A STRATEGIC ANALYSIS FOR FRANSEN ENGINEERING LTD.

by

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ABSTRACT

Fransen Engineering Ltd. is a twenty-five year old medium-sized consulting engineering firm that provides multi-discipline services to heavy industrial clients primarily throughout western Canada. Having survived an industry recession that began just as the founder of the company retired, the company is now seeking to set a firm direction for the future. Based on the company's current strengths and several unique advantages, a strategy focused on the efficient implementation of small multi-discipline projects is recommended. Because engineering consulting firms generally begin focusing on larger projects as they grow, the unique aspect of the strategy is the exclusive focus on small projects.

DEDICATION

For my parents, who are always there for me. Although a significant sacrifice, the many nights of proofreading during this program are only a tiny part of their overall contribution to my successful completion of this degree. Their constant love and support is the foundation upon which all of my achievements are built.

ACKNOWLEDGEMENTS

I would like to acknowledge my classmates and especially my cohort (Lorraine Rieger, Lyla Crighton, Mark Dickson, and Andrew Soh) for their help and support over the past two years. They say that in an executive program you learn as much from your classmates as you do from the courses themselves – and they are right. I would also like to acknowledge my friends and family for their patience and understanding of my time constraints and workload as I completed the program. Finally, I would like to thank the professors and staff of the SFU Executive MBA program. The past two years have been an exceptional experience, greatly exceeding my expectations.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

GLOSSARY

ACEC	Association of Consulting Engineers of Canada
B	Billion
E&I	Electrical and Instrumentation
EPC	Engineer-Procure-Construct, a type of contract
IS	Information Systems
IT	Information Technology
K	Thousand
M	Million
R&D	Research and Development
ROI	Return on Investment

1 OVERVIEW OF THE FIRM

Fransen Engineering Ltd. is a consulting firm that provides multi-discipline engineering services to a wide variety of clients. The company's twenty-five year history is typical of consulting firms in their initial growth phase, during which management is focused more on survival than on developing and implementing a specific business strategy. The purpose of this analysis is to develop a strategy for the company in order to focus the efforts of individual employees and differentiate the company from its competitors.

The vast majority of the firm's projects are for large clients and take place in heavy industrial type settings such as pulp mills, oil refineries, power plants, and waste water treatment plants. Currently with seventy employees, Fransen Engineering is classified by the Association of Consulting Engineers of Canada (ACEC, 2002) as a medium sized firm.

The development, design, engineering, and facilitation services that Fransen provides are required in conjunction with procurement and construction activities to implement industrial construction projects. Projects are generally undertaken to improve the capacity or profitability of facilities, although safety and environmental based projects are also common.

From its office in Richmond, British Columbia, Canada, Fransen has completed projects primarily in western Canada, but also periodically in the northwestern United States, infrequently in eastern Canada, and rarely in other parts of the world. Projects undertaken in other parts of the world have exclusively been joint ventures with larger companies where Fransen's contribution has been relatively small.

1.1 Company History

Phillip Fransen, an electrical engineer who specialized in electrical drive design, founded Fransen Engineering Ltd. in 1980. Originally Phillip Fransen simply contracted out his own services, but he then gradually added electrical design and engineering support staff over the first seven years of the company's existence. During this period, the company's focus was narrowly based on Phillip Fransen's specialized knowledge related to electrical drives. Clients were generally limited to pulp and paper mills. Electric drive projects represent a sub-set of the typical electrical engineering requirements of a pulp and paper mill.

1.1.1 Multi-Discipline Development

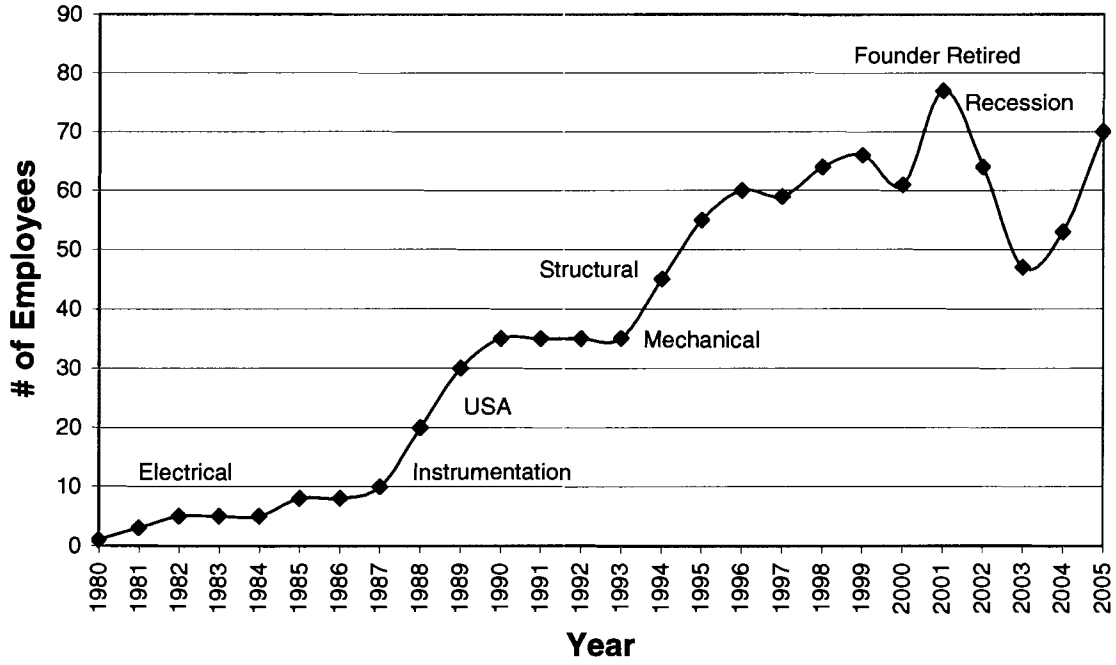
Over the years, Fransen began incorporating other disciplines and providing services to new sectors. The mechanism for this expansion was exclusively through the hiring of senior engineers with differing backgrounds. The first new discipline department began in 1988, when Mike Cantor joined Fransen and began an instrumentation and controls department.

Additional engineers and technologists were slowly hired as the electrical and instrumentation departments evolved, including core senior engineers who filled leadership roles in both departments. By 1990, the company had grown to forty employees. Gradually the focus of the services offered expanded from primarily electrical drive related projects to encompass all electrical and instrumentation (E&I) projects at pulp and paper mills, and increasingly in other heavy industrial settings.

After reaching a growth plateau in 1990 that lasted for four years, a senior Mechanical engineer, George Mitchell, was hired to lead a new mechanical department. George Mitchell's previous experience was primarily in the oil and gas industry, which resulted in further broadening of sector involvement. The growth spurt that followed George Mitchell's hiring also included the addition of a senior pulp and paper mechanical engineer and a senior structural

engineer, who began a small structural discipline department. Both of these individuals further contributed to growth and sector coverage.

Figure 1: Growth of Fransen Engineering Ltd. (1980 to 2005)



1.1.2 Satellite Office Initiatives

Fransen has made several attempts over the years to open satellite offices including: Thunder Bay, Ontario; Edmonton, Alberta; Kitimat, British Columbia; and Calgary, Alberta. All of these offices were closed within two-years of their initial opening. The lack of success of each initiative was primarily due to the failure of the company to find a satellite office manager possessing the necessary leadership and business skills to overcome the challenges associated with establishing a new office. Finding individuals with the right mixture of skills, experience, and attributes is exceedingly difficult because they typically either open their own firms or are deeply entrenched at established companies.

1.1.3 Recent History

Phillip Fransen maintained full control of the company until his retirement in 2001. The divestment process was prolonged and embittered. As a result, the transition of overall company management was abrupt and the next generation of senior managers were emotionally drained from the transition process as they assumed control.

Shortly after Phillip Fransen's retirement, the entire consulting engineering industry in British Columbia experienced a significant recession related directly to a recession experienced by several primary industries, especially pulp and paper. This left the management and employees of Fransen scrambling to maintain core employees. Fransen faired better than most consulting engineering firms through the industry recession of the late 1990's and early 2000's due largely to the company's focus on smaller projects. However, the company still lost several key employees due to lack of work during this period and was forced to compete for projects outside of its traditionally preferred sectors.

Despite the recent strength of Fransen's mechanical department, the company is primarily known throughout western Canada as specializing in electrical and instrumentation engineering. To date, the company has not made a specific effort towards re-branding in order to dispel this misconception. Also, despite the fact that all of the departments are housed within a common office building, integration between the mechanical, structural, electrical and instrumentation departments is incomplete.

1.1.4 Ownership History

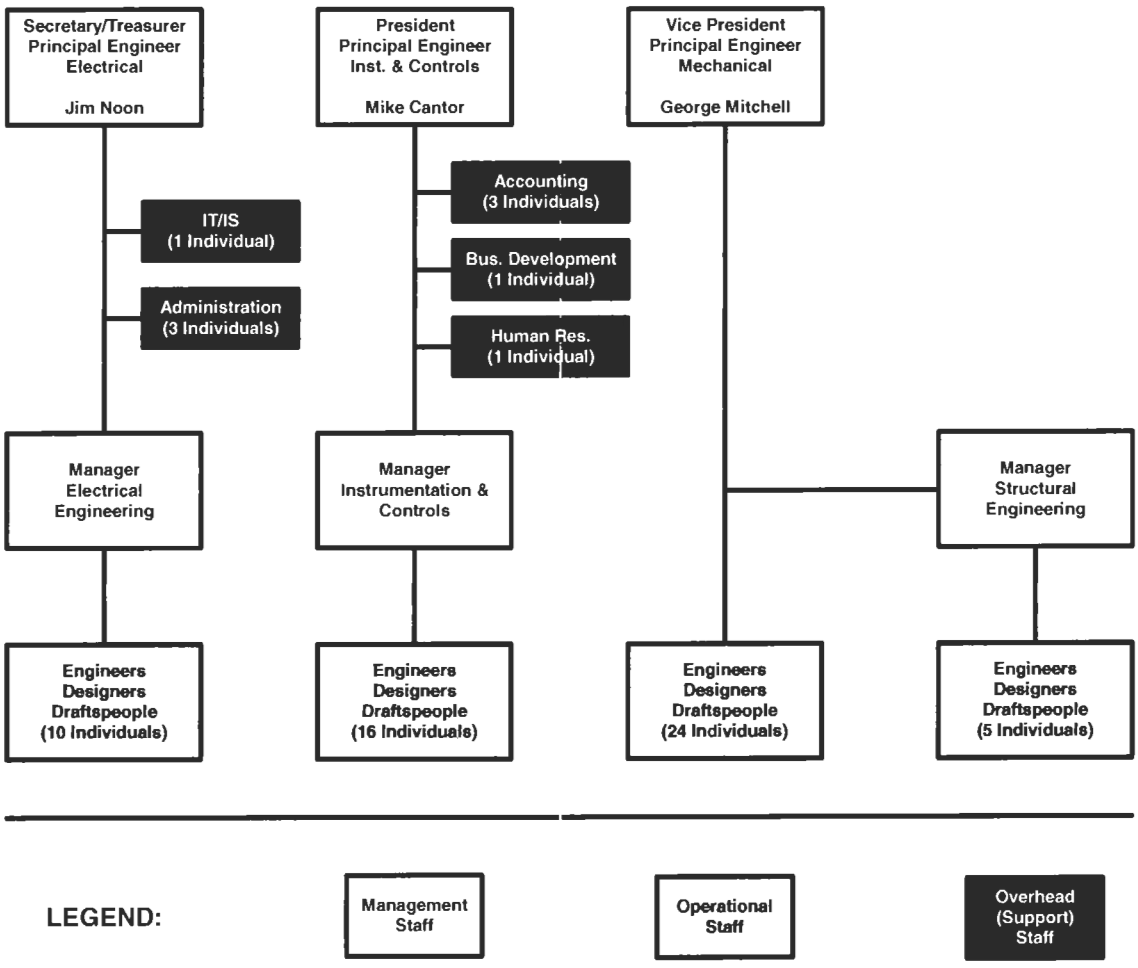
Upon his retirement, Phillip Fransen divested his remaining 50% ownership of the company to the three existing managers and four senior engineers who had already been gradually given partial ownership over the preceding years. Of the four senior engineers, only of them was a department manager. The three existing top managers emerged with a controlling

interest in the company and assumed the roles of president (Mike Cantor), vice president (George Mitchell), and treasurer (Jim Noon).

1.1.5 Organizational Structure

Fransen Engineering has a relatively flat organizational structure. Below the three majority owners, there is a single manager for each of the electrical, instrumentation, and structural departments. The remainder of the company's employees are roughly differentiated in terms of qualifications (engineer, designer or draftsperson) and experience. Figure 2 summarizes the current organizational structure and employee distribution at Fransen Engineering Ltd.:

Figure 2: Organizational Chart (2005)



1.2 Services

Although the specific nature and composition varies, the general engineering services required to complete industrial projects are relatively independent of the size of project or industry setting where they are completed. These services may be broadly broken into the following categories: detailed engineering, project management, and construction assistance.

All engineering projects follow the same general steps: feasibility study, preliminary engineering, detailed engineering, procurement, construction, and operation. The timing and degree of involvement that Fransen has in its projects varies greatly from client to client and project to project, but Fransen's services are almost always centred around the detailed engineering portion of projects.

The majority of the company's revenue is generated through multiple small projects. These projects range in size from $25K to $5M, with an average of around $250K total capital cost. Periodically the company has provided services for multi-discipline projects of over $5M and up to $30M in total capital cost. From the perspective of Fransen Engineering, projects with a total capital cost in excess of $5M are considered to be large. It is important to note, however, that there are no industry guidelines with respect to project size classifications. Depending on the economic climate and the setting, projects exceeding $5M can be considered small relative to mega industrial construction projects, which can exceed $1B in capital cost.

Large consulting firms typically focus on large projects. During recessions, clients generally eliminate large projects and curtail small projects. In the absence of large projects, large firms naturally shift their focus to small projects in order to keep their core staff busy. Large firms are generally less competitive than smaller firms for small projects during these periods because of their tendency to try and support overhead spending and core staff in excess of what is required to meet diminished demand. Although competition is intense for all consulting

firms during recessions, Fransen's general focus on smaller projects has helped to somewhat cushion the impact of low cycles. This is due in part to the company's price advantage over larger firms during recessions, but also to the momentum of ongoing streams of small projects from existing core clients.

1.2.1 Service Portfolio

Throughout each phase of a project, each of the disciplines required for the completion of the project are typically involved. Fransen provides all of the general services that are routinely required to complete heavy industrial projects and works with or sub-contracts specialists as required. Fransen's service offering is, therefore, a portfolio of the various core discipline and project stage related skills that are required to complete small industrial style projects in their entirety.

1.2.2 Differentiated vs. Homogenous Services

For the first seven years of its existence, Fransen Engineering's service offering was differentiated as it specialized in one discipline (electrical), one sector (pulp and paper), and one specific area within that sector (drives). With differentiated service, Fransen was able to charge a premium for its services.

Over the intervening eighteen years as the company grew and diversified, the service offering became almost completely homogenous. Fransen is now a generalist engineering consulting firm, with numerous competitors offering similar services.

1.2.3 Revenue Generation

Revenue in the industrial consulting engineering sector is mainly generated through billable hours (Hammes, 1988). Consulting engineering firms can supplement their revenue through related activities such as licensing process design, getting involved in equipment

manufacturing or construction, and developing software. All of Fransen Engineering's revenue is currently derived through billable hours.

Roughly half of consulting engineering work in Canada is awarded on a competitive bid basis, with the other half of projects being sole sourced (ACEC, 2004). Either method of selection normally involves a 'fixed fee' estimate. In practice for small projects, however, billing tends to be on a time and materials basis with the estimate acting as a control. This is because it is difficult to accurately fix fee estimates at the outset of projects, as they typically are not adequately defined until the engineering effort has significantly progressed.

1.3 Clients

Fransen's large heavy industrial clients typically have a yearly budget for outside consulting engineering fees associated with their annual plans for capital and maintenance projects. Consulting engineering fees generally comprise a very small part of annual budgets for large industrial clients; however, the total cost of related projects may be extremely significant.

During industry downturns, it is common for consulting engineering firms to begin scrambling to find work in new sectors. This effect, along with the diversification influence naturally resulting from hiring capable engineers with different backgrounds, has led to Fransen's involvement within a wide range of industries. In order of significance, these industries include: pulp, downstream oil, mid-stream oil, paper, gas distribution and metering, thermal power, water treatment, waste treatment, chemical, pipeline, electrical distribution, brewing, cement, mining, manufacturing, transportation, and agriculture. This represents an extremely broad coverage of industrial type sectors and notably excludes only commercial clients and upstream resource engineering (e.g. forestry and oil exploration).

1.4 Focus of the Analysis

Having survived the recent recession that followed Phillip Fransen's retirement, the next generation of owners and senior managers are now in the process for the first time in the company's history of developing an overall business strategy. The intention of this analysis is to assess the existing resources and situation of the company and industry, suggest a strategy, and provide initial implementation guidance. A specific strategy will help to focus and guide the efforts of the company's many talented and motivated individuals towards a common goal in order to improve company performance.

An overview and analysis of the consulting engineering industry is outlined in Chapter 2. The intention of this chapter is to provide a description of the industry, identify key success factors, and assess the industry's situation in the summer of 2005.

This is followed in Chapter 3 by an internal analysis of Fransen Engineering. A firm-level value chain and strategic alignment study are developed in order to determine current competitive advantages in relationship to industry key success factors.

Issues affecting the company, which are generally related to the lack of an established focused strategy, are described and developed in Chapter 4. Strategic recommendations to address the company's specific issues are presented in Chapter 5 within the broad context of a suggested overall strategy.

2 INDUSTRY ANALYSIS

2.1 Industry Overview

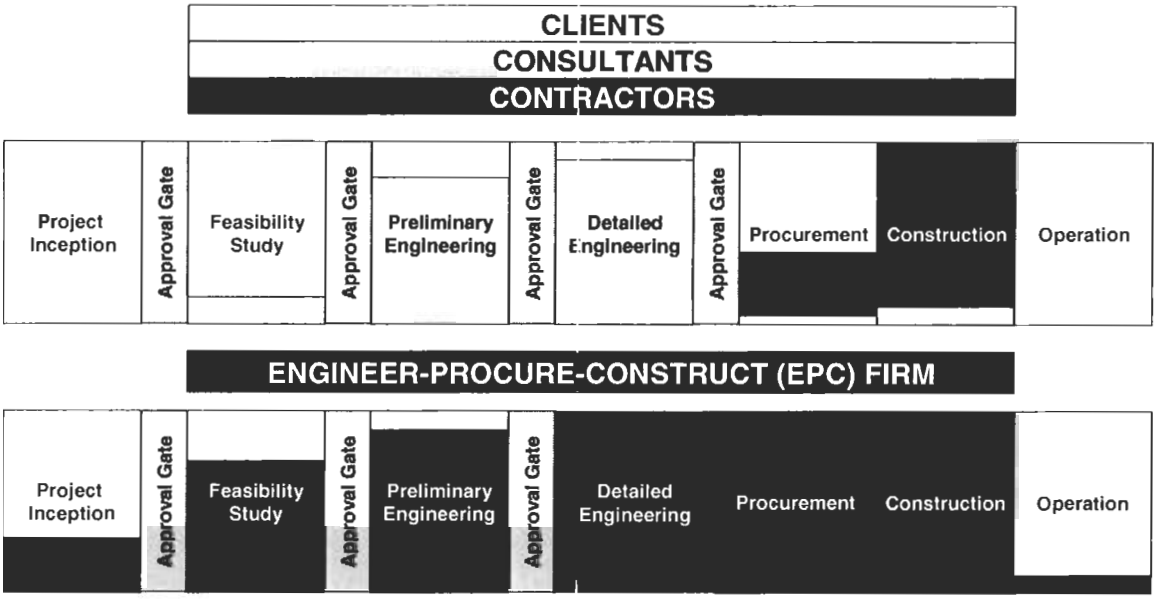
The Association of Consulting Engineers of Canada (ACEC) estimates total employment in member firms at 54,179, spread amongst 596 companies, generating an estimated total revenue of $6.4B (ACEC, 2002). These figures under-state total Canadian employment in the consulting engineering industry as only member firms are included.

Demand in the industrial consulting engineering industry is highly cyclical as it tracks the highly cyclical nature of the industries that it serves. These industries follow this pattern due to the lengthy amount of time required to complete capacity expansion projects. For example, when pulp prices are high or are forecasted to be high in the near future, clients across the pulp industry will simultaneously begin engineering for projects to increase their capacity. Once all of these projects come on line, supply of the commodity will exceed demand, the commodity price will drop, companies will cease spending on new projects, and demand for consulting engineering services will in turn drop. Eventually, after a depressed period when no new capacity is added and perhaps some existing commodity generating capacity is shutdown, conditions in the market place eventually recover and demand for the commodity exceeds supply. The cycle then begins again for both the commodity and the consulting engineering services industry.

2.2 Industry Value Chain

The industrial construction projects value chain (see Figure 3) illustrates the steps that bring project ideas to fruition. The figure also illustrates where, and to what extent, stakeholders add value. The upper value chain represents a traditional project wherein engineering and construction activities are performed by different companies. The bottom chain represents a common alternative stakeholder configuration, wherein engineering and construction activities are preformed by a single company. Considering the value-adding activates at each phase of the value chain is useful to help identify which activities contribute the greatest value. The goal is to determine key success factors for use in strategy development.

Figure 3: Value Chain – Industrial Construction Projects



% OF PROJECT COST ASSOCIATED WITH PROJECT PHASE						Totals
Engineering	½%	2 ½%	9%	0.5%	2.5%	15%
Equip/Mat./Labour	0%	0%	0%	50%	35%	85%
Total	½%	2 ½%	9%	50%	38%	100%

Each industrial construction project follows the same steps from initial project inception through to operation of the final constructed project. Although the names given to different

stages vary from industry to industry and client to client, the steps are well established and are generally essentially identical for all projects. There are three primary stakeholders in the industry value chain: Clients, Consultants, and Contractors.

'Clients' refers to professionals employed by the facility commissioning the project and includes engineers, accountants, procurement specialists, plant operators, maintenance staff, etc... 'Consultants' are outside engineers and designers whose services are elicited by Clients as needed to provide the development, design, engineering and facilitation services required to implement projects. 'Contractors' are the construction supervisors and workers who physically implement (build) projects based on the Consultant's designs and direction.

The work of Consultants is focused on the Preliminary and Detailed Engineering phases of the value chain. Consultants must be competitive with respect to their Preliminary and Detailed Engineering services in order to survive. The largest portions of cost are, however, associated with the downstream Procurement and Construction phases of the value chain. This creates a temptation for Consultants to diversify away from pure engineering into also performing these activities.

The value chain for a typical Engineer-Procure-Construct (EPC) firm is included in Figure 3 in order to demonstrate the possible extent of downstream integration by consulting firms. Different levels of integration between pure consulting and EPC are common in the industry.

2.2.1 Project Inception

Projects begin with an inception phase. Generally, project inception is completed by the Client and is based on either building a new facility to capitalize on an economic opportunity, or making improvements to an existing facility. These improvements may be focused on plant

capacity, quality, availability, operating costs, maintenance costs, safety, and/or environmental performance. Progressive Consultants will sometimes suggest projects to Clients based on their experience at other facilities in the hopes of securing revenue for later engineering and construction stages of the value chain. These Consultants add value for the Client by virtue of presenting them with financial opportunities.

2.2.2 Feasibility Study

After the inception phase, if the Client feels the project idea has adequate promise, a feasibility stage is undertaken during which the technical feasibility, justification, and rough project costs are considered. The intention of this phase is to consider the viability of projects with minimal investment prior to deciding whether to proceed with a more substantial level of investment. The client typically carries out this phase, as it requires a high degree of knowledge with respect to their industry and their unique business situation; however, Consultants sometimes provide assistance. This is especially true for large projects.

2.2.3 Preliminary Engineering

If the feasibility phase shows that the project is promising, the Client will decide to proceed with preliminary engineering. Preliminary engineering involves developing rough cost estimates for several major options to meet project objectives. These options generally centre on items such as equipment/technology and alternative possible locations. The cost estimates and further investigation carried out during this phase serve to reaffirm project viability. Consultants typically carry out preliminary engineering with heavy involvement by the Client.

2.2.4 Detailed Engineering

At the end of the preliminary engineering phase, preferred options are selected and detailed design commences. The final product of this phase is a set of drawings, specifications,

and contract documents suitable to facilitate the procurement of all necessary equipment and materials, and to complete construction of the project. Detailed engineering is carried out almost exclusively by Consultants.

2.2.5 Procurement

The procurement phase of the value chain includes purchasing and expediting all required equipment, materials, and construction labour required to implement projects. The Client, Consultant, or Contractor may carry out procurement. If the Consultant or Contractor purchases the equipment and materials, they charge a mark-up to account for risk, financing, and procurement value added services.

2.2.6 Construction

The construction phase is the physical enactment of the design. Equipment and materials that have been procured are installed in accordance with the drawings and specifications developed during the engineering phases of the project. The Consultant and/or Client continue 'engineering' during this stage by interpreting and resolving conflicts, errors, and omissions associated with the design documents. The Contractor is typically primarily responsible for this phase of the project, including construction management and procurement of non-engineered materials.

2.2.7 Operation

Once the project is constructed, the Client takes ownership and begins operating the new or modified facility. For the majority of projects, which are return-on-investment based, a revenue stream associated with the new facility begins upon commencement of operation. The role of Consultants in this phase is generally limited to training operational personnel and optimising operations.

2.2.8 Risk Reduction Mechanisms

Approval gates are incorporated after each of the early stages of the project in order to limit the Client's exposure to financial risk. The first two approval gates following the feasibility study and preliminary engineering phases limit the risk of expending engineering costs on a project that proves to be unfeasible. The final gate after detailed engineering is the Clients last chance to cut their losses before the costly procurement and construction phases of a project.

Each of the approval gates also offers the Client an opportunity to switch Consultants (or involve a Consultant for the first time). These approval gates can include formal bidding processes for Consultant selection, although projects are awarded directly to Consultants based on relationship roughly fifty-percent of the time (ACEC, 2002).

2.2.9 Progression of Service Value vs. Consultants Profit

As projects progress along the value chain, the ability of the various players to impact the success of the project diminishes. Ideas brainstormed during the feasibility stage of the project often have the potential to drastically impact the cost or the profitability of a project, whereas decisions during the construction and procurement phases generally focus on incremental improvements. Although this implies that the services of Consultants should be more valued during the early stages of a project, profit for Consultants is lowest at these stages because there are fewer employees billing to the project (see the percentage of project cost associated with each project phase in Figure 3). This observation explains the natural desire for Consultants to vertically integrate downstream into procurement and construction activities in order to capture more of the total profit associated with projects that benefit from their upstream development input.

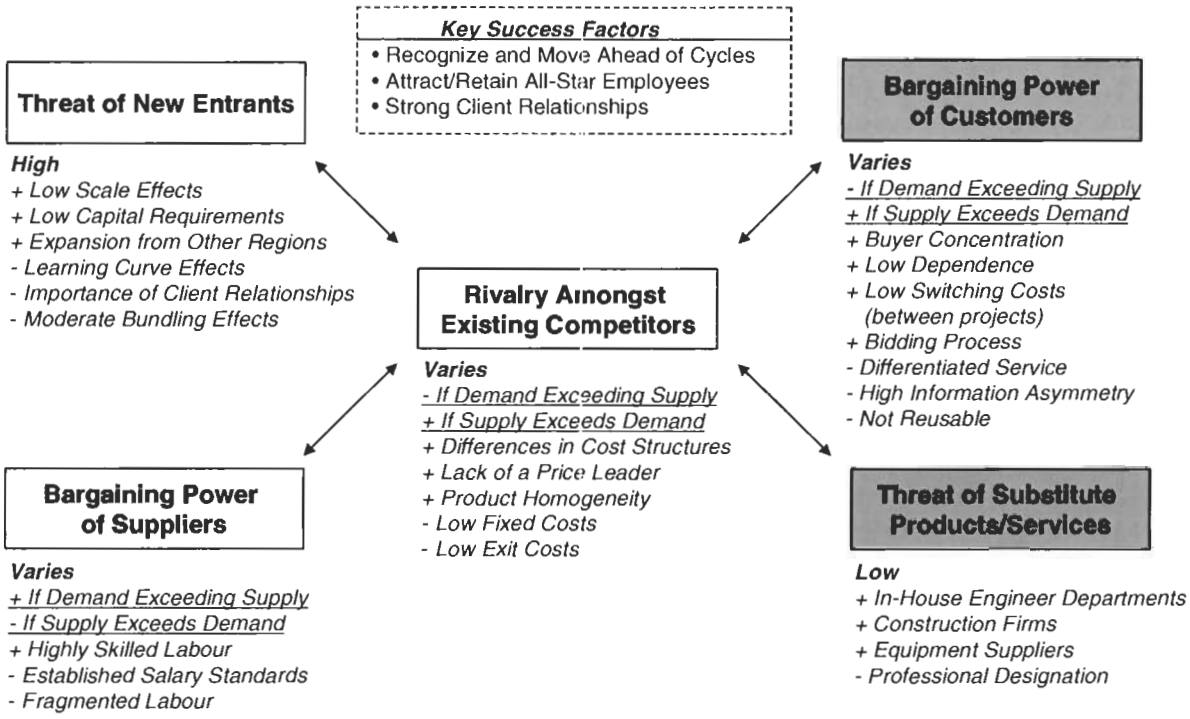
2.2.10 Vertical Integration Potential

A value chain for a typical Engineer-Procure-Construct (EPC) style company is provided for comparative purposes in order to illustrate the extent to which firms in the industrial construction field can vertically integrate to capture margin from other stages of the value chain (see Figure 3). Vertical integration provides the opportunity for Consultants and Contractors to extract more margin from the value chain. It also provides Clients with added value in the form of increased risk reduction and lower transaction costs associated with bidding, negotiating, and contract administration after the detailed design phase.

2.3 Industry Analysis

A summary of a five-factor industry analysis for the industrial consulting engineering services industry is provided in Figure 4. As with the industry value chain analysis, the goal of the five-factor analysis is to reveal key success factors that affect competitive rivalry in order to determine possible sources of competitive advantage.

Figure 4: Five-Factor Industry Analysis



Source: adapted from Porter, M.E. (1979)

2.3.1 Threat of New Entrants

New entrants pose a high threat to incumbent consulting engineering firms. New consulting engineering firms are initially created when an individual or small group of 'Star' engineers decide to leave a larger consulting firm or in-house client engineering group and start their own company. In order to stay in business, the company founder or founders need only

keep themselves busy enough to pay themselves salaries and cover minimal administrative and business related expenses. There are numerous companies with a sole owner/employee formed in this manner that survive quite profitably for indefinite periods. Therefore, scale effects and capital requirements are low and do not create significant barriers to entry.

The other major threat of entry into a particular geographical consulting engineering market results from consulting firms that are established in other areas expanding into new territories. In order to accomplish this, the entering firm must either shift 'Star' employees from their established regions or recruit 'Stars' locally. Local recruitment is difficult due to the fact that 'Star' engineers are generally well compensated and protected by incumbent firms. Shifting 'Stars' from geographic areas with depressed local demand to areas of high demand is a greater threat of entry risk. However, relationships with local clients are crucial and require time and investment to cultivate. For larger projects, it is sometimes possible for small local offices staffed by a minimal number of 'Stars' to feed work back to a large central office.

Learning curves with respect to technical and project management expertise have a generally neutral impact on the threat of entry. Individuals develop their technical and project management skills while working at established firms during the early parts of their career. When individuals start their own companies or firms shift 'Stars' to new regions, they already have these skills in place.

Client relationships, in contrast to technical and project management learning curves, are critical to success in the industry. Established firms entering new geographic regions are at a significant disadvantage in this regard. Individuals who split away from existing companies in the same area to start their own firms generally already have established relationships with clients through their previous employers, thus diminishing the significance of this variable.

Bundling of multiple service offerings, which generally means offering different engineering disciplines (mechanical, structural, electrical, instrumentation, civil, environmental, etc...), creates a significant barrier to entry for newly formed firms. This is because projects generally require input from several disciplines and, other things being equal, clients typically prefer to deal with one company per project. A small company offering only one discipline must generally partner with other companies in order to provide the range of expertise required to complete a project. From the perspective of clients, this increases transaction costs and risks associated with project implementation.

The number of 'Star' engineers in a region is relatively stable in the short term, as it is only affected by the migration of 'Stars' from other regions and the rate of entry and development of new engineers into the field. Apart from migration, the threat of entry into the industry may, therefore, be considered in terms of the threat of increased disbursement of 'Star' engineers. The theoretical furthest extension of this would be one 'Star' engineer per firm. The benefits of bundling and corporate level client relationships prevent this level of fragmentation.

Over the long term, the overall supply of consulting engineering labour including potential 'Star' engineers is affected by the general attractiveness of the consulting engineering industry. When there is high demand in the industry, more young engineers and technologists enter the industry. Some of these individuals eventually become 'Stars' capable of starting their own firms, thereby increasing the future threat of new-firm creation.

The effects of learning curves, bundling, and client relationships are in practice overwhelmed by positive entry threat effects stemming from low scale and capital requirements. As a result of these factors, entry into the industry is relatively easy. This is evidenced by the fact that the average consulting engineering firm in Canada has less than fifty employees, with total industry employment of over 50,000 people (ACEC, 2002).

The threat of entry is high when demand cycles are high. During periods of low demand, the relative ease of industry entry is irrelevant as the unattractive industry climate effectively discourages new entry. Fracturing of 'Stars' from large firms to start their own firms is, however, not uncommon in low demand periods as 'Stars' often choose to focus on keeping themselves busy rather than remaining at a larger company where they would typically be expected to support others.

The threat of new entry into the engineering consulting industry will always be high due to minimal capital requirements and benefits of scale. Individual consulting firms may gain competitive advantage by protecting 'Star' employees and core client relationships. Bundling services to lower transaction costs for clients also helps to shield against the threat of small new competitors.

2.3.2 Bargaining Power of Suppliers

The influence of the bargaining power of suppliers on rivalry varies from high to low depending on the level of demand relative to supply in the industry. The only significant supplier to the industrial consulting engineering services industry is labour. All other supplies such as office space, standard and specialty software, and business support services, are widely available and do not offer any significant opportunity for competitive advantage. Employees are the cornerstones of an engineering consulting firm and a mass exodus of 'Star' employees would bring about the demise of small to medium sized firms and dramatically hurt the local operations of larger firms.

Engineers and technical staff are highly skilled, which lends individuals some bargaining power. Labour is, however, fragmented and unionization of engineers is extremely rare. Salaries tend to be standardized across firms due to high mobility of labour. Although 'Star' engineers command premium compensation, their compensation is also fairly standard across the industry.

The more employees a firm has, the greater volume of projects it can handle. This results in greater revenue and increased potential to dilute fixed costs in order to improve profitability. For this reason, consulting firms will generally seek to maximize hiring in periods when demand exceeds supply as long as the effect on service quality does not undermine valuable client relationships. Labour bargaining power increases during these periods as firms compete for labour. The bargaining power of labour tends to be somewhat sticky, however, and lags behind increases in demand for consulting services. The slow response is due in part to a culture of professionalism that discourages competitive bidding amongst consulting firms for engineers.

During periods when supply exceeds demand, the ratio of non-billable to billable hours for employees at consulting firms begin to drop. This places pressure on the profitability of the firms. The response is to begin laying off employees. Labour bargaining power during these periods is extremely low as individuals scramble between companies trying to find work.

In order to gain competitive advantage, companies must seek to become better than their rivals with respect to attracting employees during demand peaks, and retaining core employees through demand troughs. However, this strategy is difficult to implement. Competition amongst companies makes attracting employees difficult during peaks, and financial pressures makes retaining employees difficult through troughs.

2.3.3 Bargaining Power of Customers

The influence of the bargaining power of customers on rivalry also varies from high to low depending on the level of demand relative to supply in the industry. The bargaining power of customers is highly dependant on the supply and demand dynamic for consulting services. During low demand periods, customers can choose between 'Stars' offered by various firms and seek out individuals with the most directly applicable expertise for their specific projects. At the same time, intense competition allows the client to demand a low cost for these individuals. It is

in the best interest of the client not to restrict the price too excessively, however, as this may adversely affect the quality of the end product.

A high degree of information asymmetry undermines the bargaining power of clients, even during low demand periods. Information asymmetry is typical of service industries and is especially prevalent in this specific industry, wherein the details of each project are unique, not reusable, and performed primarily away from the supervision of the client. In response, clients generally place increased value on reputation and personal experiences with individuals, thereby increasing the potential for consulting firms to differentiate based on individual employees. In practice, however, the decrease in client bargaining power due to information asymmetry is limited due to the relative homogeneity of skill sets offered and the ability of clients to request and check references for individuals.

There are also several underlying factors that contribute to increased client power. Clients tend to be relatively concentrated, with a few large firms dominating each of the local primary industry markets. Because capital projects are relatively short in nature and are typically independent of one another, clients can maintain a low dependence on individual consulting firms. Switching costs are limited to the learning curve associated with familiarizing a new consultant with the idiosyncrasies of the client's specific site. The relatively common practice of competitive bidding also leads to increased client power.

Despite information asymmetry, buyer concentration, and switching cost influences, the bargaining power of customers is primary affected by the overall industry demand cycle. Consulting firms may gain competitive advantage by identifying and focusing on core clients. This is especially true during peak demand periods, wherein customers compete for 'Star' employees. Preferentially providing 'Stars' to core clients during these periods builds goodwill that may be harvested as demand begins to sink below supply.

2.3.4 Threat of Substitute Services

Substitute services pose a low threat to consulting engineering firms. During the 1960's and 1970's, clients divested the bulk of their in-house engineering departments. They generally left behind only sufficient numbers of engineers and technologists to deal with a small base load of projects and to administer the efforts of consultants hired to complete the majority of projects. This approach makes sense because project engineering requirements vary greatly over time, making it inefficient for individual clients to maintain sufficient in-house engineering departments to meet their highest demands through periods of low capital investment. There is a very small risk that a reverse trend could occur if large clients decide to adopt a central in-house engineering approach to providing services for all or several of their facilities. Given current trends in the industry, however, this poses only a minor threat of substitution for consulting engineering services.

Despite the fact that the majority of risk mitigation steps are incorporated during the engineering phase of projects, construction firms ultimately carry the bulk of the cost based risk associated with capital projects. For this reason, there has been a growing trend in recent years towards EPC (Engineer-Procure-Construct) projects wherein one company bares the full responsibility and risk for the entire project. Potential profit is commensurate to the increased risk.

EPC contracts are, however, uncommon for all but the largest of projects. For most projects, the risk of inadequate final project quality as a result of EPC contractors using their increased decision making power to maximize their profit is too high. Significant investment in the up-front agreement process is required for EPC type contracts in order to mitigate this risk. This investment is impractical for all but the largest projects. For this reason, the threat of expanded entry of construction firms through EPC approaches poses only a slight threat of substitution most projects.

Most capital projects for heavy industries centre on a few pieces of critical equipment. Equipment vendors also sometimes provide engineering services to install their equipment, creating another risk of substitute. The risk of further entry by equipment vendors is limited, however, due to the fact that most projects require a wide range of equipment that typically cannot be supplied by a single vendor. In addition, one of the services that consulting engineers perform is facilitation of competitive bid processes for equipment selection, which ensures that clients receive optimal pricing for equipment. This competition is generally removed when equipment vendors are relied upon to supply engineering services.

Return to integrated client engineering departments and entry by equipment vendors both pose limited threats of substitute to the consulting engineering industry, as does the growth in popularity of EPC approaches for all but the largest of projects. Furthermore, the regulatory aspects associated with the profession of engineering restrict anyone other than certified professionals from performing the services provided by consulting engineers. As a result of the generally low threat of substitution, this factor does not have a significant influence on industry rivalry.

2.3.5 Rivalry Amongst Existing Competitors

The degree of rivalry amongst competitors is most highly influenced by the bargaining power of suppliers and customers. During periods of low demand, competition amongst consulting firms is fierce as individual firms seek to maintain the volume of work required to cover their fixed costs and maintain their core staff of 'Stars' and support staff necessary for basic business functions. Conversely, during periods of high demand consulting firms can easily cover their direct costs, but the variable costs associated with finding talented labour required to obtain and complete further work increases significantly. In addition, new employees during these

periods are likely to be of a lower average calibre requiring a higher investment in training and management in order to ensure their effective utilization.

Although firms typically generate revenue in the same manner (via. billable hours), the amount of overhead incorporated into charge-out rates varies significantly. Overhead spending is ultimately, however, fairly flexible. Companies with normally high overhead are typically enticed into accepting lower profit and/or cutting overhead during lean periods in order to compete with lower cost structure companies. Fixed costs come under scrutiny during slow periods when there is less revenue available for dilution, but they do not have a significant impact on the degree of rivalry in the consulting industry. This is because the majority of overall costs are labour related, which is a variable cost.

Costs at consulting firms are highly dependant on salaries, which tend to be standardized across the industry due to the high mobility of labour. This leaves insufficient room for the presence of an easily defendable low cost position. Lack of a price leader increases rivalry and is evidenced by fierce price competition during periods of low demand with no single firm emerging as a clear victor.

The threat of substitution to the consulting engineering industry has little impact on rivalry, while the threat of new entrants merely highlights the importance of protecting 'Star' employees in order to avoid fragmentation. The greatest impacts on industry rivalry and, therefore, the greatest potential sources of competitive advantage are related to the bargaining power of suppliers and customers. In order to create competitive advantage with respect to these factors, companies must adopt a strategy that takes into account the demand cycles that characterize the industry.

2.4 Key Success Factors

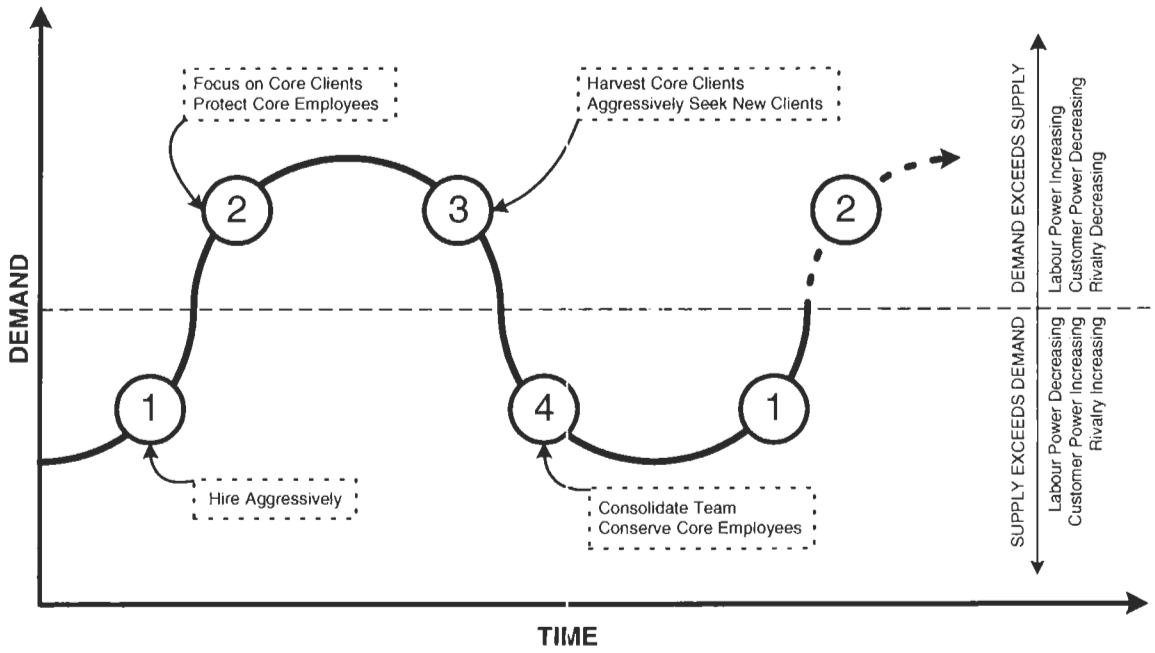
The primary key success factor relating to the consulting engineering industry is attracting and retaining core employees, especially 'Stars.' Both attraction and retention are challenging because the focus of all consulting engineering firms with respect to these activities tends to be synchronized with common industry cycles. The bargaining power of suppliers (labour) tracks these cycles and is common at any given time for all companies in the industry.

The other major key success factor is the ability of a firm to develop and maintain relationships with core clients. Strong relationships with core clients offer the best opportunity for continued revenue during recessions, which in turn helps firms to retain core employees. In other words, developing core clients somewhat mitigates or slows the increased bargaining power of customers during low demand periods. In addition, the cost of obtaining work from core clients is significantly lower in comparison to developing work with a new client.

Consulting engineering firms can gain advantages over rivals with respect to both core employee and client key success factors by anticipating market cycles in order to act before competitors. As demand shifts from peak to trough or vice versa, consulting firms should consider the implications on the other two primary key success factors in the industry: 'Star' employees and client relationships. The demand cycle for industrial consulting engineering services is illustrated in Figure 5.

Firms should (1) aggressively hire leading out of demand troughs, (2) focus on core clients and protect core employees as demand rises, (3) harvest core clients and aggressively seek new clients as demand begins to decline, and (4) consolidate the core team as demand approaches the next trough. Over the course of repeated demand cycles, successful firms are those that manage to expand their core of 'Star' engineers and technologists, as these individuals are the primary assets of industrial consulting engineering firms.

Figure 5: Demand Cycle for Industrial Consulting Engineering Services



Diversifying across industries is an effective strategy for maintaining core staff through cycles, although demand in primary industries often follows similar cycles. Geographical diversification is also a viable option. However, the geographical stickiness of labour, the requirement for a local presence in order to cement crucial relationships, and difficulties associated with breaking into new markets where established relationships already exist are challenges associated with this strategy.

Although these cycles are difficult to predict, there are many clear indicators ranging from industry specific economic outlook statistics to feedback from site personnel regarding the prevailing outlook at client sites. In addition, monitoring the frequency of engineering related job postings for both client facilities and consulting firms in local papers provides a surprisingly accurate lead indicator of activity.

2.5 Industry Attractiveness, Summer of 2005

Over the past several years, the supply of industrial consulting engineers in British Columbia (BC) has exceeded demand due to a slowdown in the pulp and paper industry, which constitutes a large share of overall primary industry activity in BC. Growth in the mining sector and the draw of consulting engineers and technologists from BC to the booming oil sector in Alberta lessened the oversupply situation. In addition, many engineers and technologists previously employed in the industrial consulting engineering field were lured away to commercial or municipal consulting engineering fields, which have also been growing locally in recent years.

Currently, the economic outlook for primary industries in Western Canada is improving (the supply/demand situation is approaching position '2' on Figure 5). As a result, demand for consulting services is increasing and rivalry amongst existing firms for projects is decreasing. Clients increasingly must compete to obtain 'Stars' for their projects. Therefore, rivalry amongst consulting firms with respect to competing for projects is being replaced by rivalry over obtaining quality employees. At present, the atmosphere with respect to rivalry in the industrial consulting engineering industry in British Columbia could best be characterized as moderate and increasing.

2.6 Optimal Firm Size

Profit margins are relatively consistent for consulting engineering firms regardless of size (ACEC, 2002). The industry is characterized by a wide range of firm sizes, with fifteen employees being the average. More than half of employees working in the consulting engineering field in Canada, however, work for large companies (ACEC, 2004). Although there are no compelling numerical-based scale effect arguments supporting the existence of large firms, Kreitl, Urschitz and Oberndorfer (2000, p. 439) note that there are several soft benefits including:

- Greater ability to attract and retain top professionals;
- Increased ability to attract and keep clients and bill higher fees;

- Easier access to large scale projects and thus higher probability of tightening client relationships;
- Greater capacity for diversification;
- Expanded economies of scale and scope, particularly in the areas of staff training and development, back office support and firm marketing and promotion;
- Greater ability to raise capital;
- A priori greater trust of clients in the know-how and experience of larger firms;
- Less vulnerability to the loss of key professionals or partners;
- Less instability due to variation in workloads and downturns in the economy;
- Ability to offer turnkey projects;

Despite these numerous advantages, the number of large firms based in Canada is relatively small. This suggests that several of the above factors are limited in their degree of importance and also implies counter benefits to smaller firms, likely relating to lower overhead costs during low-demand periods and better flexibility.

2.7 Differentiation vs. Homogeneity of Service Offerings

Small firms often offer differentiated services based on a narrow focus of technical specialty within a specific industry or type of analysis. This narrowness of focus naturally limits their size. Medium sized firms typically provide more general services and compete in limited geographical areas with a value proposition based on low overhead and personal relationships with clients. Large firms can somewhat differentiate based on their ability to add specialists to their base generalist workforce by achieving high enough overall volume to ensure adequate utilization of specialist services. In addition, large firms may also integrate procurement and construction services. However, the overall service offering of the majority of large consulting engineering firms is still relatively homogenous.

2.8 Key Competitors

There are numerous consulting engineering firms competing in the local market. Competition may be broadly broken along the following dimensions: size, geographic coverage, industries served, number of disciplines, and specific services offered. In addition, competitors may also be characterized by related vertical integration into such activities as procurement and construction (EPC firms), equipment manufacturing, and software licensing.

Large multi-national industrial consulting engineering firms with a significant presence in Western Canada include companies such as Bantrel, Fluor, Amec, Sandewell, Colt, Jako Porey, Earth Tech, CH2M Hill, Wardrop, and Veco. Each of these companies employs hundreds or thousands of people worldwide and have completed projects in a wide range of settings.

Examples of local mid-sized industrial consulting engineering companies include Duncan, UDL, Calc, Hipp, Noram, and A.H. Lundberg. These companies range in size from fifty to one hundred people. Many of them also generate profit through engineering related activities. For example, in addition to selling engineering services on a billable hours basis, A.H Lundberg also sells fabricated vessels and UDL develops and licenses industrial process related software.

There are also numerous small commodity based companies ranging in size from a single individual up to ten people working roughly in cooperation. These companies generally do not encompass all of the multi-discipline expertise required to fully complete a project and often partner with other companies at the client's behest.

3 INTERNAL ANALYSIS

3.1 Strategy Overview

The pattern of Fransen Engineering's growth to date is common in the consulting engineering industry. Small engineering consulting firms tend to be specialized and focused. With this specialization, they are able to differentiate their services on the basis of depth of knowledge and, as a result, command a price premium. This was true for Fransen Engineering during the early years when the company was highly focused on electrical drive design for pulp and paper clients.

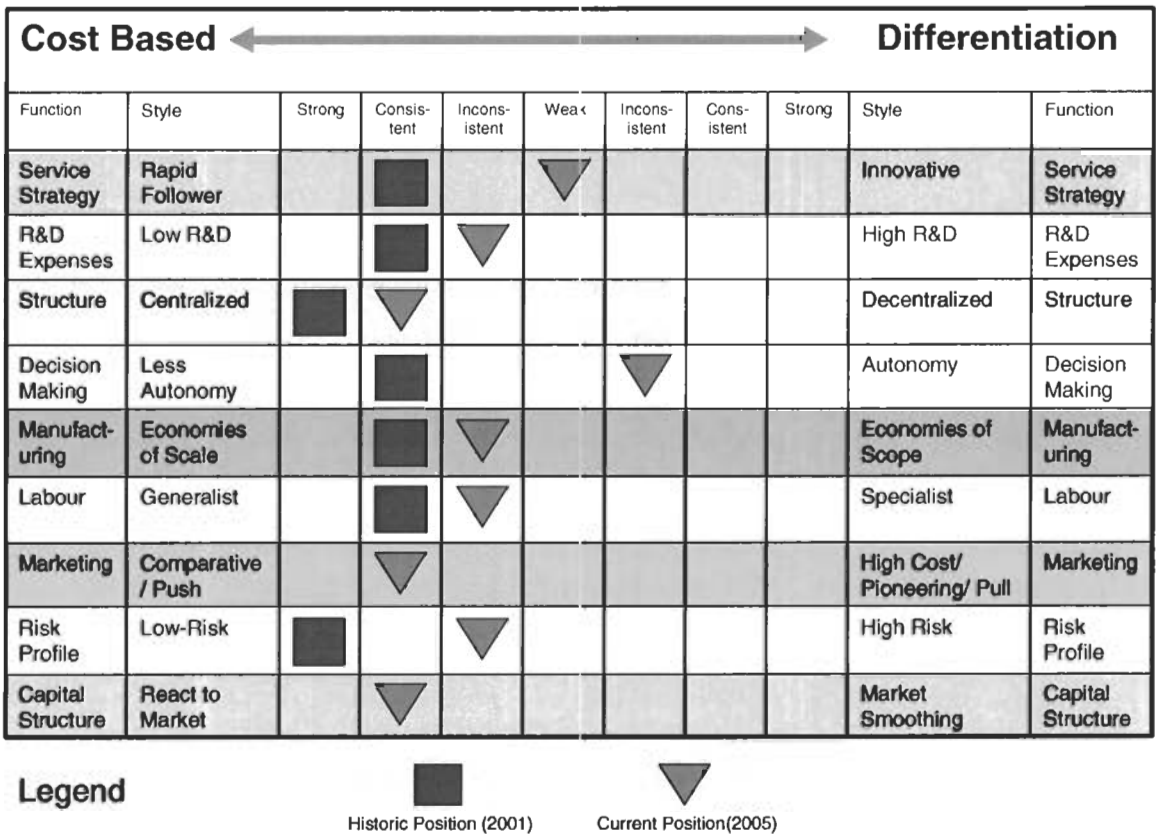
As companies grow to medium size, as Fransen has, they tend to become more generalist as they seek to offer multiple disciplines and hedge against sector slowdowns by diversifying their client base across multiple industries. Competition becomes price based for commodity-like generalist work as there are many competitors offering adequate quality. Companies that become large (over 100 employees) can support differentiated and price premium knowledge specialization in several disciplines and industries while maintaining a layer of generalist employees for commodity portions of projects.

Prior to the retirement of its founder, the company followed a consistent cost-based strategy. After his retirement, the degree of employee decision-making autonomy increased significantly. As a result, several previously strong cost-based strategic functions drifted towards weaker positions. This is evident in the growing shift from commodity-type projects based on well-established knowledge towards several divergent areas of specialization, each offering potential for differentiation.

3.2 Strategic Fit

The following figure summarizes Fransen's alignment with respect to the two main generic strategies (cost-based and differentiated) at the time of the Founder's retirement (2001) and presently (2005).

Figure 6: Strategic Fit in 2001 and 2005



Source: adapted from Porter, M.E. (1996)

3.2.1 Service Strategy

Fransen provides services that are required to implement construction projects within industrial settings. These services typically include engineering design and project facilitation activities. Traditionally, the majority of the projects that Fransen undertakes are re-application of

existing solutions. This type of project is relatively commodity like in nature and does not require a great deal of specialization.

Since the retirement of the Founder, individual employees have enjoyed greater freedom to pursue different types of projects. Recently, for example, a new employee with a background in paper machine design began pursuing a large and specialized project despite the fact that Fransen lacks established expertise in this distinctive area. At the same time, another employee is penetrating deeply into the oil sands sector in Alberta. Initially this penetration was through commodity type projects, but recent projects with this client are becoming larger and more specialized.

Fransen's service strategy is currently an inconsistent mix of the company's traditional commodity type projects with several specialized projects in scattered areas, which have been championed by individual employees. As a result, the company's previous relatively strong cost-based service approach has weakened.

3.2.2 Research and Development

Research and development (R&D) for Fransen Engineering takes the form of tools to aid in the efficiency and quality of engineering services, both with respect to design generation and project implementation. As a consulting engineering company, information technologies that allow data, information, and knowledge to be leveraged by the company's employees are the primary focus of development efforts.

Under the Founder, such development was tightly controlled. The Founder preferred traditional approaches to storing and accessing information that placed an emphasis on the skills of individuals. With the new generation of management, a series of initiatives have sprung up including a Web Portal for facilitating communication with site staff and clients, a custom quality

control database to facilitate sharing of information amongst employees, and a timesheet database utility that allows for greater budget control and provides useful information for future cost estimating.

The R&D initiatives that have emerged in the wake of the Founder's retirement have all begun through grassroots initiatives by non-management employees. Progress has been slow and difficult as management has been reluctant to devote overhead hours to R&D expenses. Nevertheless, investment in development of these tools is beginning to grow despite the lack of a consistent strategic vision to guide the individual initiatives. As a result, Fransen has moved from a consistent low R&D expenditure position, to an inconsistent position wherein R&D expenditure is sporadic and poorly focused.

3.2.3 Structure

The company was highly centralized under the Founder, who guided all work and made all financial decisions. In the more relaxed atmosphere following the Founder's retirement, departments relating to different disciplines have become more independent resulting in a growing shift toward decentralization.

3.2.4 Decision Making

The culture at Fransen Engineering with respect to decision-making underwent a large shift following the retirement of the Founder. For the majority of his career, the Founder kept tight control over both strategic and operational decisions. Towards the end of his tenure, his grip over financial decision making tightened as buyout negotiations with the next generation of managers became protracted and embittered. Once the buyout was complete, the new generation of managers immediately loosened the atmosphere at the company with respect to decision-making. A conservative approach towards financial decisions has, however, been maintained as the traditional low overhead cost structure restricts expenditures that are viewed as non-essential.

The increase in autonomy of employee strategic decision-making is the primary factor that has dislodged the previously solid cost-based functional strength. In the absence of a formal strategy, individuals are choosing to pursue all opportunities. Although the firm's employees appreciate a high level of autonomy, the lack of an overall strategic direction to guide decision-making often results in frustration for middle managers.

Generally limiting autonomy of operational decision-making is a hallmark of a strong cost-based position. The theory being that limiting operational decision-making allows a company to utilize a greater proportion of lower skilled and, therefore, lower cost employees. In the consulting engineering industry, however, there exists a paradox with respect to cost structure and autonomy. Large firms tend to have the greatest extent of standards and procedures, which limit operational decision making autonomy and allows a lower skill level of employee to be utilized. It would seem that the cost of implementing and maintaining these standards coupled with the resulting loss of operational flexibility outweighs any salary related savings, as costs for large firms are typically the same or higher than those for medium and smaller firms. The increased flexibility resulting from the greater operational decision making autonomy that is possible with a higher level of average employee is a common advantage of small and medium size firms.

3.2.5 Manufacturing

Before the shift towards several areas of specialization, the company was able to capitalize on economies of scale associated with repeating established design and facilitation steps for commodity-style projects. Economies of scale are lost as workload shifts from commodity to specialized projects. If the company decides to adopt a specialized strategy, a critical mass of work within these specialties must be maintained in order to capitalize on

economies of scope. This would be in keeping with the apparent successful strategies of larger consulting engineering firms.

3.2.6 Labour

Employees within consulting engineering firms may be broadly classified into generalists and specialists. Specialists have greater depth of experience in a narrower subject field and can command a price premium, but the demand for their services is less broad and is often geographically dispersed. Several of the new employees hired since the retirement of the Founder have much more specialized skills than the employee pool that was established by the Founder. These new employees specialize in different industry and discipline sub-sets and are contributing to a growing divergence between cost-based and differentiated services within the company's offering.

3.2.7 Marketing

Despite the shift towards more specialized services, the company's marketing message has remained consistently comparative. The fundamental marketing message is that the company offers comparable quality to larger consulting firms, but is more cost effective. This message has remained consistent over the majority of the company's existence, including the years since the Founder's departure.

3.2.8 Risk Profile

Under the Founder, the company was highly risk averse. Incentive based contracts were avoided and currently fashionable Engineer-Procure-Construct (EPC) opportunities, which offer high risk and potentially high returns, were routinely dismissed as a matter of course. Since the Founder's retirement, senior managers have begun to seriously consider several EPC

opportunities for the first time, which signifies a shift away from the previously strong risk-averse stance.

3.2.9 Capital Structure

Fransen Engineering is not a publicly traded company and, like most competitors that are similar in size, generally operates without significant debt. As a result, the weighted-average-cost of capital for the company is an insignificant indicator of strategy. Of greater significance is the company's approach to market trends. Currently, when there is not enough work to keep employees billable, they are quickly placed on temporary layoff and eventually permanent layoff, if necessary. This helps the company to maintain its low overhead position and has remained a consistent strategy following the Founder's retirement. If the company decides to shift towards a differentiated strategy based on specialized service, a capital structure that allowed specialists to be retained through slow periods would be required to avoid losing specialization gains during these periods.

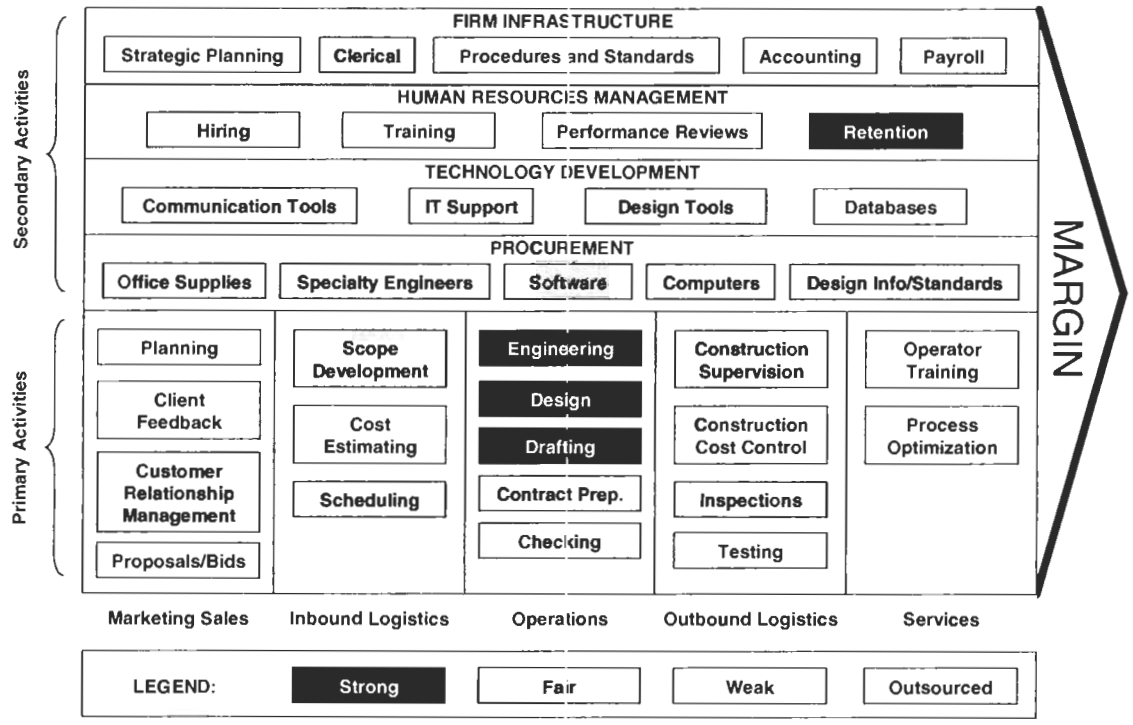
3.3 Firm Level Value Chain

Fransen's value chain spans the engineering related portions of the overall industrial construction industry value chain and closely matches the coverage of the typical 'Consultant' (see Figure 2). These engineering activities create value for clients by developing raw project ideas into detailed plans. The downstream procurement and construction portions of the industry value chain then implement these plans. For return-on-investment (ROI) projects, the final physical project is then operated in order to generate a revenue stream. The value of the project is the time discounted future profit stream associated with the revenue stream less the engineering, procurement, and construction costs associated with the project.

The value chain for Fransen is represented in Figure 7. Fransen's services are centred on the detailed design phase, but they often spread up the value chain because engineering input is

required into early financial analysis related work associated with project development. Engineering related services also spill downstream by virtue of construction input and guidance. For Fransen, however, these spill over effects are exclusively related to technical engineering related input and do not include items such as financial analysis, procurement facilitation, and physical construction.

Figure 7: Firm Level Value Chain



Source: adapted from Porter, M.E. (1985)

3.3.1 Marketing and Sales

Fransen does not currently engage in any formal marketing planning process. Decisions are made by project managers in the midst of their work and, consequently, the decision making process is largely reactionary. As a result, marketing communication and the promotional mix is often muddled with different individuals pulling the company's marketing message in different

directions. Without specific targeting of market segments and with the lack of a formal process to understand the needs and desires of clients through customer feedback, Fransen typically reacts to the needs of clients as opposed to anticipating them.

The company's main marketing strength is in maintaining strong customer relationships, which is achieved at an individual level with a cultural emphasis on establishing strong professional ties with individual clients. As Fransen's customer relationship strength is entirely culturally based, performance levels are not consistent across the company. This prevents customer relationships from being a strong source of competitive advantage for the company.

A single manager is currently tasked with 'Business Development' for the company. This is misleading, however, as in actuality the majority of business development is carried out by project engineers and the business development manager actually fulfils more of an overall customer relationship management role.

Fransen secures roughly one quarter of its work through competitive bidding, which is significantly lower than the industry average of fifty percent (ACEC, 2002). This is partially a result of the emphasis on personal-level customer relationships, which results in the fact that a large number of Fransen's projects are single-sourced. Perhaps a greater contributing factor, however, is the company's focus on small projects, which are sole sources much more frequently in comparison to larger projects.

The process for putting together proposals and bids at Fransen is highly un-standardized, with numerous individuals generating the required documentation on an infrequent and sporadic basis. This results in varying quality and wasted effort, as individuals fumble around searching for old proposals from which pieces may be borrowed and patched together.

Marketing is currently misunderstood at Fransen, as there has been a lack of expertise and formal training in the field. The term 'marketing' is associated in most employee's minds with 'business development,' which in turn is associated with the awkward task of cold-calling potential clients. Establishing a good relationship with individual clients, in contrast, is seen as a 'clean' form of business development, resulting in Fransen's better performance in this regard. The result is that the company is missing an opportunity to add value for its clients by proactively seeking to better understand their conscious and unconscious needs.

3.3.2 Inbound Logistics

As a consulting engineering company, Fransen Engineering converts raw information in the form of gross project objectives into detailed design information that may be used to facilitate the physical enactment of a project. Inbound logistics for Fransen, therefore, relate to the collection and organization of project objectives into detailed project requirements. These activities generally relate to the feasibility study and preliminary engineering stages of the overall industry value chain for industrial construction projects (see Figure 3). The output from these stages form the roadmap for the remainder of the project.

The primary function associated with establishing project requirements is to determine the physical scope required to fulfill the project objectives. Communication is essential during this phase in order to gather information from all stakeholders who are involved with the project. Currently Fransen is adequate at establishing the technical aspects of its projects; however, like many Consultants, Fransen typically does a poor job of relating the technical aspect of its projects to their Client's business needs. This often leads to a lack of focus during project execution that can undermine the detailed design stage of the project.

Cost estimating and scheduling are closely associated with project scope definition. Clients utilize cost estimates and schedules in order to refine and optimize the scope of projects.

Fransen is relatively weak when it comes to cost estimating as it lacks formal procedures and stored historical data. Estimates are created by individuals based on their personal experience and the shared experience of co-workers. Fransen is more proficient when it comes to scheduling, which follows more directly from the technical engineering aspects of projects.

Further upstream integration into the inbound logistics associated with feasibility studies and preliminary engineering would contribute to more efficient detailed engineering, which has the potential to enhance the company's cost-based position. The skills that would be required are a natural extension of Fransen's existing core competencies.

3.3.3 Operations

Fransen Engineering's core competencies are in the detailed engineering portion of the industrial construction value chain. During this phase, project requirements established during the preliminary engineering phase are converted into fully defined information that is used in the downstream procurement and construction phases. The final products of detailed engineering are drawings and contract documents that may be bid or assigned to Contractors for procurement and construction.

On the downstream side of the detailed design operations, a lack of strong formalized checking procedures contributes to some inconsistency in the final product. In addition, the company has limited strength related to the commercial aspects of contract preparation. The main threat to Fransen's detailed design core competencies is, however, that despite the quality of the detailed design effort itself, poor preliminary engineering (inbound logistics) leads to misguided detailed design. The result is efficient execution of a poor plan.

3.3.4 Outbound Logistics

Once the detailed design for a project is complete, equipment and materials are procured and the design constructed. The detailed design documentation that Fransen Engineering generates moves down the industrial construction value chain to facilitate these actions. To date, Fransen has never participated directly in the procurement of equipment and materials, although some other Consultants provide this service. This is significant given the fact that 50% of project costs are generally related to equipment purchases. Optimizing the procurement process, therefore, offers significant potential for adding value to projects by virtue of cost reductions. Fransen's outbound logistics are instead focused on ensuring the accurate construction and implementation of its designs.

Fransen is involved in construction supervision and cost tracking to some extent for most of its projects. This involvement includes working with Contractors to interpret detailed design documents, resolve conflicts, and contribute to the efficiency and safety of the construction effort. Fransen is adequate with respect to supervising the construction of its designs, but procedures and tools for cost control are lacking. This cost control weakness is significant given the fact that roughly 35% of total project costs are typically associated with construction.

Inspections relating to finished construction are a pre-requisite for Consultants. As with most Consultants, Fransen out-sources the testing associated with inspections, as it often requires expensive equipment such as radiographic units, and specialized knowledge. Fransen handles the management of inspections adequately.

Despite the potential for capturing greater margin and feedback to reinforce detailed engineering core competencies, significantly greater integration downward along the industry value chain into procurement and construction activities is not recommended. This is because the

skills that would be required do not fit well with Fransen's core competencies and feedback may be effectively achieved without full involvement.

3.3.5 Services

The final product at the end of the industrial construction value chain (see Figure 3) is a project constructed based on the engineering design created by Fransen. In order to add value to the final constructed project, Consultants can offer training for the Client's operation staff in order to optimize their use of the new facilities. In addition, Consultants can troubleshoot the operation of the facility and address any complaints or lingering issues. Fransen has historically been weak in these regards as it lacks experience with respect to actually operating the facilities in which the company's projects are implemented, and therefore can only offer limited assistance at the end of its projects when they become operational. This is a significant deficiency given that a small amount of service at this stage can have a large impact on both the perceived and actual value of the project.

3.3.6 Firm Infrastructure

Necessary clerical work is carried out adequately with minimal investment. This contributes to cost-based strategy strength without significantly jeopardizing core detailed design competencies. However, if investment into clerical support is curtailed any more than it already has been, the company will be at risk of undermining its cost-based strategy as a result of shifting low level tasks to high cost engineering employees.

Payroll services for the firm are outsourced while a small accounting group collects billable hour information for feedback to project engineers for cost control and export to the payroll firm. Under-investment in software tools to improve the efficiency of accounting information feedback to the project engineers is a hindrance to the companies cost-based strategy,

as project engineers must spend significant amounts of time gathering information and updating engineering budgets.

Fransen currently does not invest significantly into developing procedures and standards. Although this sometimes impacts the efficiency and quality of the design effort, the ability of Fransen to draw on outside procedures and standards somewhat mitigates these detrimental effects. Minimizing investment in this area, therefore, is likely a good decision contributing to Fransen's cost-based strategy.

The biggest concern with regards to the firm's infrastructure is the lack of investment in the form of otherwise billable time by senior management towards strategic planning. Although keeping even the most senior managers highly billable optimizes short-term revenue, it also limits the extent to which strategic actions can be taken to reinforce the company's cost-based strategy.

3.3.7 Human Resources Management

Fransen does a reasonable job of hiring employees and a good job of retaining them. This is due in large part to an open, trusting, and empowering culture. Areas where the company is weak with respect to human resources management include both professional development, and the utilization of performance reviews to focus the development and contribution of employees. Investment into these areas is likely currently sub-optimized from the point of view of minimizing Fransen's total service costs.

3.3.8 Technology Development

Fransen has recently made some investments into communication tools that enable employees to share information. This has added value to the company's offering without great expense by leveraging the knowledge of employees. Investment into formal databases as a means of more knowledge leveraging has been much lower. It is debatable, however, whether large

investment into formal databases is warranted as informal communication based knowledge leveraging may accomplish many of the same goals. Investment into accounting system technology is certainly sub-optimised, however, as costs associated with extracting and analyzing information for the purposes of internal manpower management are significant.

3.3.9 Procurement

For the most part, procurement of materials and tools does not offer a significant opportunity for competitive advantage or added value. Procurement of office supplies, software, computers, design information and standards represent a relatively small part of company costs and these items are relatively standard across the consulting engineering industry.

Procurement of specialty engineering services, however, does provide a significant potential for competitive advantage and an opportunity to add value for clients. Differentiated consulting firms often add value by incorporating a higher proportion of specialists into their companies. Fransen utilizes an established network of specialists who are available to work on an as needed basis. This allows Fransen to efficiently match detailed skills to project requirements without having to retain expensive specialized labour that would erode the company's cost-basesd structure.

3.4 Company Structure

With the company's relatively flat structure, nearly all major decisions are made as a consensus between all three majority owners. The managers who are in place for the structural, electrical and instrumentation departments generally assist in operational decision making associated with project work and also provide input to business related decisions. Currently, a mechanical department manager is conspicuously absent, especially given the fact that this is now the largest department at the company (see Figure 2).

In practice, the only clear evidence of the power structure at the company is with respect to approving overhead expenditures. All overhead expenditures, from training to office supplies, must currently be approved by the president of the company. Decision making for both client work and internal initiatives that do not require overhead expenditures is decentralized. As a result, the overall power structure within the company is informal. If Fransen grows and decides to implement a more focused strategy, however, a more distributed structure will be required in order to allow for more efficient decision making and control.

3.5 Company Culture

The culture of the electrical and instrumentation departments (E&I) at Fransen Engineering differs significantly from the culture of the mechanical and structural departments. E&I employees are generally quieter and less likely to offer strong opinions. This is due largely to the fact that the Founder tightly controlled the electrical and instrumentation departments up to the time of his retirement. His autocratic leadership style discouraged contribution outside of core client related work. As a result, the electrical and instrumentation department lost several promising self-motivated individuals when the Founder was in control.

In contrast, the mechanical and structural departments were afforded much more freedom under the Founder's tenure. This is because the Founder, who was an electrical engineer, viewed the mechanical and structural departments as an adjunct to the company. George Mitchell, who was manager of the mechanical department prior to becoming vice president of the company, was afforded much more freedom to run his department with respect to most issues. Overhead expenditures were, however, a notable exception.

The culture of the mechanical and structural departments under George Mitchell encourages individual initiative. This is reflected in the individuals who may be currently found

within the department and is a major reason that the mechanical department has surpassed the electrical and instrumentation departments in size.

Since the Founder's retirement, the resulting increase in the level of decision-making autonomy represents a bigger change for the electrical and instrumentation departments. However, a quiet and somewhat submissive culture is deeply engrained. Whereas the mechanical department's desire to avoid the Founder's attention previously prevented full integration of the two sides of the company, it is now the difference in culture that appears to be responsible for the continuing divide. Given the close relationship of the president and vice president of the company, however, greater integration may slowly naturally develop without a concerted change effort.

3.6 Financial Analysis

Utilizing ACEC reported statistics for total consulting engineering industry revenue in Canada ($6.4B), the proportion of revenue generated in British Columbia and Alberta (24.3%), and the proportion of revenue generated from industrial sectors (43%), provides a rough estimate of the approximate total western Canadian market for industrial consulting engineering of $669M/year (ACEC, 2002). Based on revenue, Fransen Engineering share of this market is approximately 1%.

As is common with consulting engineering firms, revenue generation at Fransen is solely through billable hours. The split of manpower between the disciplines may be used to approximate the revenue generation split between discipline departments (see Table 1.1). The majority of costs are payroll related. Other costs include: accounting services, information systems, business development, human resources, management, rent and miscellaneous materials.

Table 1.1: Employee Distribution by Department

DEPARTMENT	# OF EMPLOYEES & MANAGERS
Mechanical / Process	25
Instrumentation and Controls	18
Electrical	12
Structural	6
Support Staff (IT/IS, Accounting, Business Development, Human Resources, Administration)	9
TOTAL	**70**

Given that the profitability of consulting engineering firms tends to be relatively standard regardless of size (ACEC, 2002), the ratio of individual charge-out rates to raw payroll costs provides a good indication of a firms overhead spending. Fransen Engineering's average ratio of 2.0 is significantly lower than the industry average figure of 2.4 (ACEC, 2002), indicating low overhead expenditures.

All aspects of Fransen's cost structure are consistent with a cost-based strategy in the short term with the exception of salaries for employees who carry out primary activities. These salaries are in the mid range for the consulting industry. Costs associated with support activities are especially scrutinized and limited, which is why competitive salaries are required to obtain a reasonably high level of employees who are capable of functioning with a high degree of operational decision making autonomy.

3.7 Competitive Advantage

3.7.1 Small Project Focus

Fransen has historically completed primarily smaller projects. As a result, the company's structure and employees are naturally inclined towards the implementation requirements of small projects. The distribution of skills required for the execution of large and small projects differs significantly. For large projects, project management becomes a distinct role and requires greater depth with respect to financial and contractual skills. For smaller projects, project management is weighted more towards technical proficiency and the ability to efficiently allocate resources amongst multiple dynamic small projects.

Currently, there is a pronounced lack of medium or large consulting engineering firms in Western Canada that focus specifically on small projects. This is because there is a natural tendency for companies to gravitate towards bigger and more glamorous projects. Small companies generally focus on small projects, but these companies usually lack the breadth of experience to provide efficient services, especially when the projects require the involvement of multiple-disciplines.

Fransen's competitive advantages centre on the efficient execution of small projects. This advantage is reinforced by the company's emphasis on core engineering and design activities, which are proportionately more important for small in comparison to large projects. Conversely, the company lacks the financial and contractual core competencies that are critical for large projects.

3.7.2 Cultural Strength

The ability of companies to attract and retain key employees is a key success factor of the industry. Despite the differences in the cultures of the E&I and mechanical/structural departments at the company, the overall prevailing attitude amongst employees is that Fransen

Engineering is a good place to work. This is due to the fact that salaries at the company are competitive and also because the company's focus on small projects means that the hiring and firing cycles that are prevalent at large companies are much less pronounced. This results in a sense of trust amongst employees regarding long-term employment stability, which contributes to improved retention.

The empowering culture of the mechanical departments is another source of competitive advantage. A good example of this is the mechanical department's weekly meeting system, wherein different members of the department take responsibility for determining the resource requirements for the upcoming week and then leading a meeting of the entire department wherein everyone gets involved in resource allocation. Through this process, everyone within the department contributes to solving and gains an appreciation for the significant challenge of efficient resource allocation amongst multiple dynamic small projects.

4 ISSUES

4.1 Direction

Porter (1996) states that "Attempts to compete in several ways at once create confusion and undermine organizational motivation and focus." (p.76). Although it was not clearly articulated, the company enjoyed a focused cost-based strategy under the tight control of the Founder. Since the Founder's retirement, this focus has begun to drift. The recession that followed the Founder's retirement greatly contributed to strategic drift, as the new owners were forced to grab at any available projects in order to retain core employees.

Despite recent improving demand for consulting engineering services, the current culture of the company encourages employees to pursue all opportunities, regardless of industry, size, or fit with company's core competencies. Once a strategy for the company has been articulated, the greatest implementation challenge will likely be related to maintaining discipline with respect to turning down project opportunities that are not in keeping with the strategy.

4.1.1 Autonomy

The primary strategic fit misalignment at Fransen in relation to the previously strong cost-based strategy is with respect to the drastic increase in employee strategic decision making autonomy under the company's new generation of management. This has allowed several employees, mostly in the more rapidly growing mechanical department, to follow their own strategies in the absence of a unifying overall corporate strategy.

The new directions embarked upon by individual employees have caused several previously consistent cost-based strategic fit positions to drift towards inconsistent or weak

positions. This is evident with respect to the company's service strategy in that portions of the company continue to focus on commodity-based projects, while other sub-sets of employees pursue various divergent areas of specialization. Another example of strategic drift is the numerous un-organized grass-roots information technology projects that have emerged.

4.1.2 Cost-Based or Differentiated?

Both a cost-based strategy focused on commodity projects and a differentiated strategy based on targeted specialization potentially have merit. In order to develop a strong strategic position, the company must either re-establish cost-based strength contributing factors, or consciously select a limited number of specialized areas and attempt a transformation to a differentiated offering.

If the company chooses to revitalize its historical cost-based strategy, it must first place limits on the decision-making autonomy of employees. A clearly articulated strategy that explains the need for this tightening of control should be presented in order to avoid backlash and reduce the risk of losing valuable employees. As part of the cost-based strategy, the company should avoid projects that require a great deal of specialization in order to preserve a low average charge-out rate and to promote economies of scale with respect to the production of commodity type designs.

If the company wishes to move towards a differentiated strategy competing on depth of knowledge as opposed to price, it must first select specific areas of specialization. The number of simultaneous areas of specialization developed should be carefully restricted based on availability of resources. Observation of trends amongst consulting engineering firms suggest that the company would have to expand from a medium to a large size in order to successfully support multiple areas of specialization through market demand downturns.

4.1.3 Limited Resources

The company has limited labour and capital resources. Investment decisions with respect to either resource should be carefully scrutinized. For example, the decision to pursue a project often means that resources are not available to pursue the next project that comes along. This means that either the second project must be turned down or manpower will be spread thin and quality will suffer. Although this possibility is widely recognized, the prevailing attitude at the company is that all work should be pursued. This often means that services to core clients are diminished as a result of commitments to non-strategic clients.

Despite the fact that a major portion of the company's service offering is to help clients evaluate and compare projects for their facilities, Fransen currently lacks formal processes for evaluating internal investment opportunities. As a result, limited overhead resources of time and capital are generally allocated based on the priorities of whichever individual project champion is most vocal. Inefficient allocation of overhead resources has been exaggerated by the recent increase in the autonomy of individual employees.

4.2 Marketing

Fransen does not currently have a formal marketing plan and, due to an overall lack of direction, the company's marketing message is often muddled. It is common for individual employees to customize written proposals and verbal communications for the perceived needs of individual clients. This is a contributing factor to the increasing drift towards multiple new areas of specialty and larger projects.

As a result of the fact that the electrical and instrumentation departments are older than the mechanical and structural departments and have previously been significantly larger, Fransen is still primarily known as a company specializing in these disciplines. With the recent strong growth of the mechanical department, Fransen's historically strong branding as a company

specializing in E&I engineering services is being eroded. Although a change to the company's image appears natural, a strong overall direction would help to improve the effectiveness of the marketing message.

4.3 Overhead Activities

Fransen Engineering's emphasis on its core competencies relating to its operational activities (detailed engineering activities) reinforces a cost-based strategy by creating a culture of low overhead. However, this emphasis has extended to the point that overhead activities (information technology, accounting, business development, human resources and administration) are virtually ignored from a planning standpoint.

In addition to inefficient overhead investment, the culturally rooted belief that overhead is inherently undesirable serves to undermine the development of employees working in overhead departments. This is reinforced by the fact that upper management does not generally challenge or recognize the efforts of employees working in overhead departments. The result is under-motivated employees who are not contributing to their full potential.

Although Fransen Engineering's charge-out rates are low, total costs to the client are the product of charge-out rates and hours spent; therefore, a strong low-cost strategy includes not only low charge-out rates, but also efficiency of design. Low charge-out rates are much more easily observed, which creates a short-term disincentive for firms to raise overhead enough to invest in efficiency improving infrastructure. However, if a company continues to inadequately and inefficiently invest in this infrastructure it will eventually erode cost-based positional strengths, as clients gradually come to realize that the overall costs of the company's services are high.

4.4 Discipline Integration

Cultural differences between the E&I and mechanical/structural departments that were engrained during the Founder's tenure have resulted in a lack of integration between the departments. This lack of integration detracts from the efficiency of project and internal related work. In fact it could be argued that Fransen's multi-discipline service offering, far from providing improved efficiency for clients, is actually resulting in worse efficiency due to the fact that departments view internal clients from other departments as secondary to their own external clients. For example, electrical engineers are more likely to respond to the needs of a client for whom they are the primary contact rather than provide support to a mechanical engineer's project.

The cultural divide between the departments is reflected in the physical distribution of employee offices and cubicles, with E&I employees located on one side of the office and mechanical/structural employees on the opposite side. Non work-related visits by members of each department to the opposite side of the office are infrequent.

At any given time, several employees are typically at client sites on short or long-term assignments. The personal relationships and direct contact that these employees enjoy with clients creates an exceptional potential for the development of new business. Site personnel typically do a good job of obtaining new projects relating to their own discipline, but as a result of their lack of close relationships with the other departments, they generally do a poor job of obtaining new projects for other departments. In several instances, Fransen's E&I and mechanical/structural departments have worked nearly independently for the same client at the same time with surprisingly little communication.

Fransen advertises itself as a 'multi-discipline engineering company.' This implies an efficiency benefit to clients that does not currently exist. Although the lack of integration is not

immediately obvious, the underlying contrast between the inference of the promotional statement and reality has a high potential to undermine Fransen's marketing message.

4.5 Standards and Procedures

Standards and procedures help to ensure quality and improve efficiency of engineering design, support activities, and project facilitation services. They offer the potential to leverage the knowledge and experience of senior 'Star' employees. As a result, the greater the extent of standards and procedures that a consulting engineering firm has in place, the lower the average level of employee the company can justify hiring. This provides a critical advantage in the consulting engineering industry because the ability to obtain employees during market upturns is a key success factor.

Despite the advantages, maximizing the extent of standards and procedures is not necessarily a prudent goal for all companies. This is because the safety net that they create to ensure quality and efficiency of work by the lowest common denominator of employee inevitably restricts the flexibility and efficiency of 'Star' employees. In addition, standards and procedures are costly to develop. The extent of standards and procedures should, therefore, be tailored to the individual needs of companies.

Fransen Engineering currently has few standards and procedures. Those that exist are not rigidly enforced, serving rather as guidelines. This is in alignment with the company's flexible culture with respect to the core engineering activities of employees. Although this flexibility contributes to the company's ability to efficiently adapt to the requirements of small projects, the company would benefit from increased investment into standards and procedures that are focused on promoting efficiency of services.

4.6 Knowledge Leveraging

Ultimately consulting engineering companies sell knowledge. A consulting engineering firms' ability to leverage the knowledge of individuals in order to maximize the extent to which the whole is greater than the sum of the parts is a key avenue for improving both efficiency and quality. Each project that Fransen Engineering completes offers a wealth of experience and knowledge. Currently these benefits accrue almost exclusively to the employees who are directly involved in projects. This is highlighted by a few examples where new employees have carried out projects without even being aware that the company had previously completed nearly identical projects.

Infrastructure and time is required in order to facilitate sharing of knowledge. Currently there are several grass-roots initiatives underway to put in place infrastructure based on web portal, Wiki (editable webpage), and database technologies. These initiatives have been moderately successful, but they suffer from a lack of organized planning and investment. In addition, upper management has been reluctant to mandate usage of knowledge leveraging tools, although this has recently begun to gradually change. This is evidenced by upper management's recent decision to require all employees to begin using a newly developed quality control database that tracks all incoming and outgoing correspondences.

4.7 Human Resources

Employees are the key success factor of consulting engineering firms; therefore, a firm's success is directly related to its ability to attract, develop, and retain talent.

4.7.1 Attracting Talent

As a result of a flexible work environment and competitive salaries, the company has a reputation for being a good employer. Unfortunately this reputation is generally not strong

enough to attract talent without focused effort. Once the company has identified potential employees, however, it does help to convince them to join the company.

Fransen's primary method of finding new employees is through personal relationships. This has proven to be the most efficient and effective approach. During periods when labour is in high demand, the company is forced to resort to advertisements in industry and local publications.

The main issue with Fransen's approach to attracting talent is that it is ad-hoc. There is little consideration to market cycles or effort to systematically search for 'Star' employees. Searching generally begins only when an immediate need is perceived. Given the importance of attracting talent to the success of a consulting engineering firm, a more consistent and focused approach to attracting talent is warranted.

4.7.2 Developing Talent

The management of Fransen Engineering holds formal reviews for employees sporadically and the focus is normally nearly exclusively on bonuses and wages. In addition, the company does not have any formal systems for tracking or guiding the development of employees. Fransen does make some investment in professional development, but the investment is un-focused and goes to employees who are vocal in their requests.

Despite a lack of formal employee development systems, Fransen does an adequate job of developing talent as a result of the learning opportunities associated with the ample and varied projects in which the company is involved. In addition, the size and flat structure of the company means that senior management is in close contact with everyone in the company. A notable exception, however, is site personnel. Under normal circumstances, roughly one quarter of the company's employees are stationed primarily at client's site. These employees tend to be 'out-of-

sight, out-of-mind.' Their development is almost exclusively through their experience gained at site.

4.7.3 Retaining Talent

Turnover at Fransen Engineering is relatively low during periods when there is adequate work volume. The primary circumstance under which Fransen has lost good employees is during industry downturns when sufficient work to keep employees adequately billable could not be found. Fransen's financial structure does not allow the company to carry non-chargeable employees for very long, a common issue in the industry. Firms with different financial structures seem to differ only with respect to how long they can holdout before laying off employees.

Apart from downturns, employees who are stationed at client sites for extended periods of time pose the highest risk of leaving the company. Over time, these employees often 'go-native' in that they begin to identify more with the client than with Fransen. This can lead to dissatisfaction and, in several instances, has ultimately resulted in employees quitting and joining the client directly.

4.7.4 Succession Planning

The dependence of small and medium size consulting firms on a few 'Star' employees makes succession planning extremely critical. Succession issues are the most common reason that small and medium consulting firms cease to exist. Since a common characteristic of 'Star' employees is a desire for control, these employees typically require a share of ownership if the company wishes to retain them. Existing majority owners must gradually relinquish ownership to up and coming 'Stars' in order to prevent their exit so that they can continue fuelling the company.

From the point of view of majority owners, awarding ownership in the company to any employee who does not require ownership for retention is a mistake. The adversarial transition of ownership from the Founder of the company to the next generation of senior management (three individuals) resulted in shares being sold to four other individuals, only one of whom required ownership in order to ensure retention.

Compounding the problem, six of the seven individuals who own shares belong to the E&I department. This is not in proportion to revenue generation of the departments, as the mechanical department is currently the largest based on total employment and has the greatest growth momentum. In order to ensure the company remains strong as the primary owners move towards retirement and begin divesting their ownership, the primary owners must find a way to keep the next generation of 'Stars' at the company.

4.8 Financials

Management of the company does not currently regularly scrutinize the financial situation of the company in order to ensure peak profitability. Although the financial model is simple, more in depth and regular analysis of profitability would help to focus improvements.

4.8.1 Revenue

Revenue is generated almost exclusively through billable hours. Maximizing charge-out rates and the billable to total hours ratio for employees, therefore, maximizes revenue at a given staffing level. The current culture at the company effectively discourages non-billable hours, which improves short-term profitability. Charge-out rates are, however, set somewhat arbitrarily with costs and history having a much greater influence than demand.

4.8.2 Costs

Direct costs are related to payroll for the engineers, designers, and draftspeople who generate revenue. Fransen Engineering pays competitive salaries, which naturally raises the possibility of lowering direct costs by limiting employee salaries and/or benefits. Reducing compensation is not advisable, however, as the company's current structure and culture is based on a relatively high-level of employee.

The largest portion of indirect costs at Fransen is related to non-billable employees, who work on overhead activities. It is difficult to determine the effectiveness of overhead activities, as a single billing code is currently utilized for all overhead activity and there are no formal planning and control procedures in place. Other indirect costs include items such as rent, insurance, promotional materials, etc... These costs are also not regularly scrutinized.

5 STRATEGIC RECOMMENDATIONS

5.1 Direction

If Fransen Engineering is to improve, the first and most critical priority for the company's senior management is to agree upon an overall direction for the company. This direction should be clearly articulated, serve as a guide for decision-making, and focus investment of capital and human resources. Without an overall direction, the atmosphere of increasing freedom following the Founder's retirement will continue to result in individuals pursuing their own individual goals for the company. Given the current positive culture at the company, these initiatives would likely be well intentioned; however, they would also likely be increasingly un-focused. The result would be a muddled and weak strategy.

Considering Fransen's history, current staff, and the business climate for consulting engineering, a cost-based strategy focusing on the efficient implementation of small multi-discipline projects is the best fit for the company. A cost-based strategy is recommended because it is in keeping with Fransen's history, reflects the generalist nature of the services presently provided by the company, and is befitting of a medium sized consulting firm. A multi-disciplinary focus is required to set the company's service offering apart from small competitors. The focus on obtaining numerous small projects from core clients is advisable because they:

- Spread risk;
- Avoid lumpiness of resource demand;
- Are less subject to demand cycles;
- Require lower business development overhead costs;
- Require less specialization;
- Fit well with current company strengths;

The small multi-disciplinary project focus of the strategy is the unique and key aspect. There currently exists a void between small sole-proprietors who cannot offer the breadth of services required for multi-discipline projects, and large consulting firms with high overhead costs that focus on small projects only during downturns as a way to keep their core staff busy. The natural competitors to fill this void are other medium size firms. In practice, medium sized firms generally gravitate towards larger projects, which are viewed as more glamorous. The author is not aware of any medium or large sized consulting engineering firms in western Canada that aggressively focuses exclusively on small multi-discipline projects.

The key implementation challenge associated with setting a direction for the company will be how to limit the autonomy of employees while maintaining the company's cultural strength. Senior management can address this challenge by setting the overall direction and doing a good job of explaining the analysis which led to its selection, while continuing to allow a great deal of autonomy with respect to how individual employees choose to implement change initiatives.

Timing is critical to the successful implementation of the suggested strategy. During periods of high demand, small projects may be viewed as 'loose bricks' (Hammel & Prahalad, 1989) that have escaped the attention of larger competitors. By collecting small project 'loose bricks' during these periods, Fransen can build a strong position in preparation for the next demand downturn. When that downturn comes and large companies attempt to switch their focus to small projects, Fransen must be able to demonstrate a clear advantage with respect to the implementation of small multi-discipline projects. The following sections provide recommendations for addressing the company's current strategic issues based on the proposed strategic direction for the company.

5.1.1 Service Offering

Although it is enticing for consulting firms to vertically integrate down the industry value chain into procurement and construction, this is not a desired approach for Fransen Engineering as this approach would not complement the company's core detailed engineering competencies. In addition, small projects do not lend themselves well to EPC contract types, as the high transaction costs associated with establishing the EPC agreement are not justified by the relatively small project capital costs. A small investment in developing skills associated with construction cost control and operations services is, however, justified on the basis of reducing overall project cost and providing better feedback information. The resulting improvement in services provided would ultimately lead to stronger client relationship and corporate reputation.

The most significant opportunity for Fransen Engineering to improve the value of its service offering is through improving inbound logistics skills associated with the feasibility and preliminary engineering phases of projects. The skills required for these stages are relatively closely related to the detailed design skills that are the company's existing core competencies. Contributing to better early project development and organization will enable Fransen to more efficiently carry out detailed design activities, which will reinforce its cost-based strength by raising the quality of services without a significant impact on cost.

5.1.2 Growth

Fransen should grow to meet demand during industry demand upturns at the fastest possible rate that it can find employees who meet their high standards. This growth will help to reinforce the company's strategic focus on small multi-disciplinary projects, as it will allow for a greater degree of manpower scheduling flexibility. Increased volume of work will allow for a broad range of skills to be shared amongst projects. In addition, greater size will allow for a greater number of core clients in different locations and in different fields, which will allow the

company to hedge against geographical and/or industry downturns. The long-term goal should be to become a large company focused on small projects, which would be a unique position in the industry.

5.2 Marketing

A good strategy should define not only what opportunities a company should pursue, but also perhaps even more importantly what opportunities it should avoid. In order to solidify the proposed strategic direction both internally and to customers, the company's marketing message should be re-focused. This may best be accomplished by emphasizing the most readily quantifiable aspect of the proposed strategy: the size of project targeted. A suggested marketing message that highlights this focus is "Fransen Engineering specializes in the efficient implementation of small (less than $5M) multi-discipline projects in industrial settings."

Strictly limiting the company to a certain size of project may seem somewhat arbitrary. In addition, it will require a significant cultural change with respect to business development, which has previously stressed developing all opportunities as a means of minimizing the risk of not having enough work to keep employees busy. The benefits of a strict limitation, however, are that it would prevent strategic focus drift and clarify the marketing message. The act of declining a potential project because it slightly exceeded the $5M maximum capital cost would send a strong message to both employees and clients regarding the fortitude of upper managements resolve with respect to their strategic focus.

The first step with respect to marketing the new strategy should be a client survey to better understand perceptions with respect to differences between small and large projects. This will provide ideas for potential avenues of developing further competitive advantages with respect to small projects.

Once it is felt that Fransen has established enough clear advantages with respect to small multi-discipline projects, a concentrated media campaign should be carried out. The campaign's focus will be to re-brand the company in alignment with the new strategy. The challenge will be to build upon previous brand strength with respect to electrical and instrumentation discipline work while clearly signifying a distinct change in direction.

5.3 Overhead Investment

Apart from merely communicating a strategic focus on small multi-discipline projects, Fransen must also continuously strive to become more efficient at the actual implementation of this segment of projects. To help achieve this, the company must cease treating overhead as something inherently bad that should be minimized and instead approach it as an investment towards strengthening the company's strategy. All overhead investment should be considered with respect to the strategic direction.

A yearly budget planning process should be implemented for the company's overhead cost centres: Business Development, Information Technology, Administration, Knowledge Leveraging and Human Resource Department. The yearly budget for each department would include ongoing items such as reception services and IT support, but it should also include internal projects. These internal projects would be suggested by employees and developed in a similar manner to the way that company engineers develop projects for outside clients. Utilizing a common project implementation language will aid in the transition to an internal project style approach to overhead spending.

An initial collection and high-level scope definition phase should be carried out at the beginning of each budget cycle. The result would be a list of proposed projects along with a justification summary, cost estimate and schedule. From this list, senior management would pick

projects to be developed and implemented over the following year. This planning process will help to ensure that limited resources are focused on strategic priorities.

In order to efficiently implement greater overhead department autonomy, planning, and accountability, a system of more detailed accounting cost pools is required. The current method of individual employees filling out spreadsheet based timesheets should be replaced with a web-interface based database accounting software package that will allow for a greater degree of cost differentiation without requiring excessive employee time. As many of the performance metrics associated with the overhead departments are non-cost based, a Balanced Scorecard (Kaplan & Norton, 1996) approach should be considered in order to prevent an over-focus on cost and to ensure that all objectives are met.

Finally, the term 'overhead' carries a somewhat negative connotation with some employees. Simply beginning to refer to employees of indirect departments as 'support staff' as opposed to 'overhead staff' would help to change perceptions regarding the role of these departments.

5.4 Discipline Integration

As small projects require a great degree of operational flexibility, improved discipline integration is central to the proposed strategy. If the efficiency of Fransen's multi-discipline service offering does not exceed the efficiency of several small firms working together, then the company will be unable to offer a strong value proposition to its clients with respect to its chosen target market segment of small multi-discipline projects.

As the office is currently physically divided, one possibility for promoting improved integration would be to mix the offices of employees from the various discipline departments. The dangers associated with this would be in losing cluster efficiencies and in the inevitable

alienation of some employees that would be likely to occur. Based on observation of work habits, the physical cluster affect does not appear to be a significant factor in a relatively small office. It is recommended, therefore, that a greater degree of physical integration be gradually implemented as workspaces become available.

Another potential means of improving multi-discipline performance is to create distinct technical and project management groups. The technical groups would fall along traditional discipline lines and would include designers and engineers who focus explicitly on a single discipline. At the same time, a program should be put in place to identify potential project managers. Once selected, project managers should be given high-level training in the disciplines in which they do not already have background knowledge.

The result could be cross-trained project managers who would have a good understanding of what technical resources are required from each of the disciplines to complete projects in their entirety. Apart from promoting discipline integration, cross-trained project managers would be more efficient at managing small projects, wherein the balance of technical to project management skills is weighted further towards technical skills in comparison to large projects. The cross-trained project manager approach would, therefore, become a marketable advantage for Fransen Engineering with respect to small project efficiency.

Involving all employees in strategic planning would further promote discipline integration and help to achieve buy-in regarding the company's strategic direction. A series of joint strategic planning sessions should be held by managers to help launch a new strategy, with monthly or bi-monthly town-hall style meetings held afterwards to aid in refining and adapting focus.

Finally, simply encouraging more social events wherein employees from different disciplines interact with each other would help to improve integration. Currently social events

are usually segregated along discipline lines. A goal of the human resource department should be to encourage employees to set up social functions that are open to employees from all departments.

5.5 Standards and Procedures

Increased investment into standards and procedures is required in order to improve efficiency and reinforce the company's cost-based strengths. The selection and extent of standards and procedures must, however, be carefully scrutinized in order to protect the company's flexible culture. This may generally be achieved by adopting standards and procedures as guidelines rather than strict templates. Cost effective development may be achieved through a program of documentation in conjunction with ongoing project efforts.

For large projects, clients will generally fully accept the standards of the consulting firm that is completing the project based on an argument of improved efficiency. For small projects, clients who posses their own internal standards generally prefer or insist that they be adopted by all consultants. Fransen's standards and procedures must, therefore, be flexible in order to allow for the use of different client standards while seamlessly filling gaps.

There are a great number of standards and procedures that address the management of large projects. A common criticism of clients and consultants, however, is that many of these standards and procedures do not scale well to small projects. In order to further develop a competitive advantage with respect to small multi-discipline projects, Fransen should consider developing standards and procedures specifically for the management of small projects. Developing these standards and procedures in conjunction with a web-based interface would offer further branding potential.

5.6 Knowledge Leveraging

Research and development expenditures under a low-cost strategy should be focused on improving efficiency of design efforts by facilitating knowledge sharing in order to firmly entrench a cost-based advantage. The challenge with respect to improving cost-based advantage through improved efficiency is that short-term overhead costs must increase in order to provide the capital for investment in infrastructure, such as databases. A delicate balance must be maintained, but a strict focus on infrastructure that will reduce operating costs for implementing small multi-discipline projects will help to ensure wise investment.

Several of the grass roots Information Technology (IT) projects that have sprung up in the years since the Founder's retirement are focused on improved knowledge leveraging. One such initiative is an Internet portal that helps to facilitate communication amongst employees and clients, and also uses editable webpages (Wikis) to allow information to easily be added and updated. Another example is a new quality control database that electronically stores all project related documentation and allows all employees to easily search and retrieve documents.

Recent experience with IT projects focused on knowledge leveraging has highlighted the need for overall guidance and encouragement. Without proper management of growing information stores, data becomes unwieldy and is less likely to be converted into useful information or knowledge. A system for measuring and managing knowledge leveraging efforts is required. Appointing a chief knowledge officer and adopting a Balance Scorecard system would form the basis of a good management system.

Although Fransen has a relatively stable employee base, the consulting engineering industry is typically highly transient with employees moving from company to company. Many employees are naturally averse to sharing their knowledge, as they believe that it will decrease their marketability. The knowledge sharing initiative should, therefore, also include a means of

encouraging increased sharing. A simple first step would be to include a discussion of contribution to shared knowledge during the employee review process.

5.7 Human Resources

5.7.1 Managing Cycles

The main challenge for all consulting engineering firms with respect to human resources is managing demand cycles. During high demand periods, firms compete over employees. During low demand periods, firms struggle to keep core employees as overhead hours increase and profitability dwindles.

As Figure 5 illustrates, firms can gain an advantage over competitors by anticipating demand cycles. Most prominently with respect to attracting high-level employees, Fransen should seek to aggressively hire during periods when demand is rising. Although this may at first seem too obvious a tactic to provide a source of competitive advantage, in practice most firms are reluctant to hire during these periods having just experienced prolonged periods of staff shrinkage.

A key advantage of the strategy of focusing on small projects is that they are less subject to industry demand cycles. If Fransen successfully implements the proposed strategy and establishes an advantage with respect to small project work, it should be in a position of having comparatively more work during industry downturns when large projects have disappeared. This will allow Fransen to more aggressively hire top-level employees as they come free from competitors. If the company can then hold onto these employees through the following upturns and continuing cycles, this effect will offer a long-term competitive advantage.

5.7.2 Attracting Talent

In order to gain an advantage over other firms with respect to attracting 'Star' employees, Fransen should invest more time in identifying and tracking these individuals. At the moment, this is done in an ad-hoc fashion, typically during periods of high demand when a pressing need for new employees is perceived. The problem with this reactionary approach is that 'Star' employees are unlikely to be available during high demand periods. Fransen should seek to capitalize on the less cyclical demand associated with small projects to obtain 'Star' employees during periods when other companies are forced to terminate their employment.

In order to identify 'Star' employees, managers should encourage all employees to offer suggestions. Each employee should be encouraged to review their own past experience in order to assist their memory of 'Star' colleagues. In addition, managers should continually ask perspective employees, vendors, and clients for leads. The results should be consolidated in a database.

5.7.3 Developing Talent

A greater degree of planning is required with respect to the development of talent. This applies both to work related development and outside professional development courses. In order to achieve this, a stronger human resources department is required. The human resources department should have a mandate to track individual employee development, ensure that investment and opportunities are spread equitably, and focus professional development spending on courses that are in alignment with the proposed strategy.

5.7.4 Retaining Talent

Although Fransen currently does a good job of retaining employees, the company should always be aware of the current demand situation and carefully protect core employees during periods of high demand. Professional development has proven to be a good means of retaining

talent; therefore, increased investment in this regard would also aid retention in addition to productivity. Unfortunately professional development is often neglected during busy high demand periods when the risk of employee flight is elevated.

5.7.5 Succession

The first step for upper management should be to attempt to buy back share ownership from the three new owners who do not require ownership. This is recommended as a first step as it will give upper management maximum flexibility to implement further steps. If ownership cannot be recovered from these individuals, upper management will likely soon be forced to dilute overall ownership by creating new shares in order to secure key mechanical department personnel. Pressure with respect to this issue will continue to mount if the mechanical department's superior growth continues. Loss of key personnel in the mechanical area would slow company growth and could have a significant impact on company culture.

In the longer term, a more innovative approach to ownership has the potential to provide a source of competitive advantage by virtue of improved ability to attract and retain key personnel. Options include: gradually moving towards an employee ownership model, use of a second class of shares, or introducing rigid mechanisms for share transfer into the partnership agreement. Rigid mechanisms might include a pre-established buy-out and control transfer schedule for owners based on years to retirement and revenue contribution levels.

5.8 Financials

5.8.1 Revenues

In order to improve financial performance, a better understanding of both revenues and costs is first required. To better understand revenues, an attempt should be made to compare charge-out rates to industry standards. Fransen should experiment with rate increases in order to

test market demand. As it is difficult to raise rates when industry demand increases, consideration should be given to setting rates based on high demand and offering discounts during lower demand periods as opposed to the current policy of setting rates based on the lowest common denominator. If the company is successful at becoming more efficient at implementing small multi-discipline projects and can clearly demonstrate this efficiency, clients will be willing to accept higher charge-out rates as long as they are convinced that overall costs are reasonable.

5.8.2 Cost

A greater potential for improving financial performance is through reducing direct and indirect overhead costs. The first step must be to better understand costs. To accomplish this, a more detailed system of cost accounts should be established. Currently most overhead spending is lumped under a single charge-code and further differentiation is roughly implied by the accounting department for tax reporting purposes. As measurement is a key component of control, a new cost code system should be developed to assist strategic implementation. In addition to more detailed cost codes, a Balanced Scorecard (Kaplan & Norton, 1996) system is further recommended in order to ensure that increased scrutiny of overhead costs does not result in an over-focus on short-term financial indicators to the determinant of long-term strategy implementation.

5.8.3 Profits

As medium sized consulting firms typically do not retain significant amounts of earning due to tax considerations, the full benefit of ownership of a consulting engineering firm typically includes: the difference between the salary that the owner draws compared to the salary they would draw if they did not have ownership, dividend yields, and bonuses. The ultimate measurement of the success of the proposed strategy to focus on small multi-discipline projects is whether it will ultimately result in increased profitability for the company's owners.

Increasing revenue and decreasing costs while maintaining the company's current size does not offer significant opportunities for improving profitability. As Fransen does not currently have obvious avenues of diversification that would allow for alternate means of generating revenue, the only practical means of increasing profitability is through growth. Industry statistics suggest, however, that the long-term profitability of consulting engineering firms is independent of size (ACEC, 2002). This implies that costs typically grow in proportion to increased revenue as consulting engineering firms grow.

It is the assertion of the author that this effect is the result of the natural tendency for larger companies to focus on larger projects, which are more expensive to obtain and are much more subject to industry cycles. Increased profits resulting from overhead spreading scale effects are likely eroded when companies attempt to retain staff through industry downturns.

6 CONCLUSIONS

Relative to other consulting engineering companies in the same geographic area, Fransen Engineering currently performs slightly above average primarily on the strength of a strong culture. In order to distinguish itself, Fransen must select and implement a strategy. This document recommends a strategy of focusing on small multi-discipline projects. The vision is to become a large company that focuses on small projects, which would be unique in the local consulting engineering industry.

In addition to the fact that Fransen's current situation is well suited to the proposed strategy, focusing on small projects has several other advantages relating to key success factors in the industry. Foremost amongst these is the fact that small projects are less subject to industry demand cycles, which should allow the company to better build and protect core staff.

The main challenge associated with implementation will be setting an overall direction while protecting cultural strength, which is rooted in the self motivation that results from autonomy of decision making. The key to efficient implementation is ensuring that limited resources of time and capital are expended in the most efficient way possible. In order to implement the chosen strategy, long-term goals should include:

- Targeting streams of small multi-discipline projects from core clients. Better integration between discipline departments will be required.

- Declining all multi-discipline projects with expected capital costs in excess of $5M, as undertaking larger projects will divert resources and attention from the core strategy.

- Seeking to understand how small projects differ from big projects as a means to discover opportunities to create and reinforce competitive advantages.

- Focusing all overhead investment towards becoming the most efficient consulting firm with respect to implementing small multi-discipline industrial projects. More detailed measurement and control of overhead spending is required in order to meet this objective.

- Focusing the marketing message so that clients understand Fransen's advantages associated with the implementation of small multi-discipline projects.

- Growing at the quickest rate that talented employees can be found and core clients developed. This will maximize manpower scheduling flexibility and allow the company to offer the greatest breadth of experience.

At a bare minimum, full consensus regarding the chosen strategy is required amongst the three principle owners if implementation is to succeed. It is also recommended that visioning sessions be held with all employees in order to gain buy-in and refine the strategy. If consensus can be obtained at least amongst senior management, a change management program should be developed to ensure efficient implementation. A Balanced Scorecard (Kaplan & Norton, 1996) system is suggested as a means of facilitating implementation.

Rising local demand for industrial consulting engineering services has created an excellent opportunity for Fransen Engineering to implement the suggested strategy. Efficiency of implementation is required, however, so that a strength position with respect to small multi-discipline projects may be established before the next downturn. All that is required is will and focus.

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