
5	Massachusetts	12 095	19 625
6	New Hampshire	9775	19 196
7	North Dakota	15 422	16 357
8	Michigan	23 331	15 739
9	California	13 700	15 618
10	Montana	18 165	15 537
11	Texas	12 665	14 492
12	Alaska	16 014	13 967
13	Ohio	10 382	13 233
14	Minnesota	8449	12 900
15	Illinois	11 962	12 601
16	Colorado	13 724	11 508
17	Wisconsin	8102	11 015
18	Nevada	12 057	10 930
19	Vermont	8505	10 876
20	Florida	9366	8848

Source: Adapted from Statistics Canada, 2002

### 4.2.3 Europe's Home Construction Market

Canadian home builders are in a good position to satisfy the requirements of European markets for prefabricated housing. More stringent energy consumption requirements tend to favour Canadian housing types. In Germany, more than 85% of prefabricated homes are wood-frame construction (CMHC, 2000).



Buildings included countries in Asia, Africa, Europe, and the Middle East. These companies are listed in the table below. Japan was a significant importer of Canada's pre-manufactured homes with a market value more than three times the size of Washington State's. However, none of the other countries had a market value that would put them in the top 10 relative to the individual states in the US. Recently in 2006 Indonesia became a new market for western Canadian home builders. In July 2006, Britco Homes has announced a deal that will see them ship 3000 homes (450 ft<sup>2</sup> each) to Indonesia (Britco, 2006). This was facilitated through tsunami relief victims and efforts of the international community to improve living conditions.

**Table 4: Top 11 Offshore Importers of Canadian Prefabricated Buildings**

Country	2001	2002	% Change
Japan	121 660	118 901	2.3
Algeria	440	12 300	2695.5
United Kingdom	5400	7100	31.5
France	4800	4800	0.0
Germany	2700	3300	22.2
South Korea	3100	3200	3.2
Kuwait	-	1800	100.0
Romania	-	1800	100.0
India	120	1600	1233.3
Jamaica	390	1400	259.0
China	730	1100	50.7

Source: Adapted from CMHC, 2006b

There is greater potential for these smaller markets to grow for Canadian exporters as their infrastructure and accessibility develops. As well, several of these countries are finding that Canadian building standards and the use of lumber for framing provide beneficial qualities. There is a developing market in these countries where a home built with lumber is considered superior for its resiliency and longevity. This is particularly evident in countries that are prone to

natural disasters such as earthquakes and flooding that destroy their traditional brick, or concrete homes and kill thousands of people when they collapse.

### **4.3 Competitive Advantages and Disadvantages in Markets**

This discussion of competitiveness will focus on competitors in the manufactured home industry in Canada and the US. Although this analysis is focused on factory built homes, there is better research on firms that construct manufactured homes, and most of the information can be applied to either market.

Comparisons of US and Canadian manufactured home firms have been completed in the past and have provided varying comments. A comparison completed by CMHC in 1999 analyzed the results of 2 independent surveys from 1999 and 1997. The study compared US to Canadian manufactured home builders. The limitations of this analysis were that the majority of Canadian companies cited were located in the east and are known to have profit margins lower than western firms. Therefore the results of this particular study may not be entirely applicable to a western Canadian firm.

In general in Canada the costs of labour and transportation are relatively higher compared to the conditions experienced in the US. This is a disadvantage for Canadian firms accessing markets that are distant from a factory. These conditions preclude a firm in western Canada from competing in the eastern and southern US value-added markets. The results of the CMHC study (1999) indicate Canadian factories were thirty-two percent more expensive than their US competition. Since this research was completed the currency exchange has shifted and the Canadian factories have become even more expensive than their American competitors. This difference in average price can be partially explained by economies of scale, currency differences, the different years the studies were completed and differences in quality and building codes. However it does indicate that if Canadian firms are to compete in the United States they will have to improve their competitive position. This research partially indicates why firms in

Canada have not been effective in entering the U.S. market (CMHC, 1999). To be successful the Canadian firms will have to reduce their costs and increase production.

A different study completed by Woodbridge and Associates in 2003 focuses on western Canadian firms. The results indicate that overall western Canadian firms have some competitive advantages relative to US based companies. Specifically they enjoyed relatively low fibre and energy costs, reinforced by an exchange rate advantage (currently 10% in 2006), but had a location disadvantage because the largest market was predominantly in the south and eastern US. A comparative analysis indicated western Canadian firms tended to possess solid core competencies and higher productivities because of a well developed industrial structure. Analysis of the industry indicated that “some BC firms in this sub-sector are at the leading edge of the industry internationally in successfully identifying and pursuing core-competencies. These firms are well positioned for growth. However, many smaller western Canadian firms and some larger ones need to invest in productivity improvements and enhanced products/services in order to ensure sustainable competitive advantage, and not just rely on their relative exchange rate premium in export markets. Prior to the countervailing duty and softwood tariff between the United States and Canada, BC ranked ahead of Alberta in overall costs and productivity because of its more developed industrial structure and higher rates of productivity” (Woodbridge and Associates, 2003). In a comparative ranking, BC was less competitive than Colorado and Arizona, due to operational and scale efficiencies that enabled higher productivities and investment per employee (refer to Table 5). These were facilitated by their proximity to major markets and value-added manufacturing clusters.

**Table 5: Western Canada’s Competitiveness Relative to Western US**

Ranking	Manufactured Homes – Mobile	Factory Built Homes – Modular	Log Homes & Timber Frame
#1	Arizona	Colorado	BC
#2	California	Arizona	Washington
#3	Oregon	Alberta	Oregon
#4	Colorado	BC	Montana
#5	Idaho	California	California
#6	Washington	Oregon	Colorado
#7	Alberta	Washington	Arizona
#8	BC	Idaho	
#9		Montana	

Source – Adapted from Woodbridge and Associates, 2003

#### **4.4 Financial Analysis – of Four (4) Factory Sizes**

Financial feasibility of a factory built home manufacturing plant will be carried out from a management accounting perspective. The evaluation will include four different factory sizes with different levels of production. Each level of production will be based on a specific building and lot size, estimated equipment costs, and other fixed costs. The discussion will consider the impact the rate of production has on per unit fixed and variable costs of building a standard house. Profitability will be evaluated based on set market conditions with sensitivity for fluctuations that could occur. The final evaluation will be on the amount of operating capital required to operate the different sized factories.

A standard house for this exercise was set at 1500 square feet. This was derived from some market research that included discussions with realtors and builders in different markets around BC and Alberta.

The fixed and variable costs were calculated on a per unit basis that set the variable cost of a house at \$157,500 if built in a factory with a capacity of sixty homes per year. The unit costs

in the larger factories were assumed to decrease based on anticipated improvements in operational efficiencies and economies of scale.

Option 1 was completed by evaluating a base scenario. This will assume that sixty standard homes are built per year in a 17,000 square foot facility on a two acre lot. These homes would be sold in the domestic market. These parameters are standard for factory built home builders in western Canada.

Option 2 will be a factory that can build 150 homes per year in a 40,000 square foot facility on a 3 acre lot. These homes would be sold in the domestic market and some export markets may need to be accessed.

Option 3 will be a factory that can build 300 homes per year in a 90,000 square foot facility on a 5 acre lot. These homes would be sold in the domestic market and export markets would need to be accessed.

Option 4 will be a factory that can build 900 homes per year in a 150,000 square foot facility on a 10 acre lot. These homes would be sold in the domestic market and export markets would need to be accessed.

**Table 6: Evaluation of Fixed and Variable Costs per Unit**

	<b>Option 1</b>	<b>Option 2</b>	<b>Option 3</b>	<b>Option 4</b>
	<b>60 homes per year - 1 every 5 days</b>	<b>150 homes per year - 1 every 2 days</b>	<b>300 homes per year -1 every day</b>	<b>900 homes per year -3 every day</b>
<b>FIXED COSTS</b>				
	2 acres and building	3 acres and building	5 acres and building	12 acres and building
Land	\$400,000	\$600,000	\$1,000,000	\$2,400,000
Building	\$450,000	\$700,000	\$1,000,000	\$1,400,000
Land+Building	\$850,000	\$1,300,000	\$2,000,000	\$3,800,000
Amortization (years)	15	15	15	15
Annual Amort 8%	\$96,708	\$147,912	\$227,556	\$432,360
Price per Unit	\$1,612	\$986	\$759	\$480
Equipment	\$250,000	\$500,000	\$750,000	\$1,400,000
Equip per Unit	5	5	5	5
Equip Amort (years)	\$60,648	\$121,285	\$181,932	\$339,600
Equip Annual Amort 8%	\$1,010.80	\$808.57	\$606.44	\$377.33
Other	\$200,000	\$300,000	\$500,000	\$800,000
Other per Unit	\$3,333.33	\$2,000.00	\$1,666.67	\$888.89
Total Fixed Costs Per Unit	\$5,956	\$3,795	\$3,032	\$1,747
<b>VARIABLE COSTS</b>				
Wood Costs	\$ 34,650	\$ 34,650	\$ 34,650	\$ 34,650
Other Materials	\$ 67,725	\$ 67,725	\$ 67,725	\$ 67,725
Direct Labour	\$ 26,775	\$ 25,000	\$ 24,000	\$ 23,000
Other Production Costs	\$ 6,300	\$ 6,300	\$ 6,300	\$ 6,300
General Admin and Selling	\$ 22,050	\$ 21,000	\$ 20,500	\$ 20,000
Total Variable Costs per Unit	157,500	154,675	153,175	151,675
Total Fixed Costs	\$5,956	\$3,795	\$3,032	\$1,747
Total Variable Costs	\$157,500	\$154,675	\$153,175	\$151,675
<b>Total Unit Cost</b>	<b>\$163,456</b>	<b>\$158,470</b>	<b>\$156,207</b>	<b>\$153,422</b>

Source: Author

## **4.5 Fixed Costs**

Fixed costs are those that do not fluctuate with the volume of production. Most of the fixed costs are associated with the land and building, equipment, and other or miscellaneous costs. They are typically dependent on many factors related to the operating environment. To simplify the analysis the costs of leasing were considered to be similar to purchasing land and a building. This analysis requires some regional generalizations to enable a comparative analysis to occur.

### **4.5.1 Land and Building**

Factory built homes require a factory location where the majority of construction and finishing will occur. The factory site will employ tradesmen for electrical, plumbing, roofing and several other trades depending on management's preference. The building will ideally have between five and twelve stations where homes at different stages can be worked on. The larger factories where more than three units are completed per day will require up to thirty stations. Additional space outside of the factory is necessary to carry an inventory of building supplies and near finished and finished units ready for transport to the site.

The factory needs to include office space for management, sales, procurement and accounting. Additional space will be required for a lunch room and washrooms as per local permitting.

### **4.5.2 Equipment**

The amount of equipment utilized in a factory varies with management style and corporate strategy. The factories usually have all the hand and power tools necessary for the sub-trades to operate. These include tools and equipment for the tradesmen in electrical, plumbing, roofing and others. The basic tools are several types of power saws, an air compressor and several power or air tools. The more expensive equipment includes a crane, a forklift and often a

bobcat. The crane is used when installing the walls and the ceiling trusses and should be able to carry up to six tonnes. A forklift is utilized to move the completed home modules. A bobcat is optional, but often useful for moving inventory or home modules. A jig for the ceiling and wall construction will enable the workers to efficiently build homes with a tight fit. A jig can be built out of wood in small factories. In larger factories (greater than 150 homes per year) there may be several jigs and they may be automated and built out of steel.

#### **4.5.3 Other**

Other fixed costs will include the fixed wages and costs associated with running a factory. These costs will include management that requires at least one manager, and a book-keeper/receptionist. The factory foreman, salesperson and procurement person's wages are covered under variable costs where their numbers will vary with the number of units in production and the number of shifts at the factory. Other fixed costs also include the basic utilities, property taxes and other smaller fixed costs. The amount of electricity will increase with production, but there is also a fixed cost to heat and maintain the buildings whether they are under production or not. This analysis will consider energy to have a fixed cost, with any increased costs from production being accounted for under variable costs.

### **4.6 Variable Costs**

Variable costs make up more than ninety percent of the total house cost when a factory is operating a planned capacity. These costs are dependent on the volume of product produced and the costs of the inputs. The input costs vary widely based on geography, season of purchase, and availability. This analysis will utilize the results of a study completed by Woodbridge and Associates in 2003 on manufactured value added wood products in North America. In this analysis the inputs to a manufactured and factory built homes were considered to be similar. The results are presented in Table 7.



**Table 7: Prior to 27% Tariff – Percentage of Total Manufacturing Costs**

VARIABLE COSTS	Percent of Total Cost
Wood Costs	22%
Other Materials	43%
Direct Labour	17%
Other Production Costs	4%
General Admin and Selling -Other Labour	14%
TOTAL (FOB Mill)	100%

Source – Adapted from Woodbridge and Associates, 2003

#### **4.6.1 Wood Costs**

Wood costs can fluctuate with the market and the selection of products. If the strategy is to utilize premium or a ‘J’ grade of lumber the wood costs can be two to three times higher relative to the base price. The price for wood will fluctuate with demand. In 2006 the US housing market has decreased an estimated twenty-five percent, and the price of lumber is about half of what it was. An example of this was observed at a wood products retailer where a four by eight OSB sheet cost sixteen dollars in 2005, and in 2006 it was about half price or around eight dollars. The wood costs will also change depending on the style of construction selected. The use of two by ten lumber boards may be more expensive than using engineered products. The use of laminated veneer lumber for header beams may also adjust the costs of construction. In a study of factory costs completed by Woodbridge and Associates in 2003 the relative contribution of wood costs to a home was determined to be twenty two percent

#### **4.6.2 Other Materials**

This category includes the materials other than wood. This will include any copper, electrical gear, plumbing equipment, heating-ventilation ducts, cabinets, roofing, the furnace, appliances, cabinetry in the kitchen and bathroom, and roofing supplies. These materials contribute to about forty-three percent of construction costs for a home.

### **4.6.3 Direct Labour**

This category includes the labour working on the project and any supervisors or foreman. The amount of these persons will vary with the number of unit under construction and the skill and experience they have. An inexperienced crew will likely be less productive and require more supervisors than an experienced crew. The use of thirteen percent is considered an average contribution of the costs of labour per unit constructed.

### **4.6.4 Other Production Costs**

Other production costs include several smaller ones that alone may only add up to a single percent, but together they account for on average about four percent of the cost of a house. These may include electricity, fossil fuels, delivery charges for supplies and other small costs.

### **4.6.5 General Admin and Selling (Other Labour)**

General Admin and Selling includes the costs of marketing, sales, procurement, foremen, supervisors, quality control and other labour. These costs will vary with production. They account for about fourteen percent of the cost of a house. Together with the direct labour costs, the total cost of labour is about thirty-one percent of housing construction costs. This is important to note and explains why the location of a factory near less expensive labour may be preferable to the location of a factory near less expensive raw materials (lumber) that only account for about twenty-two percent of costs.

### **4.6.6 Delivery Costs**

Delivery costs have not been factored into the discussion as factory built homes as they are typically sold Freight-on-Board (FOB) at the factory. This means that any additional freight costs need to be added onto the price of the home. These costs are typically two to eight percent of a home's cost depending on distance to the site and the number of modules that need to be

transported. If a factory located near Vancouver is shipping to the northern resource communities the delivery costs will escalate. This method of pricing from the mill site enables consistent pricing to be provided to each customer irrelevant of their location. The mill manager is also better able to track his cost per unit more precisely.

A common method of minimizing delivery costs is to align an outgoing delivery with an incoming one or a 'haul-back'. This strategy creates a measurable synergy where the delivery cost could be reduced by fifty percent. Challenges to this option exist, including the need to manage logistics and get timing of delivery on both ends coordinated. Any delays on either end could result in escalating costs.

#### **4.7 Evaluation of Profitability**

In this section the data from the financial analysis will be utilized to determine the profitability of the four different production rates, in three different sales environments. This will generate a matrix of twelve different scenarios, each with an individual profit margin. This can be used as a sensitivity analysis to evaluate profitability based on current and forecast market conditions. Please refer to Table 8.

**Table 8: Profit margins based on 3 pricing scenarios**

	<b>Production Rate</b>	<b>Rate 60</b>	<b>Rate 150</b>	<b>Rate 300</b>	<b>Rate 900</b>
Sale Price per square foot (ft <sup>2</sup> )		<b>60 homes per year</b>	<b>150 homes per year</b>	<b>300 homes per year</b>	<b>900 homes per year</b>
<b>1.) \$150/ft<sup>2</sup></b>	Total Cost	<b>\$163,456</b>	<b>\$158,470</b>	<b>\$156,207</b>	<b>\$153,422</b>
	Sales	\$225,000	\$225,000	\$225,000	\$225,000
	Net	\$61,544	\$66,530	\$68,793	\$71,578
	<b>Margin</b>	<b>38%</b>	<b>42%</b>	<b>44%</b>	<b>47%</b>
	TOTAL REVENUES	\$13,500,000	\$33,750,000	\$67,500,000	\$202,500,000
<b>2.) \$130/ft<sup>2</sup></b>	Total Cost	\$163,456	\$158,470	\$156,207	\$153,422
	Sales	\$195,000	\$195,000	\$195,000	\$195,000
	Net	\$31,544	\$36,530	\$38,793	\$41,578
	<b>Margin</b>	<b>19%</b>	<b>23%</b>	<b>25%</b>	<b>27%</b>
	TOTAL REVENUES	\$11,700,000	\$29,250,000	\$58,500,000	\$175,500,000
<b>3.) \$110/ft<sup>2</sup></b>	Total Cost	<b>\$163,456</b>	<b>\$158,470</b>	<b>\$156,207</b>	<b>\$153,422</b>
	Sales	\$165,000	\$165,000	\$165,000	\$165,000
	Net	\$1,544	\$6,530	\$8,793	\$11,578
	<b>Margin</b>	<b>1%</b>	<b>4%</b>	<b>6%</b>	<b>8%</b>
	TOTAL REVENUES	\$9,900,000	\$24,750,000	\$49,500,000	\$148,500,000

Source: Author.

The profitability analysis indicates the more favourable margin of forty-seven percent exists when a factory with an output of 900 homes per year is able to have average sales of \$150 per square foot. The worst case scenario or margin of one percent exists when a sixty unit per year factory has average sales of \$110 per square foot. All other scenarios provide a positive margin. The best margin is always at the largest factory (900 homes) due to anticipated economies of scale and improved operational efficiencies. The risk of this factory not producing at full capacity would be the greatest as the largest amount of capital is employed and serviced.

## **4.8 Operating Capital Requirements**

This section will evaluate the requirement of maintaining a positive cash flow to be successful. This analysis will be above and beyond the need to service the debt associated with any fixed assets, and will consider the costs of financing the construction of a house until it is completed. This is a requirement of many home purchasers who are dependent on financing from an institution. These institutions will normally only fund a factory built house up to a maximum percentage until the unit is installed on a foundation. Until the installation is complete, the factory builder will need temporary operating capital to finance the construction of the house. This may only last 30 days, but because these factories are constantly replacing one purchase with the next, the need to maintain an on-going amount of operating capital is required. The base case for each house considers that \$100,000 is needed by the factory to finance the construction. This is based on the ability of management to negotiate with some suppliers and have up to forty-five day terms for payment on supplies, and each home purchaser providing a twenty-five percent deposit. The base case analysis implies there will be up to five homes under construction at any one time in a factory that build sixty homes a year. This means that in addition to the financing of any assets, the firm will need to have \$500,000 in ongoing capital available.

Another analysis was completed to determine what the annual fixed costs will be for a factory sitting idle. The smaller factory will be servicing an annual payment of \$357,356, with the largest factory servicing an annual payment of \$1,571,960, please refer to Table 9. This amount needs to be considered when evaluating the risk and potential downfalls associated with the opportunity.

**Table 9: Operating Capital Requirements and Annual Fixed Costs**

	<b>60 homes per year</b> -5 homes in progress at a time	<b>150 homes per year</b> -13 homes in progress at a time	<b>300 homes per year</b> -20 homes in progress at a time	<b>900 homes per year</b> -60 homes in progress at a time
<b>Operating Capital Required</b>	\$500,000	\$1,300,000	\$2,000,000	\$6,000,000
<b>Annual Fixed Costs that exist if the factory is built, but not operational</b>	\$357,356	\$569,197	\$909,488	\$1,571,960

Source: Author

## 4.9 Summary

The opportunity analysis indicates there is a domestic and global demand for factory built buildings and the financial analysis indicates a venture should be profitable if the capacity of the factory can be maintained. The domestic market for residential homes is concentrated in BC and Alberta. However a secondary opportunity was identified in the industrial camp market. The export market opportunities are most promising in Japan, the United States and other Pacific Rim countries. Access to China’s housing market continues to be difficult for Canadian producers, and any sales in Europe will have heavy competition from existing producers.

The financial analysis indicates the economic benefits of building a home in a factory. The larger factories have greater efficiencies that enable them to have better margins. Any factory will need to sustain a significant level of operating capital that could become a barrier to entry. However all scenarios indicate that the venture should be feasible.

## 5 SUMMARY AND RECOMMENDATIONS

The feasibility of establishing a factory built home company in Western Canada has been considered. The domestic market for home construction in this region is primarily (90%) located in British Columbia and Alberta. Therefore the feasibility analysis focused on these provinces.

Forecasting the housing market and demand for factory built houses should drive the decision on what size of factory to construct. The feasibility analysis indicates the project is feasible on its own at any of the 4 factory sizes evaluated. The profit margins improve with the increased size of the plant assuming it operates at capacity. The duration of time that will pass until sufficient orders are secured and the factory is at capacity could be derived by completing a comprehensive market evaluation, but cannot be confirmed until the factory is implemented. With over 80,000 new housing starts occurring in Alberta and BC annually, a plant with a capacity of 900 homes per year will need to secure over 1% of the market. This will be difficult to accomplish because of the geography, and the difficulties discussed about accessing both the Calgary and Vancouver markets from the same factory. Alternatively an export market could provide the additional sales required to run at a capacity of 900 homes. A factory positioned in BC with a low cost connection to a port in Vancouver or Prince Rupert would be preferred when accessing an export market.

A more conservative approach would be to develop a plant with a capacity of 60 or 150 homes per year that is scalable to 300 to 900 homes per year. This would enable a plant to develop that should be able to capture sufficient domestic market to operate at capacity, without

having to rely on exports. Delivering homes to a domestic market also enables any problems that develop after a home is delivered to be more easily corrected.

The amount of start-up capital available for start-up will be a key factor in the decision. The amount of capital available for the venture could ultimately determine what size of factory to construct.

Currently the existing factories in BC and Alberta are operating at capacity and have waiting lists of one year or longer for the construction of a new home. These conditions suggest the existing market has enough capacity for a new entrant.

An evaluation of horizontal integration strategies indicates that several companies have successfully enter into the lower cost manufactured homes and industrial camp markets. Potentially a new factory that does not have sufficient sales in the targeted residential home market could optimize the production in their factory by horizontally integrating into these related markets. This would also provide diversification and better position a factory to survive through any market downturns.

Site location will ideally be located in BC or Alberta. In BC the location would be between Vancouver and Hope, near Kamloops or in the Okanagan. In Alberta the location would be between Calgary and Grande Prairie. In all cases the factory needs to have good access to a railroad loading site to enable access to a port in Price Rupert or Vancouver. These areas will geographically position a company to service the residential market in cities with greater than 1,000,000 and access to the resource communities to the north. These areas (except between Vancouver and Hope) are also in drier climates that are preferred to a moist coastal climate for factory built home construction. The advantage of access to the north is the ability to access a market where the growth of several thousand homes is projected in the next couple years. Furthermore, there is a lack of local home builders and tradesmen available in the construction industry. The other advantage of the north is the opportunity to horizontally integrate into lower



cost manufactured homes and industrial camps. The access to a railroad is needed to fulfill the positioning strategy of future access to export markets in the Pacific Rim.

The housing market in the US is not considered to be an area where marketing or sales should be focused. The US is currently in a depressed housing market with a forecast twenty-five percent decrease in housing starts between 2005 and 2007 (CMHC, 2006a), the Canadian currency is relatively strong and trading around \$0.90 per dollar (October 1, 2006), and their factories are efficient. With these considerations, the analysis suggests a Canadian firm has a competitive disadvantage when it enters the US market and should only enter it opportunistically when they are contacted by a buyer.

Marketing and sales will need to overcome the stigma associated with factory built homes having a lower quality of construction. Methods to accomplish this may require the construction of a small model home for potential purchasers to view and assess prior to making their purchase.

To maximize profits a value chain analysis indicates the best opportunity to increase margin exists in the preliminary marketing and sales effort followed by the engineering and drafting of the house plan. The margin will increase by selling customized features that can individually have margins of two hundred percent. When several customized features can be added margin on a house sale can increase from twenty percent to forty percent.

A factory building that can house most of the tradesmen and their equipment will be mandatory to optimize efficiencies. Workers could complete the units outside, however the loss of efficiencies will result in a factory with costs similar to the on-site home builder. A building and the size of the factory will depend on risk tolerance, market positioning and sales forecasts.

The factory should try to vertically integrate into sales and marketing as soon as possible. This needs to be internalized to ensure consistency between the abilities of the manufacturing plant and the customer. This will improve the customer service that is one of our

key factors of success and a strategy. To reduce raw material costs the firm will need to integrate backwards on the value chain to reduce the number of times that materials are handled.

The factory built home construction opportunity seems to be very promising. The market is currently growing rapidly in Western Canada and there are opportunities for vertical and horizontal expansion. Indicators suggest there will be a growth in demand however; the impact the decreasing housing market in the US will have on Western Canada's market is a concern. This analysis has indicated there are competitive advantages a factory-built home manufacturer can benefit from including access to both domestic and global markets, improved operational efficiencies, reduced waste and development costs, and reduced costs of construction relative to traditional on-site construction of up to forty percent. Finally a detailed financial analysis indicates that a proposed factory will be profitable if a market of at least sixty homes per year can be secured. A recommendation to pursue this opportunity is suggested.

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## APPENDIX: MARKETING MATERIAL

### Save Time, Save Money with Modular Construction

- Concurrently scheduled site preparation and factory manufacturing significantly reduces total construction time to occupancy
- Overall project time savings results in construction cost savings and contributes to the bottom line with facilities open & earning revenue much sooner
- Design-build capability means predictable, manageable costs from the planning stage to completion of the project with the added advantage of a single source of responsibility

### Controlled Construction Environment

- Buildings are manufactured in a dry, enclosed factory
- Efficient, assembly-line construction by skilled trades
- Inspections are done at the factory during manufacturing
- Systematic, in-plant monitoring & supervision with strict quality control ensures a superior quality product

### Factory vs Site Construction

- On-site skilled trade shortages, remote location accessibility and seasonal climate changes are not a factor
- Minimizes site construction noise & disruption for existing operations and neighbours
- Eliminates the risk of theft and vandalism often experienced during site construction
- Greatly reduces the volume of construction waste and the cost to dispose of it

### Superior Quality Product

- Built to meet or exceed the same rigorous local, regional & international codes & standards as traditional site-built construction
- Modules are constructed to withstand the rigors of transport and handling, often more than once, resulting in greater strength and durability
- Separate layers of the assembled modules results in double the normal soundproofing standards
- Superior finishing, advanced technology and precision engineering
- Award-winning designs incorporating health-related features & environmental technology systems