CHALLENGES OF GROWTH IN A NETWORK COMPANY

by

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ABSTRACT

Mark Engineering is a large network company facing challenges between growth and its small company feel. Small networks are rewarding for both individuals and companies. With growth, networks become cumbersome and costly to operate. Like effective teams, networks must remain small to be efficient. Growth tends to drive management to more traditional hierarchical structures, but such a move would undermine the value of a network organization.

Strategy and market forces influence organizational structure. Once outside environmental factors are considered, management make strategic decisions regarding resource allocation and the operational configuration that meets the market opportunity. In a network organization management can implement control systems in conjunction with incremental structural adjustments to maintain balance and harness the benefits of a network organization.

In this paper, strategic options are evaluated to improve the bottom line without transformational restructuring to a traditional hierarchical structure.

DEDICATION

Family makes all other things possible. This is dedicated to my wife Terri, and son Matthew. I look forward to being able to spend quality time with you once again.

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GLOSSARY

ACEC	Association of Consulting Engineers of Canada
APEGBC	Association of Professional Engineers and Geoscientists of British Columbia
CEBC	Consulting Engineers of British Columbia
CRT	Central Resources Team. The functions of clerical and support staff at Mark Engineering
INAC	Indian and Northern Affairs Canada
Practice Network	Mark Engineering's definition of specialized practice areas
Sole Sources Work	A method of securing consulting work without submitting a competitive proposal
Value Engineering	A method for evaluating designs based on life cycle cost analysis

1 COMPANY BACKGROUND

1.1 Introduction

Mark Engineering (ME) is a multi-disciplinary municipal consulting company with a staff of approximately 250 people located in seven offices across Alberta and British Columbia.

The areas of practice include planning, transportation, municipal engineering, landscape architecture, and Geographic Information Systems. ME provides municipal services to government, First Nations, and land developers.

1.1.1 Purpose

ME wishes to maintain the small company feel and the original company philosophy as a small network organization that emphasises strong relationships.

Individuals are encouraged to pursue areas of interest and become leaders. This creates highly motivated entrepreneurs. Highly motivated individual entrepreneurs are growth-oriented and make the 'small company feel' much more difficult to maintain. Entrepreneurial forces increase the need for hierarchy. To avoid becoming a hierarchical organization, a strategy is required to maintain the networking style.

This paper will identify strategic options that best meets the current market opportunity.

1.1.2 Professional Requirements

Various professional bodies govern the practice of industry professionals. Licensing by these bodies is required in order to practice. Professionals must certify and take professional responsibility for all drawings, reports and cost estimates produced under their direction.

1.2 Geographic Locations

ME offices are located in Prince George, Kelowna, Richmond, Fort St. John, Nelson, Calgary and Edmonton. The head office is in Prince George, BC. The administrative function is located in the head office. The administrative function includes an accounting team headed by a Chartered Accountant.

1.3 Clients

ME has a stable client base serving municipal (local) governments, provincial governments, First Nations and land developers. Sole-sourced opportunities are the focus of business development opportunities. A client 'filter' prioritizes prospective clients. The filter's purpose is to examine if a good fit exists with the prospective client. The filter ranks fit (relationship and philosophy), ability to service the prospective client, strengths, learning opportunity, and financial benefit.

1.4 Company History

After working in a structured company that was resistant to change, the founding partners had a vision of something better. In 1975, five employees of Versatile Engineering (VE) quit to form Mark Engineering (ME).

The architects of ME were deliberate in avoiding the pitfalls and limitations of traditional hierarchical structures. Embedded in the company values are the principles of trust, integrity, partnering, longevity, diversity, and shared ownership. Leadership abilities and individual 'magnitude of mission' were set as the primary factors in assessing future partners.

ME's innovative approach led to rapid growth for the first number of years. Within the first four years, the company had grown to 50 people, with offices in Calgary, Kelowna and the head office in Prince George. By 1981 ME had increased to approximately 80 people.

The period from 1981 to 1987 is characterized as the "Character Building" years. Because of the recession, ME had to part with a number of staff. By 1984, ME had shrunk to 50 people. The company managed to retain the core employees by working harder and smarter. This tough time forced diversity, resourcefulness and an entrepreneurial spirit.

The period from 1988 to 1992 has been termed the "rebound years." The economic rebound of the late 1980's positioned ME to take advantage of a growing economy. ME added landscape architecture, transportation engineering, and capital planning to the initial mix of services. In 1992, Don Peterson took over as CEO from Terry McBride.

The growth trajectory continued through the 1990's and into the new millennium. In 2005, Cameron Grant replaced Don Peterson as the third company CEO.

1.5 Current Company Ownership and Management

ME is owned by 43 partners dispersed through each branch office. The Board of Directors consists of 10 partners. The majority of partners are professional engineers, planners, or technicians. Approximately 50% of partners are professional engineers.

Each office has a Managing Partner who assumes the local branch leadership. The Branch Leadership Team (BLT) is comprised of several people including the Managing Partner. The BLT establishes office direction and makes branch decisions. There is little hierarchy below the Branch Leadership Team.

1.6 Understanding ME

Relationships are the fundamental building blocks of ME. How the employees relate to the company, to clients, and to each other is fundamental to understanding ME. ME believes in building relationships with its clients and within the communities where it works.

1.7 Company Core Strategy

1.7.1 Core Strategy

The traditional definition of strategy is the plan that a company uses to achieve its aims. ME defines its strategy as "Great People Providing Great Service to Great Clients." In this paper, the traditional definition of strategy is used.

1.7.1.1 Great People

ME literature describes great people as team oriented, proactive, motivated, self-directed employees committed to getting better, and growing in their career (ME, 2005). ME supports the development of staff by investing heavily in training opportunities for employees. ME staff are rewarded with above average compensation.

1.7.1.2 Great Service

Great service to clients is the most important element of ME's strategy. The key elements are frequent communication, listening, responsiveness, availability, attitude, enthusiasm, and creativity. ME views clients as partners in projects.

1.7.1.3 Great Clients

ME defines great clients as those that seek a long-term partnering relationship based on mutual respect and trust.

The combination of these three elements allows ME to provide integrated, innovative, holistic solutions for its clients.

1.8 Current Vision

The Vision of ME, outlined in the Employee Handbook, consists of the following three items:

1. We are the consultant of choice: Targeted clients within our chosen market area see us as trusted advisors and call upon us first for particular kinds of services.
2. We are the workplace of choice: We bring out the best in our 'folks' and are able to attract and retain the very best people in the field.
3. We are 10/10 in all Four Bottom Lines: We are consistently strong and successful in each of our Four Bottom Line areas (clients, people, finances, and organization).

The company periodically develops a vision statement to focus employees on the future. Staff visioning workshops solicit ideas from staff to create the vision. Vision 2010, the latest company vision statement, builds on the existing values and strategy.

Vision 2010 adds goals in the areas of solid finances, priority-building initiatives, and adds other visioning elements. A summary of these is shown below:

1.8.1 Solid Finances

Solid finances include the following foundational areas:

1. Capture full value for our services.
2. Strong financial performance.
3. Strong ownership.
4. Benefits for our people from our financial success.
5. Appropriate levels of investment.
6. Five-year financial plans.

1.8.2 Priority Initiatives and Additional Visioning Elements

Vision 2010 includes the following priority initiatives:

1. Growing Our Own: Attract, develop and retain personnel through meaningful career growth.
2. Creating a Learning Organization: Provide ongoing training through University of Mark (U of M), training materials, and resource development.
3. Strengthening our Professional Practice through High Performance Teams. Developing cohesive High Performance Teams with company wide resources based on our clients and Practice Networks, and strategic relationships with other companies.
4. Commitment to Excellence: Establishing a quality management system, developing technical and leadership skills, and understanding and meeting client expectations.

5. A Living Company: Continuously investing for the future while benefiting from past investments.
6. Engaging in meaningful and fulfilling work that provides long lasting contributions to the people, organizations and communities with whom we practice.
7. A strong, vibrant, resilient, creative and collaborative practice with a solid foundation reinforced by staying true to our core values.
8. A great place to work infused with positive energy and the atmosphere of excitement, enthusiasm and passion.
9. An outstanding interdisciplinary consulting company operating as a professional practice known widely for the values and impact created by our partnering approach with our clients and service partners.
10. Characterized by a culture of encouragements achieved through multiple generations working together, active coaching and mentoring, leadership, interdependence and support.
11. Populated exclusively by great people who work hard, are fully engaged, are achieving great results, are evolving to meet our clients' needs, are growing in their careers, and are working together building on one another's strengths.

1.9 Company Performance Targets and Measures

1.9.1 Performance Measures

ME measures success in a number of areas. Some are formal measures reviewed annually; others are informal measures reviewed annually. Success is measured in four areas including finance, clients, organization, and people (the Four Bottom Lines).

The financial target is the core measure of success. ME has a target profit margin of 10 %.

Formal procedures for measuring client success do not exist. Written client satisfaction surveys are not done. Indirect observation informally measures client satisfaction. Client success may be financial, or in the case of First Nations, success may mean cash flow which through a series of projects leads to infrastructure that improves their quality of life. Clients normally provide direct feedback to the project manager they deal with.

The Branch Performance Plan and the Practice Network Plan establishes the objectives of each branch office and each Practice Network (PN). Yearly plan updates are completed. Quality Assurance Review Plans measure feedback.

Individuals are monitored as revenue centres. Billable employees are measured based on meeting their assigned revenue target. Each individual has a target percent of billable hours to total hours worked. Junior employees usually have a high target, while senior employees have lower targets to account for company overhead time.

Personal Development Plans (PDP) documents individual goals for employees. Employees in consultation with their career coach develop Personal Development Plans (PDP). The purpose is to establish individual values, areas of interest, and document an action plan to achieve goals. A yearly PDP review evaluates progress, and sets new goals. Growth opportunities include attending courses and conferences that support an individual's career direction. The company provides financial support for these activities. Yearly staff surveys measure PDP effectiveness and employee satisfaction.

1.10 Top Employer Rankings

Maclean's magazine has ranked ME as one of Canada's Top 100 Employers for three consecutive years. In addition, Canadian Business ranked ME as one of the Best Workplaces in Canada for 2006.

1.11 Current Mission

The corporate mission noted in the ME employee handbook is shown below (ME, 2003, p.2):

> We exist as a professional practice to serve our clients. In carrying out this mission, we hope to make a difference through:

our work – doing worthwhile things and making this world a better place; and

our people - providing an opportunity to earn a good living while doing good work in a good working environment.

1.12 Current Systems

1.12.1 Quality Systems

Guidelines are in place for most activities to improve quality and consistency. The guidelines outline procedures and processes for client development, project review, and project completion.

1.12.2 Hiring Practices

ME has one of the most rigorous hiring processes in the industry. Over a series of interviews, an applicant must complete an aptitude test, an inbox exercise, formal interviews, and prepare a formal presentation within a limited period. The desired goal is to hire 'great people,' as described in Section 1.7.

1.12.3 Workload Planning and Distribution

Workload meetings coordinate resource allocation and communicate capacity. Engineering workgroup meetings, planning meetings, CAD workload meetings are the core mechanisms for evaluating and distributing workloads. Usually these concentrate on branch workloads, but also consider inter-branch workloads where there is cross-utilization of resources.

The CAD workload group meetings are the most specific, and the most effective. They started in 2005 in response to excessive workload demands. Each branch establishes meeting format. Meetings are held once per week. Usually a representative for each project manager is required at the meeting in order to have CAD support. One individual coordinates and allocates CAD resources to different project managers. If a project manager forgets to request resources,

or misses the meeting, he or she may have to wait until the following week for resources. Typically, managers that are more senior have more influence when seeking resources. Different offices may have different formats.

The other meetings (engineering and planning) occur on a monthly basis, usually over the lunch hour. Each person fills out work projection forms. Total work is tallied, and then staff discuss the total volume of current and potential work at the meeting. The meetings are very general, and do not get into specifics of allocation.

1.13 Organizational Structure

The division of labour at ME is mainly horizontal-based. There are no divisional structures at ME. An organizational chart has never been developed. Key structures include Practice Networks (PN's) and branch offices.

PN's are loose structures formed around client type and work specialization. There are five PN groups, which include local government, First Nations, land development, transportation planning and engineering, and water and wastewater. The water and wastewater PN includes the storm water practice and environmental engineering.

Each PN is lead by a practice leader. Work units are formed using cross-functional teams. The main responsibility of the leader is to ensure ME is growing in market profile, expertise, and knowledge.

The various project managers from each PN's draw resources from the technical core that includes the Central Resource Team (CRT), the CAD Group, and various specialists as needed to complete an assignment. Teams may be formed across PN boundaries, and across offices.

The teams' individuals report to a variety of people including the project manager, and their career coach. A direct reporting link does not exist between the PN leader and team members unless the PN leader is also the project manger for the team's project, or the career coach of a team member.

Project managers, in most instances, seek resources from the technical core on an ad hoc basis. PN Teams generally form based on the expertise needed to complete the project task with members from various functional groups. The project manager asks individuals if they would like to be on a project team, and if he or she has capacity. Project managers generally do not assign team members.

1.14 Billings

There are two methods of billing clients. Most commonly, billings are based on personal hours spent on a project at a defined charge out rate. The charge out rate includes profit and overhead. Task billing is also used. Task billing is based on the percentage of a project task completed.

Hourly employees (CAD and clerical staff) are paid time and one-half for work in excess of eight hours per day. Clients do not pay overhead premiums.

1.15 Operational Layout

The operational layout of ME is by function. Functional groupings include individual specialists, the Central Resource Team (CRT), and CAD Technicians. The CRT provides various support activities such as typing, cost tracking, report and proposal preparation. Individual project managers and technical specialists usually have their own office.

1.16 Summary

ME has grown to 250 people in its 31-year history. The company founders formed the company based on a partnering culture with strong relationships. The recession in the 1980's developed an entrepreneurial spirit that lives on today. Individuals are encouraged to follow their passion and develop leadership skills.

The company would like to maintain its 'small company feel.' This is increasingly difficult with a highly motivated entrepreneurial staff driven to succeed by seeking new opportunities. ME has a client 'filter' to verify the suitability of new opportunities, and that company capacity exists to do the work. However, the filter is subjectively used.

ME has a well developed mission and vision statement. The key component of this vision is strong financial performance, while investing in the company, the staff, and the communities it works in.

2 INDUSTRY ANALYSIS

2.1 Industry Scope

The core focus at Mark Engineering (ME) is on planning and engineering projects in a municipal setting. Landscape architecture supplements these services. The industry consists of other engineering companies who may also provide planning services as a complement to engineering services. Planning work is complementary to engineering work as it provides the early conceptual work that result in engineering work in later stages.

There are 592 member firms in the Association of Consulting Engineers of Canada (ACEC), (Compas, 2004), located in 11 provincial and territorial member organizations.

Competing companies range in size from a single person to multinational companies. (ACEC, 2006). On average, member firms consist of 128 (full time and contract employees) persons (Compas, 2004). Small firms range from 0-19 employees, medium sized firms 20-99 employees, and large firms over 100 employees (ACEC, 2004). The majority of firms are small firms, with limited economies of scope.

ACEC divides member companies into 14 major economic sectors. ME provides services in three of these sectors. These sectors are municipal engineering, water supply and sanitation, and environment.

2.1.1 Current Competition

There are approximately 200 firms across Canada operating in sectors similar to ME. This includes only firms with membership in ACEC. The Consulting Engineers of British Columbia (CEBC) lists approximately 55 firms across B.C. who perform municipal engineering

and planning consulting. In the BC Interior, ME competes with approximately 12 competitors for various areas of business (sectors): With First Nations (Federal Government), local, regional and provincial governments, as well as private land developers. In each practice area there are typically less than six direct competitors. Roughly half of all work is sole sourced. The remaining is bid competitively (ACEC, 2004).

There is little scale effect in municipal consulting. ME competes against large and small companies.

Companies with scope economies do not limit competition. ME competes against other integrated firms, as well as less integrated companies. Smaller companies may provide integrated services by hiring specialists from other companies.

2.2 Industry Supply Chain

Figure 2.1 shows the industry supply chain.

Figure 2.1: Industry Supply Chain

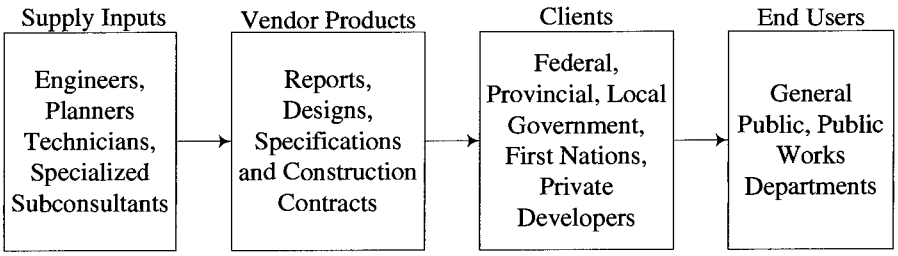


Figure by author

2.3 Industry Value Chain

Figure 2.2 shows the municipal consulting industry value chain.

Figure 2.2: Municipal Consulting Value Chain-Engineering Costs as a Percentage of Overall Project Life Cycle Costs

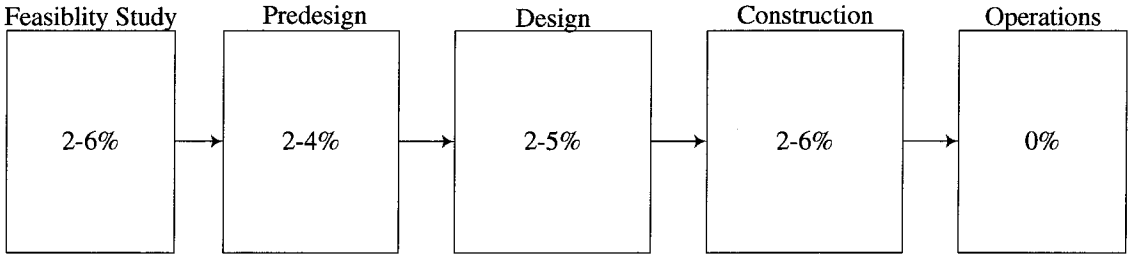


Figure by author. Data based on estimated life cycle costs for a sample of First Nations Capital Projects funded by Indian and Northern Affairs Canada

The industry value chain uses a cross section of Life Cycle Costing done at ME.

The component of engineering work (as a percentage of life cycle cost) in each phase can vary considerably depending on client requirements, and project scale. If a client elects to skip early project feasibility studies that scope out viable options, more engineering work will be required in later phases, and there will be less opportunity to minimize overall project life cycle costs.

Abbott (2005) identified the value added components for typical industrial consulting engineering projects. Abbott identified a smaller cost component of engineering at the feasibility stage (0.5%). Municipal projects engineering value chain components are different from industrial projects because of scale effects, and because projects are typically less complex. Designs that are more complex often require higher levels of maintenance over the life of the asset.

Due to the lack of scale in municipal projects, municipal consultants typically do not vertically integrate down the supply chain into construction activities. Those Engineering, Procurement, and Construction (EPC) companies that vertically integrate down the supply chain are large international companies. These large companies usually pursue large projects, and diversify by geographic expansion. These companies do not have a major presence in small

municipal projects typically found in British Columbia and Alberta. However, they may enter the local market if significant profits appear.

2.4 Industry Value Chain Components

The industry value chain consists of feasibility, pre-design, design, construction and operations activities. The various levels of cost estimates associated with each phase are described in the Appendix.

The actual phase in which a project starts is dependent on the client. Where public funds are involved, projects often will start with a study that defines the feasibility, the overall options, and approximate life cycle costs. Private developers are more likely to start at the pre-design or design phase, where overall life cycle costs are less important than market timing.

2.4.1 Feasibility Stage Studies

A client elects to complete a feasibility stage assessment of a project where there are a number of viable options. If market timing is critical, a client may skip the feasibility stage. Clients who operate an asset are more likely to complete a feasibility assessment, since feasibility scoping usually provides an optimum solution. Best solutions involve less operational complexity, better technology, or better physical location. Land developers are less likely to complete feasibility evaluations if they are not the owner and operator of the asset.

The feasibility work identifies the lowest life cycle cost option that provides the greatest value over the life of an asset. Feasibility studies use Class "C" cost estimates (see Appendix) for evaluation. Feasibility assessments for government clients often require value engineering that rates options based on life cycle cost. This analysis is required to satisfy the tax-payer that public funds are being used efficiently. The life cycle cost analysis includes an estimate of engineering, construction, and operation and maintenance costs for each option.

Figure 2.2 indicates that the engineering costs for feasibility ranges from 2 to 6 %. The majority of municipal projects completed with public funds will have a higher engineering cost. This component may be as high as 6 % (of life cycle cost) for small municipal projects with limited operational complexity. For larger projects with higher operational complexity, engineering cost will be lower (around 2 %).

Engineering cost for feasibility evaluation of large industrial projects is 0.5% (Abbott, 2005). This (low) cost reflects the significant scale, and operational complexities of industrial type projects (such as mining projects). Municipal projects are not this large, not always as complex, and therefore have higher engineering cost based on the overall life cycle cost.

2.4.2 The Design Stage

The design develops and refines the most feasible option selected during the feasibility stage and communicates how to construct the project.

2.4.2.1 Preliminary Design Activities

A preliminary design (pre-design) will be competed where there are still unknowns that may affect the work. The pre-design work sets out the design criteria and requirements that will enable timely design completion. For small projects where the feasibility study identified and evaluated all unknowns, a pre-design may not be required.

2.4.2.2 Final Design Activities

The final design stage, often just called the design phase, documents all the requirements a construction contractor needs to build an asset. The design stage includes detailed design calculations, detailed design drawings, construction specifications, and occasionally a design report.

2.4.3 Construction Services

Construction services include the tendering of a project for bidding by contractors. Services also include construction inspection, and completion documents including as-constructed drawings. An asset is turned over to the client once construction is complete and completion certificates have been issued.

2.4.4 Operations

After construction, the client or end user takes possession of the asset and assumes responsibility for operation and maintenance. Land developers sell all or components of a developed property to private interests, who then assume responsibility for operation and maintenance. Consultants rarely provide operational support.

2.4.5 Changes in Value Chain

Traditionally, engineering consultants have provided the most value at later stages of the industrial value chain, typically pre-design, design and construction. However, engineering consultants can have the greatest impact on value earlier in projects. A thorough evaluation of project options at the feasibility stage can identify the best and lowest cost option considering both the capital and operating cost of the asset.

2.5 Industry Analysis

2.5.1 Industry Success Factors

The key success factor in this industry is access to skilled practitioners with local licensing accreditation. Secondary factors are reputation and access to distribution channels.

2.5.1.1 Government Controls

A key factor in the municipal consulting industry is regulatory control by the various regulatory bodies. There are 12 professional provincial/territory bodies controlling and regulating the practice of professional engineering in Canada. Each provincial association provides the legal authorization to practice under the various provincial/territorial acts. A comprehensive peer review system controls professional practice standards.

Other regulatory bodies control other practice areas. The provincial engineering and geoscience associations are the most influential of the various regulatory bodies and represent the majority of professionals involved in municipal consulting.

The objectives of each provincial association are to protect the health, safety and well-being of the public and the environment. They also provide fair administration of the Act and Code of Ethics, and enhance the reputation of the engineering and geoscience profession.

2.5.1.2 Control of Mobility

The various provincial/territorial bodies control entry, and regulate the industry based on legislated provincial acts, bylaws, and Codes of Ethics. Licensing is limited to members who have met certain education, experience, and examination requirements.

Each provincial engineering and geoscience association strictly controls and enforces the practice of its members. Unlicensed practice is strictly enforced. Legal penalties will result for unlicensed practice.

Inter-provincial agreements have simplified the process of transferring membership between provincial professional engineering associations.

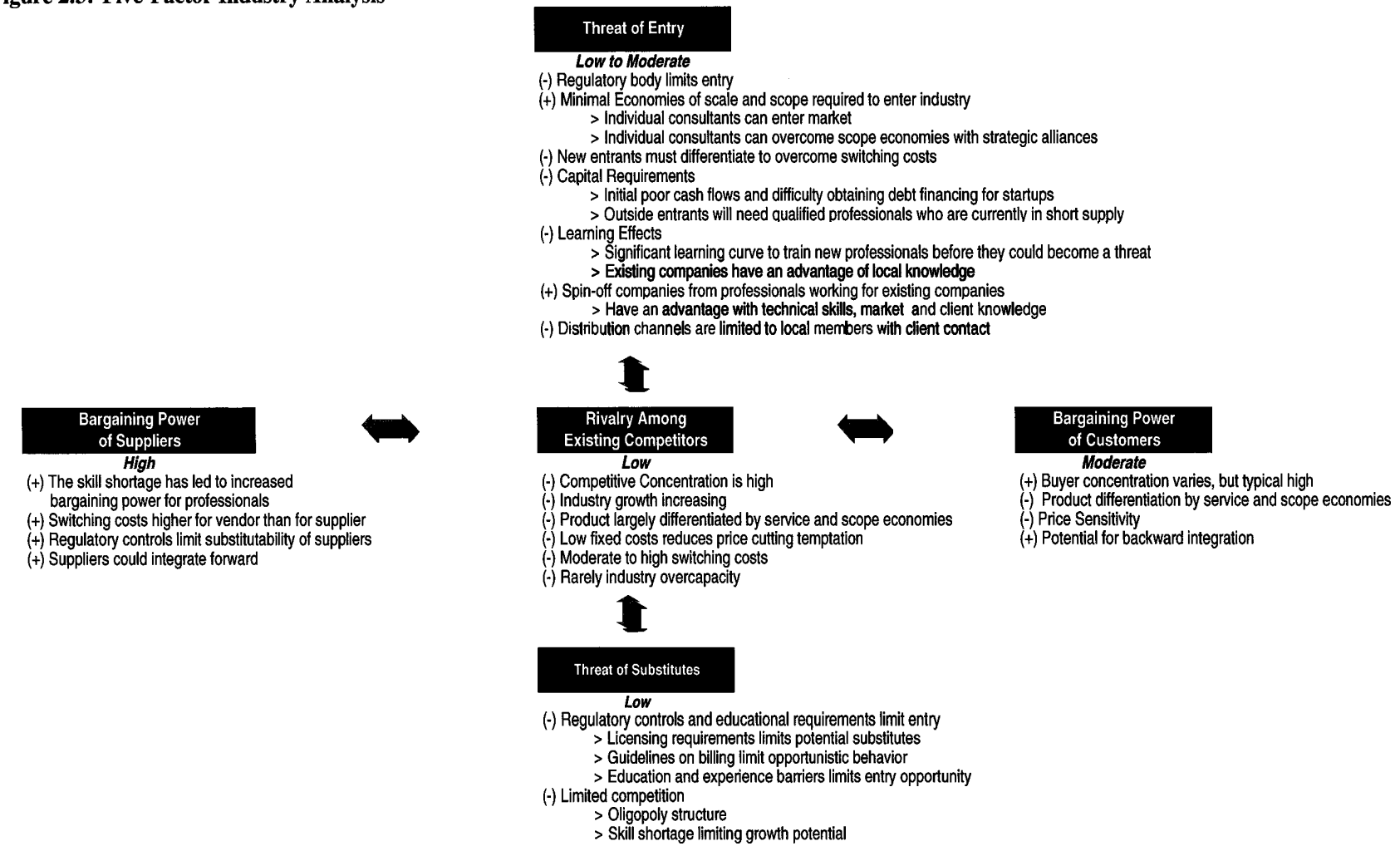
The provincial associations closely scrutinize foreign applicants before allowing practice in Canada. Applicants must have suitable training and experience before licensing is granted.

The academic credentials must meet the minimum requirements of the provincial/territorial association. A minimum of four years of professional experience is required for engineers, with one year in Canada under the direct supervision of a registered professional. This limits entrance to engineers registered in Canada. Entry by a foreign competitor is not possible without a locally registered professional on staff. The provincial/territorial bodies also strictly control market entry pricing. Anyone who provides service for less than cost may be reprimanded and may have his or her licence to practise revoked.

2.5.2 Industry Analysis

Porter's Five Forces may be used to define the factors that shape competitive strategy. Figure 2.3 shows a graphical summary of Porter's Five Forces for the municipal consulting industry. Each force is described in detail below.

Figure 2.3: Five-Factor Industry Analysis



Source: framework adapted from Buzkar (2006) after Porter, M.E. (1979), content by author

2.5.3 Rivalry amongst Competitors

Any consulting firm in Canada could become a rival if they have a professional with the training, qualifications and experiences required by the provincial/territorial regulatory body. Typically, any firm wishing to compete in a local market must hire a local professional, or bring in a professional from another location in Canada. Unless their professional has local experience and reputation, their initial market penetration will be limited.

The regulatory controls (Section 2.6.1.1 and Section 2.6.1.2), limits local competition and industry professionalism limits rivalry.

During an economic boom, most consultants have ample work through existing clients, and other sole sourced opportunities. During a boom, consulting firms are 'going flat out' on billable projects and do not have the resources to commit to writing proposals. This limits the ability of clients to obtain competing proposals, unless there is compensation for the consultants' time. Consultants prefer to seek sole sourced opportunities to reduce or eliminate the cost of proposal preparation.

During a market downturn, consultants are more aggressive in pursuit of work. New work is required to maintain core staff. If necessary, consultants will look outside their market area for opportunity.

2.5.3.1 Competitive Concentration

Even during a market downturn competition is limited in certain ways. The key driver is the limited number of skilled professionals with local experience. Typically, competition is limited to a few rivals for any one project or client.

Some individual consultants also compete. Individual consultants may operate at a lower cost by operating from home. Overall, individual consultants do not pose a significant threat because of their limited capacity.

The current competitive concentration is high. It should remain high in the future. This is due to the continued skill shortage, the length of time needed to train professionals, and time required to develop local competencies.

2.5.3.2 Market Growth

Overall market growth in engineering services has been increasing in the last several years. This is a result of work available in all sectors (distribution channels). A buoyant economy coupled with failing infrastructure is the primary stimulus of growth.

The greatest increase in opportunity is from private developers. Government work tends to be more stable. As market opportunities for developers dry up, consultants tend to focus more on government work to maintain staffing levels.

Because of the current skills shortage, all consultants have limited ability to attract skilled professionals. Larger companies may have more success in attracting talent since scale economies will allow them to pay higher salaries and provide better opportunities for learning.

2.5.3.3 Product Differentiation

Industry products are relatively homogenous. The products among rivals are differentiated by levels of service, and scope economies. Most work requires only an adequate level of quality.

2.5.3.4 Cost Structure

Fixed costs are relatively low, as with any service-oriented business. The highest (variable) cost component is skilled labour. Rivalry will tend to increase during market slowdowns when companies try to maintain revenues in order to retain key professionals.

2.5.3.5 Switching Costs

Switching costs tend to limit client mobility between consultants. Client switching costs vary depending on their concentration. Switching costs include:

1. Transaction costs in acquiring a new consultant.
2. Lost learning efficiencies. The tacit knowledge that a consultant has of client operations and infrastructure is lost if a new consultant is hired. This increases a client's cost in the short term while a new consultant builds his or her own knowledge.
3. New relationships that take time to establish.

2.5.3.6 Overcapacity

It is extremely rare to see a company with insufficient work to meet their capacity. Since the late 1980's work has been steady. In recent years, consultants struggle to find sufficient skilled staff to meet workload demand.

2.5.3.7 Prognosis for Rivalry amongst Competitors

Rivalry amongst competitors is low. Rivalry will continue to be low in the future. Industry consolidation may increase due to a shortage of skilled professionals. The low threat of rivalry suggests that margins will remain stable into the future.

2.5.4 Threat of Substitutes

2.5.4.1 Availability of Substitutes and Regulatory Controls

Regulatory controls limit the potential for substitutes in the municipal consulting industry. Regulatory restrictions limit the amount of engineering work clients do independently.

This limitation exists through government control of various activities that affect public safety and health. A professional engineer's certification is required by a government agency before the agency will permit public use of the facility.

An increase in substitution will only occur through government intervention. For this to occur, a significant difference between price and performance must occur.

2.5.4.2 Skills Shortage

Geography or industry does limit the skills shortage. Retirements in the baby boom generation are increasing the skill shortage. Demographics suggest this is going to increase in the near future.

A scarce supply of skilled labour limit substitution since the skill shortage affects most if not all industries.

2.5.4.3 Industry Prognosis Based on the Threat of Substitutes

The current overall threat of substitutes is low. Regulatory controls will keep substitution low.

2.5.5 Threat of Entry

New entrants could come from local spin-off companies formed by local 'Star' employees (Abbott, 2005), or larger companies expanding into the local market.

'Star' employees from these firms could become a threat. Existing 'Star' practitioners in the field that have an established reputation and client contacts could form spin-off companies.

Growth and expansion requires a significant amount of cash to cover costs until business is established. This pertains to both spin-off companies without a client base and larger companies expanding into the local market. New entrants would need sufficient equity to carry

them through lean times while they build their client base. Small companies would have a difficult time entering because of a limited ability to cover expenses.

The possibility of retaliation from professional services firms is low because of the underlying professionalism of the industry.

2.5.5.1 Government Policy

Regulatory requirements limit entry to the profession. Accreditation by the local provincial governing body is required before individuals may practice. This limits rivals to companies with professionals licensed locally.

Professional members licensed in other provinces or territories in Canada may practice locally by applying for local licensing. For qualified applicants, the application review process is relatively straightforward. An application review, and granting of a licence usually takes about four weeks.

Practising professionals must "undertake and accept responsibility for professional assignments only when qualified by training or experience" (APEGBC). The various associations who have the legal authority to investigate any complaints against individuals may take legal action to enforce practice requirements. Contravention may lead to disciplinary action and licence suspension.

This limits entry to professionals registered in Canada.

2.5.5.2 Economies of Scale

There is little scale effect in this industry. While some degree of specialization and division of labour will provide for more efficiency and lower cost, individual consultants may be able to compete with little more than a computer at home. Larger companies have greater fixed

costs (plant and equipment), with marginal costs increasing proportionally to company size. The lack of scale economies for sole practitioners with little overhead is balanced by the high cost structure of larger service firms.

Any company or person with a licensed professional may be able to enter the market and compete. Other skilled practitioners may also be able to enter the market providing they have a professional who will sign off on their work.

An individual consultant may overcome the lack of scope economies by establishing a close relationship with specialist sub-consultants.

2.5.5.3 Product Differentiation

Clients have switching costs because of the implicit knowledge held by their consultant. New entrants must differentiate their product in order to overcome switching costs.

Larger companies likely have better branding because of the larger channels of distribution, and market contact. Unless a new entrant has an existing client base in another business area, entry is difficult. Larger companies usually have a perceived value and an image of quality, whether true or not.

2.5.5.4 Capital Requirements

Access will be difficult for new entrants without an existing client base, and cash flow to support debt-servicing costs. New entrants will therefore require substantial equity investment.

Capital requirements vary proportionally with the number of staff needed. To enter the industry, a pool of capital is needed to support the business through the lean times until a solid client base is developed. Through the start-up period, there could be a significant amount of time with little cash flow. This is true for individual consultants as well.

The exception to this is professionals who spin-off from an existing company with a pre-existing client base. Unless there is a covenant in the employment contract restricting client contact, entry will be relatively easy. In fact, switching costs are likely higher for the client if the client remains with the company, since the tacit knowledge of the client leaves with the professional.

2.5.5.5 Learning Effects

Tacit knowledge of customers, business operations and industry players is crucial to developing a stake in the industry. Unless new entries have local knowledge and client contacts, there will be a barrier to entry.

2.5.5.6 Bundling

Direct competitors use some level of bundling that allows one stop shopping by clients. This reduces transaction costs for clients. Smaller companies without scope economies must form strategic alliances with other specialists to compete with integrated firms. Depending on overhead carried by larger companies, this could be a cost advantage for smaller companies.

2.5.5.7 Distribution Channels

Consulting work is sole sourced through existing client relationships approximately fifty-percent of the time (ACEC, 2002). Acquisition of the remaining work is through competitive proposal submissions. Competitive proposal calls typically have a quality based selection process that involves rating each proposal submission on different categories, such as experience, capacity, references, proposal quality, and price.

A 'Star' employee from a local firm may spin-off and start a new company, or alternately be lured away by a larger company entering the market, creating easier market access for the new

arrival. The 'Star' employees are often well compensated and therefore have high switching costs, reducing their threat as new entrants (Abbott, 2005).

2.5.5.8 Prognosis for Threat of Entry

The threat of entry into this industry is low to moderate. Over time, there will be little change. The main threat is from skilled professionals who spin-off, starting their own companies. This threat leads to increased costs, with skilled professionals getting the economic profit. This will increase charge out rates, but not necessarily improve the bottom line.

2.5.6 Bargaining Power of Suppliers

2.5.6.1 Key Suppliers

Key suppliers for firms in our industry include professional engineers, planners, biologists, skilled technicians, and specialized sub-consultants. Historically these suppliers have had little power. This is due to their low concentration in comparison to the concentration of their employer.

However, given the current skills shortage, this has changed. There is increasing bargaining power on the part of these skilled professionals. They also hold a high level of tacit knowledge that is difficult to replicate. These professional will increasingly demand premium compensation.

A shortage of skilled professionals increases the cost to practise. Higher costs are passed along to the client through higher charge out rates.

2.5.6.2 Threat of Vertical Integration

Consulting firms are not the sole customers for industry professionals. In the current competitive arena, professionals have a variety of vendors they could work for including individual clients and various levels of government.

2.5.6.3 Prognosis for Bargaining Power of Suppliers

Current supplier power is high. There will be scarcity in supply for the foreseeable future. This fact will keep supplier power high over the long term. This threat will increase cost. This cost is passed along to the client through higher charge out rates.

2.5.7 Bargaining Power of Customers

2.5.7.1 Buyer Concentration

Buyer concentration varies, depending on which client is considered. Provincial government clients tend to be very concentrated. Municipal government clients are less concentrated. The concentration of private clients varies.

2.5.7.2 Product Differentiation

The product that consultants provide is relatively homogeneous. Minimum practice criteria require that all consultants provide at least adequate quality. Service and scope economies are the key ways of providing differentiation.

2.5.7.3 Price Sensitivity

All clients are price sensitive. Government clients tend to take a longer-term view, and are usually less price sensitive than private clients are.

Provincial and municipal governments view price as only one component of proposal ranking. Government agencies may sole source work if the cost is less than a stipulated amount.

Generally, work with First Nations clients is sole sourced. First Nations are not price sensitive if work is funded by Indian and Northern Affairs Canada (INAC). INAC is price sensitive only when the price performance mix is out of line with industry norms. INAC has requested that First Nations tender engineering work where the price performance mix is out of line. Often First Nations resist this, preferring to work within their established client-consultant relationship.

Private land development clients tend to be more price sensitive, since shareholders tend to focus on short-term profitability. Larger land developers tend to be less price sensitive than small land developers. Consultants tend to do more of the upfront work when there is little or no cash flow for developers. Larger land developers are less price sensitive than small developers since they usually have multiple projects providing cash flow, with consulting fees being only a small component of their expenses.

Because of ME's perceived reputation, it can choose who it works for. Generally, ME prefers to work with clients who are not price sensitive. Overall engineering is a small component of an asset's life cycle cost. This makes most clients less price sensitive.

2.5.7.4 Backward Integration

Clients are a credible threat to integrate backward. All government agencies at one time or another have had a design and drafting department. Provincial governments and the federal government have been moving away from in-house design departments in recent years. Some municipal governments are increasing the size of their design departments.

A shortage of skilled professionals in the consulting ranks could influence clients to backward integrate into the supply chain to secure scarce resources, and reduce transaction costs. Clients may vertically integrate by attracting talent from consultants, or other sources. This would not only reduce potential work, but also the pool of skilled labour available to consultants.

However, the need for multidisciplinary teams makes this kind of integration difficult in a tough labour market.

2.5.7.5 Prognosis for Bargaining Power of Customers

Overall, the threat of buyer power is currently moderate. This is because current market demand for services and a shortage of skilled labour is offset by buyer concentration, and the threat of vertical integration by clients. This threat leads to lower revenues and lower margins.

A market downturn would have little effect on buyer power. Consultants would become more aggressive in pursuit of work. However, there would also be a reduced threat of vertical integration.

Buyer concentration is a factor that ME can control by reducing the emphasis on large clients who complete large projects. An increased focus on smaller projects would reduce buyer power.

2.6 Summary

Data from the Association of Consulting Engineers of Canada indicates that ME is a large company in the municipal consulting industry. The industry lacks scale effects and therefore ME competes against other large companies, and smaller companies. Having licensed professionals is mandatory to enter the industry. The speed of market entry is dependant on having local knowledge, and on having established client relationships.

The industry value chain suggests that there is an opportunity to increase profitability through an increased focus on early and late value chain activities. There is a win-win opportunity to maximize value over the life of a project by additional focus on feasibility studies. The completion of feasibility studies also benefits the client by providing an optimum solution.

ME may also capture value by targeting services that support a clients operation and maintenance activities.

Porter's Five-Factor Industry Analysis is a tool for assessing the attractiveness of an industry. Porter's model assesses the rivalry amongst existing competitors, the threat of substitute products, the threat of entry by new competitors, the bargaining power of suppliers, and the bargaining power of customers.

The municipal consulting industry is an attractive industry. This is due to regulatory controls that limits entry and enforces strict practice requirements, limited competition, low fixed costs, and an abundant supply of work.

The major concern is the increase in supplier power, mainly due to the shortage of skilled professionals. Consulting companies will need to provide higher salaries, more benefits, and lock in these professionals to reduce their threat as future competitors.

A secondary concern is an increase of vertical integration by customers seeking to secure scarce resources.

3 MAJOR ISSUES

3.1 Current Issues

ME has become a relatively large company over its 31-year history. From its inception of five founding fathers to approximately 250 people, it has enjoyed tremendous success. The great service it provides, and entrepreneurial nature of its employees has led to high demand for its services. At present, there is an overabundance of work. The current issues are shown below.

3.2 Conflicting Pressure for Growth versus a Small Company Feel

The founders never intended for ME to become a large company. However, with its current mission, vision, strategy, and market demand for services, growth is inevitable. The focus has shifted from keeping the company small to maintaining a 'small company feel.' An ever-increasing challenge is to implement structure, revise processes and systems while remaining true to core values and mission, and to remain profitable.

3.3 Sourcing and Allocation of Resources

3.3.1 Acquiring New Staff and Retaining Staff

In recent history, it has been difficult to acquire skilled staff. ME has focused on hiring new professionals out of school, with little experience. This allows ME the control to hire staff with the right attitude. In addition, it also is a natural fit in a partnering type of company since unseasoned professionals need to work with others to survive. However, this leaves a gap of skill in meeting client requirements for quality, speed, dependability, flexibility and cost.

3.3.2 Maintaining Philosophy and Meeting Revenue Targets

ME was founded on the culture of integration, teamwork and partnering. However, individuals are monitored as revenue centres. To meet revenue targets individuals may need to work unpaid overtime, or bill for non-billable activities. If individuals are saddled with the responsibility of writing proposals that are unbillable, they will not be able to meet their revenue target. The reduction of billable time reduces time spent on networking since employees increasingly work through lunch and other breaks to meet billable targets.

Unpaid overtime skews true costs. The estimated costs of future proposals are then underestimated. Future projects then go over budget so more unpaid overtime is required to complete the projects. This endless cycle results in employees burning out. Inexperienced employees making budgetary decisions and a lack of senior review capacity exacerbate the problem.

3.3.3 Over Emphasis on Larger Projects

There is an increased level of large municipal projects because of developers taking advantage of strong market conditions. There are benefits and drawbacks to large projects.

People naturally gravitate towards large glamorous projects. Larger projects have lower overhead and therefore, it is easier to meet billable targets. Staff are usually dedicated to a large project; thus they do not have the stress of dealing with the demands of multiple project managers.

Large clients complete large projects. Their concentration gives them more power to control company resources. Larger projects are an enormous drain on company resources. The clients are demanding, and as a result, smaller less demanding clients suffer.

In the short term, large projects will provide good profitability. However, they consume large amount of resources, often requiring sacrificing the smaller projects. Smaller projects sustain a company through market downturns (Abbott, 2005). Small projects often are completed by small clients, who have less power than large clients do. These smaller clients are less demanding, but faithful if given reasonable service. When a larger project finishes, excess capacity is difficult to fill because of the lumpy nature of large projects. If smaller projects are ignored during strong economic conditions, and market demand drops off, small projects cannot absorb the excess capacity when the large projects finish or are postponed.

Over the longer term, a balance of large and small projects are needed to sustain a company through a market downturn, and retain key personnel.

3.4 Overwork and Burnout in the Technical Core

ME is facing major issues with very high demand for its services, and limited resources to complete projects. Entrepreneurial employees are getting new work, but the ability to hire and train new staff cannot keep pace with the volume of new work. In addition, an inefficient operational layout is creating additional stress. Team members geographically separated have a more difficult time arranging necessary face-to-face communication. It is difficult to find the time needed to travel to meet in person.

Employees face conflicting demands. They need to balance billable time with the need to write proposals for future work. Proposals commonly are not billable tasks. Junior employees have higher revenue targets than more senior staff, making it difficult for them to write proposals. Senior staff have higher charge out rates that make proposal writing an inefficient use of their time. A shortage of senior staff makes it difficult to balance unbillable work with other high priority tasks.

3.5 Operational Layout

The operational layout at ME is by function. Individuals (or groups of individuals such as the CAD technicians) are grouped based on the tasks they perform. Management has shied away from forming project teams with different functions in one group. In an effort to maintain the company's cultural roots as an interdependent partnering, consultative organization, individuals are routinely and somewhat frequently relocated without any say in the relocation. This makes people less efficient, since greater time is expended walking about or travelling to meet other team members.

3.6 Controlling Quality

The level of quality at ME is inconsistent. Many complete work to very high quality standards, but not all individuals do so. Quality systems are not consistently used.

3.7 Finding and Sharing Information

A recurring problem is the inconsistent storage of information for future use. Considerable time may be spent by staff finding old information and work completed by others. Data storage requirements are not consistent from person to person. There are guidelines and quality systems in place for information storage, but they are not consistently used. Individuals choose their own method of storage of project information. This creates significant inefficiencies. Work is redone when past work cannot be found.

3.8 Financial

The entrepreneurial focus and leadership development of employees places an emphasis on growth. Growth reduces profitability and cash flow because of increased costs. Cash is required to purchase new equipment, and acquire additional office space due to an expanding

workforce. In addition, learning curve issues (new employees), resource allocation conflicts, and space limitations leads to inefficiencies.

3.8.1 Project Budgeting

Project cost records may not be an accurate measure of actual costs. Project budgeting is based on individual experience, rather than cost records. The accounting system lacks the refinement to give cost feedback on activities. The accounting system can give feedback on project costs. If project costs exceed budget, costs may be allocated to another project (with client approval) or charged as overhead. Stated project costs therefore may not be an adequate measure of actual project costs.

3.8.2 Controlling Costs

ME is a high cost company. This is a strategic choice. The company invests highly in new technology, and in training.

Profitability measures have not increased in spite of attractive market conditions. While not a company strategy, cost control is important strategically, and financially.

Individuals are measured as revenue centres. The problem with this is that non-billable time limits the commitment of time, quality and service to clients. Different clients have different needs. Some cannot afford front-end proposals; some need competing proposals to satisfy constituents (publicly funded municipal work), others do not need proposals at all (land developers). Measures that recognize this discrepancy are not currently in place. For some First Nations projects, considerable upfront technical work is required which cannot be recouped until the project is funded.

3.8.3 Capturing Value

Many consulting companies are guilty of not recouping the value of their services. Other professional services, such as lawyers and accountants, have higher charge out rates, and typically do not provide proposals for 'free.'

Companies with a large contingent of engineers are more prone to undervaluing their services. This underlying philosophy possibly stems from conservative personality characteristics. A second factor is engineering work often deals with private funds, or limited public funding sources. Clients that pay the full cost of work are typically more price sensitive.

3.9 Summary

Large network organizations are difficult and costly to coordinate. ME's main issues are excessive demands places on staff, an inability to control individual actions, and layout inefficiencies.

Entrepreneurial managers acquire work that requires technical resources. Demands from multiple project managers creates overload on shared technical staff.

Staff are individually accountable. This creates inconsistencies in how most activities are completed. This leads to inconsistent quality, and difficulty reusing information on future projects.

The time it takes to travel to meet with other team members creates project inefficiencies. This makes it more difficult to provide great service, and limits team learning on projects.

Different Practice Networks have different needs. The accounting system is not customized to meet the specific needs of different Practice Networks. This reduces the flexibility of managers to customize and capture data to meet his or her needs and the needs of clients.

4 INTERNAL ANALYSIS

4.1 Culture Forces

Schein (Nadler, Gerstein and Shaw, 1992) defines organizational culture as "the learned behaviour of a group of people as they cope with problems presented by their external and internal environments." As successful solutions emerge to problems, they become ingrained in the fabric of the organization as the way things are done. Organizations that have done things well in the past can fall into the competency trap (McCarthy, 2006).

Effective teams range from two to 25 people. Beyond this size it is difficult to resolve differences, control dominant coalitions, and develop a common purpose and trust. Ultimately, large groups have difficulty overcoming theses issues and completing real work. Large groups usually break into subteams to overcome these issues (Katzenbach & Smith, 1993).

Large networks have similarities to teams. It is inefficient to try to maintain quality relationships in a large network. There just isn't enough non-billable time to maintain quality relationships. Within a large network there isn't time to maintain the level of trust needed for effective collaboration. In larger networks, maintaining relationships will reduce productivity (Cross, Nohria and Parker, 2002). Either relationships suffer, or inefficiencies result.

Emphasis should be placed on team composition that promote creative problem solving and collaboration. Integration through personnel shuffling should be reduced. Relocation strategy should evolve around effective teams that efficiently meet client requirements.

4.2 Current Strategy and Strategic Fit

Strategy is the plan a company makes to achieve its aims.

A competitive advantage is achieved when you provide a group of activities that are different from those of your competitors, or activities that are performed better (at a lower cost) than your competitors. For a strategy to provide a competitive advantage there must be trade offs for a competitor wishing to replicate your strategy (Porter, 1996).

4.3 Generic Strategy

Table 4.1 shows the generic strategy for Mark Engineering (ME). ME pursues a differentiated, high quality, adequate-cost strategy. The various activities are ranked based on being either cost-based or differentiated. Each activity is described in detail below.

Table 4.1: Generic Strategy for Mark Engineering

	Cost Based Low Cost/Adequate Quality	Strong	Weak	Strong	Differentiation High Quality/ Adequate Cost
Service/Product Strategy	Rapid Follower		▼		Innovative
R&D Expenses	Low R&D			▼	High R&D
Structure	Centralized		▼		Decentralized
Decision Making	Less Autonomy		▼		Autonomy
Manufacturing	Economies of Scale		▼		Economies of Scope/Flexible
Labour	Generalist		▼		Specialist
Marketing	Comparative/ Push		▼		High Cost/ Pioneering/Pull
Risk Profile	Low-Risk			▼	High Risk
Capital Structure	Leveraged		▼		Conservative

Source: adapted from Bukszar (2006) based on Porter (1998)

4.3.1 Service and Product Strategy

4.3.1.1 Background of Services

ME is a service-based consulting organization. The products stemming from the services ME provides are limited to design drawings, feasibility reports and design reports.

ME provides integrated and innovative services in the areas of planning, municipal engineering, and landscape architecture. Depending on client needs, services are provided along the value chain from project inception, through to detailed design and construction services. Construction services are limited to inspection and administration to ensure projects are completed in accordance with the designs that are produced.

4.3.1.2 Service Orientation

ME has a strong service orientation. The key focus of ME is to provide great service to clients. The quality of products it provides is adequate and generally consistent with industry standards.

By providing great service, and building client relationships, additional value can be created through the acquisition of tacit client knowledge. This is a high cost strategy in the short term, but over the long term reduces cost because work is more frequently sole sourced. This strategy develops 'lock in' because of the knowledge of the clients operations. This creates high switching costs for clients. Clients usually only switch when service significantly degenerates.

4.3.1.3 Integrated and Innovative Solutions

The services ME provides are broadly defined by the various Practice Network (PN) areas. Within these PN's, individual employees are allowed to pursue a variety of projects pertaining to their particular area of expertise and interest. Support may be obtained from other PN's, specialists and support teams in local offices, or other offices. ME can provide innovative solutions relating to the broad integrated skills of the many varying practitioners it has, and the state of the art tools and technology it employs.

ME focuses on providing new services to existing clients. New clients are sought if they meet certain criteria stipulated in the client 'filter.'

In some cases, quality is lower than industry standards, because of insufficient senior review. Recommended review processes may or may not be followed by junior staff. In some cases junior staff send out work without a senior review.

A key success factor for ME with its service strategy is client partnering. Partnering involves working closely with clients, and listening to them to understand their needs. Partnering

is difficult in a technical setting because individual characteristics focus primarily on knowledge and not relationships.

4.3.2 Research and Development Expenses

ME does not have expenses in the traditional R&D sense since they provide professional services, not durable goods. R&D takes the form of investment in the development of its employees. Employee development costs include formal coaching arrangements of individuals by assigned coaches, noon hour seminar sessions presented by employees or suppliers, formal courses on relevant topics through the University of Mark Engineering (U of M), and external courses and trade shows. Four percent of an employee's salary is committed to the cost of individual training.

4.3.3 Structure

ME is a decentralized organization. A flat network hierarchy has been maintained since company inception in 1975. There are few formal reporting relationships. The most formal reporting relationship is between an employee and his assigned career and technical coach. Any issues that arise with an employee's performance are usually reported to an employee's coach. The coaches ensure that the employee is maintaining personal and professional growth within ME.

All branch office employees are accountable to their career coach, and a local Managing Partner who acts as branch manager. The branch manager is accountable to the Board of Directors, and company Partners.

4.3.4 Decision Making

Decision rights move down the chain of command in a network style company (Nohria, 1991). Employees are given a great deal of autonomy and latitude in achieving objectives. Issues only arise if employee revenue targets are down or if project requirements are not being met.

There are numerous guidelines and standardized forms in place to ensure there is consistency in service and product quality. The application of these guidelines and standards is inconsistent because of the autonomous decision-making and lack of a feedback mechanism to ensure consistent quality.

4.3.5 Manufacturing

ME provides services in municipal consulting where it has core competencies. ME focuses on providing integrated consulting services covering key areas of municipal engineering, and planning in a municipal setting. There are limited scale effects in this industry.

4.3.6 Labour

Since company inception over 30 years ago, the degree of specialization has significantly increased. Originally, the level of specialization was limited by the skills of the founding partners. With the increase in a stable client base, and as the needs of clients grew, increased specialization was added.

The current skill set at ME provides engineering and procurement (EP) services with specialists in water treatment, wastewater treatment, storm water, transportation, landscape architecture, environmental consulting, and First Nations. Custom client services may cut across these areas of specialization. More commoditized services still tend to be outsourced to sub-consultants. These sub-consultants provide specialized homogenous services that are not directly sourced by clients.

4.3.7 Marketing

ME's marketing strategy is somewhat dependent on current market conditions. At present, marketing is primarily a pull strategy, with less emphasis on personal selling, since there is a strong demand for services by both existing and prospective clients. Personal selling is always required, however, to ensure existing clients are aware of the scope of services. During market slow downs, marketing strategy is more of a push, with employees working harder to get new work by personally selling services.

4.3.8 Risk Profile

Risk is exacerbated by the network style of ME and tight project time lines. Project completion often depends on individual specialists that require significant coordination if the project is to be completed in a timely manner. Networks require a high level of trust, which means projects may not be reviewed as thoroughly as they could be. There may be an expectation of fast turnaround when insufficient time has been allowed to forge team relationships.

ME focuses on hiring younger recruits with exceptional aptitudes and attitudes, but little experience. The large volume of work from different project managers often overloads employees. Projects can become cumbersome to control and coordinate. Quality may suffer because of limited time to meet deadlines.

Currently ME is focusing on larger higher profile, high risk projects. Some of these projects are with long-term clients, but not all. Some project managers accept new projects with little consultation with other managers regarding resource capacity and allocation.

High quality relationships with clients tend to mitigate risk. With new clients, there isn't always time to establish a trusting relationship.

4.3.9 Capital Structure

Mature companies tend to have higher debt financing. This is mainly due to increased availability of debt financing related to greater fixed assets and more stable cash flows.

ME has maintained a conservative capital structure through the years. In recent years, the debt to equity ratio has increased due to growth.

4.4 Firm Level Value Chain

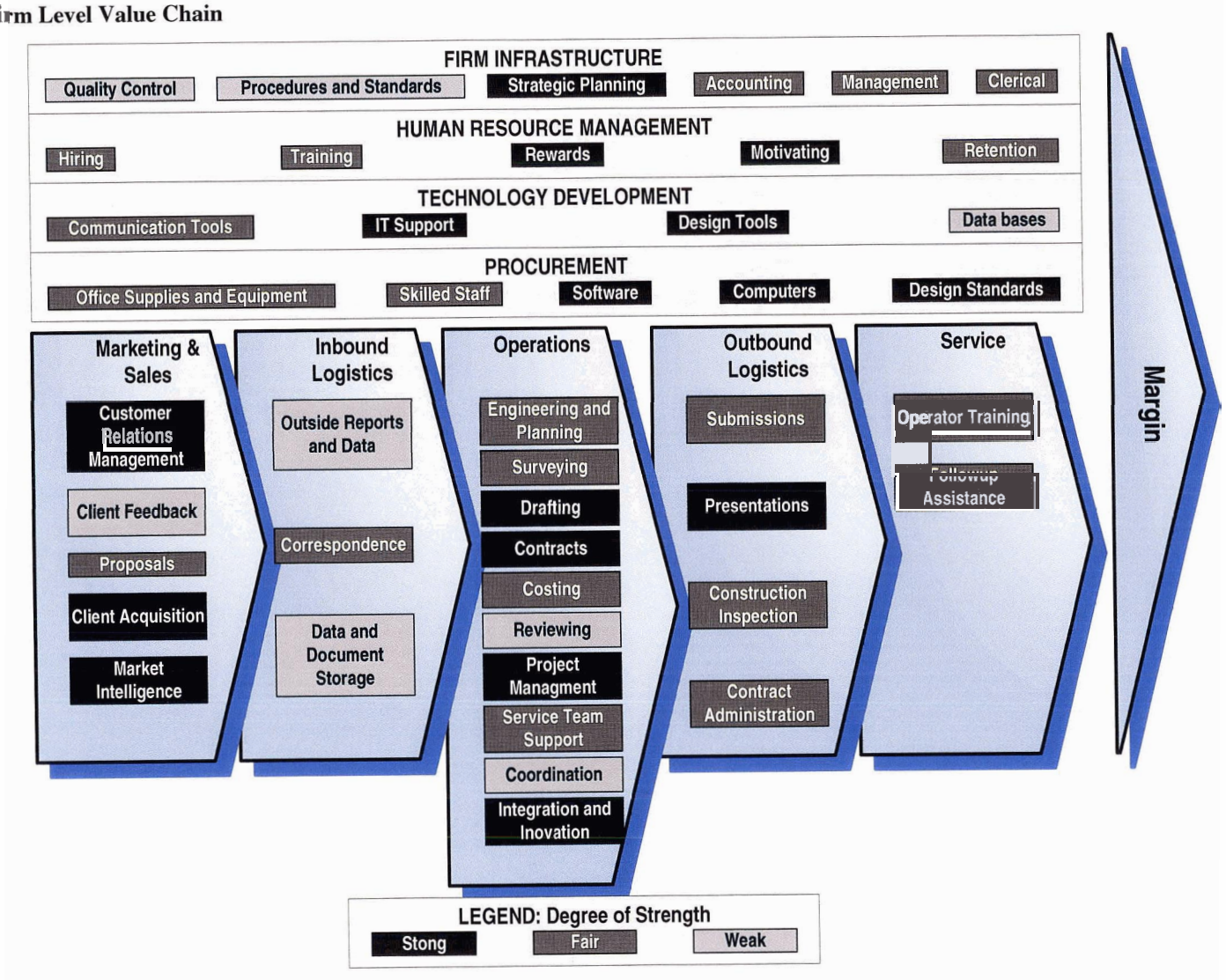
The firm value chain is shown in Figure 4.1. The purpose of the value chain is to identify company strengths and weaknesses. This information is used to establish the core competency of the company. Focus on the core competencies allows ME to provide services that clients value and they are, therefore, willing to pay a premium over the cost of production.

4.4.1 Marketing and Sales

ME acquires new work from repeat clients, but also considers new clients providing they pass the client 'filter.' A pull strategy is used during market upturns to acquire new clients.

ME focuses on sole source work from repeat clients. This provides value not only to ME, but also to the client. Sole source proposals allow ME to reduce its overhead costs, which allows a greater emphasis on other activities. It also benefits the client, since the knowledge of the client allows a greater opportunity to meet their needs.

Figure 4.1: Firm Level Value Chain



Source: after Porter, 1998 content by author

ME is adept at customer relations management. The strategy focuses on getting to know the client and their operations in order to provide value added services that will save the client money in the end.

ME's strong relationship management allow them to acquire timely market intelligence on new threats and opportunities. Government funding programs are tracked closely so staff can advise clients of potential opportunities. Funding programs are announced on the Intranet and circulated in local offices to advise all project mangers.

There is weak standardization for proposals. Writing proposals is usually an overhead cost and therefore reduces profitability. For sole source work, proposals do not get the attention that they would in a competitive proposal situation. With individuals monitored as revenue centres, the motivation is to get the proposal out versus preparing a quality work program. In some instances, this has led to problems, where work programs were inadequately detailed, and costs were underestimated.

Because of a lack of formal reporting structure, proposals may go out without a senior review. In other cases, deadlines leave little time for review. Poor planning by junior staff limits the ability of senior managers to complete an adequate review.

There is no formal client feedback system at ME. Some consultants use third parties to collect feedback from clients to ensure adequate service. Client feedback is usually by word of mouth.

4.4.2 Inbound Logistics

Inbound logistics consists of general correspondence, incoming reports and data from outside agencies and sub-consultants, and the storage of these documents.

General correspondence consists of daily project correspondence, including invoices, newsletters, product literature, and e-mail. Hard copy information from incoming mail and courier services is efficiently sorted and distributed by the front-end clerical staff. Project correspondence by e-mail is not efficiently or effective sorted and stored. There is no policy for the storage of e-mail. It is left up to individual discretion to sort and file project e-mails in the project directories.

Project reports and data are not effectively stored once they reach their intended destination. There is a standardized project directory format but the format is not always followed. There is no policy in place for the mandatory storage of documents by individual employees. Individuals are allowed to store information as they choose, making it difficult to review, or reuse the information.

4.4.3 Operations

ME has design and service competencies, particularly when the client requires a fast turnaround. However, this comes at a cost.

Resources can be reorganized and reassembled quickly to tackle new work. However, shared resources means some projects may be delayed. Occasionally deadlines are missed, or quality may be sacrificed to meet a deadline.

Historically, ME has completed surveying requirements in house. In recent years, the focus has been increasing specialization in the design and drafting function, and a move to outsource to companies specializing in surveying. In some cases, the surveying quality has not been what it could be. This is mainly due to the project manager's failure to specify suitable terms of reference to the surveying sub-consultant company, rather than to poor work quality.

ME still has reasonably current survey equipment, and can complete survey work in-house. However, our higher charge out rates makes this more difficult, particularly without reinvestment in new equipment. The benefits to doing survey in-house are increased revenue, knowledge of site conditions and client personnel, and learning efficiencies (if the same personnel are involved in the design).

Many staff have competencies in contracts. The company supports continuing education, and as a result, many have received training and certification in Municipal Master Construction Documents (MMCD). There are many seasoned practitioners on staff with experience in construction and contract management, as well as a veteran lawyer.

ME keeps data of recently tendered projects costs, which are used for the costing of new projects. A number of staff in the office are involved in various construction trade associations, and can keep up on industry changes. Suppliers are invited to give noon hour talks about their products that allows staff to stay abreast of industry cost increases. Some staff have affiliation with construction associations, and some keep good relationships with construction contractors. This allows for timely information on industry cost changes.

Project reviewing has been a weakness. Either project team members have allowed insufficient time for a senior engineer to review studies and designs, or have not consulted with the Engineer-of-Record (EOR) until late in the project. This usually occurs when the project manager is not the EOR. A lack of a thorough review has lead to quality problems, and in some instances loss of work, and potential law suits. The problem is exacerbated by a general lack of seasoned professionals in the company and available in the industry in general.

A core competency of ME is project management, and providing integrated innovative solutions. This is largely a result of the network, partnering philosophy. However, because of resource scarcity, some projects suffer. Over allocation of staff creates scheduling problems.

4.4.4 Outbound Logistics

ME shines in the submission and presentation of projects. This is a core focus, and a core competency. The delivery of projects is flexible and built around client requirements.

There are skilled staff in construction administration and construction inspection. However, there is a weakness in keeping the EOR involved in the process of construction completion. Some staff may take short cuts because of budget shortfalls. Communication with the EOR is required, particularly near the end of project construction. This increases the risk the company takes on, and the risk to the professional taking ultimate design responsibility.

4.4.5 Service

In developing long-term repeat clients, ME naturally develops some competency in follow-up service following project completion. Operational training is usually included in project budgets, but long term follow-up assistance is usually an overhead cost. For some Practice Networks (First Nations), there may be an opportunity to recoup this value within the project.

4.4.6 Firm Infrastructure

ME has developed procedures and standards for quality systems that are available on the Intranet. The quality systems provide detailed instructions and guidelines on various activities and processes. A significant amount of time has gone into development of the quality system. The document is impressive.

Use of the quality systems by all staff are important, particularly in a network type organization with a lack of top down control. The quality systems contain work checklists and review procedures. A major problem is that the document is used inconsistently. Not all staff use the quality systems. Time pressure limits the ability of team members to use the quality systems,

and check their own work. More costly senior personnel must then catch mistakes or missing information.

ME has developed significant strength in strategic planning over the last 10 years. The plethora of information and the development of a formal strategy, vision, and mission are strong evidence of this.

The accounting department provides efficient collection of operational costs, and timely invoicing. The only weakness is the development of project costs on individual activities. Such project cost records would be useful for estimating future project costs. An associated problem is the hiding of costs by project managers in an effort to meet revenue targets. This leads to errors in the true cost of work, and leads to inaccurate costing of proposed projects. For a system utilizing a value based (lump sum) billing system, it is important to have an accurate cost basis for proposals, particularly for newer employees with a lack of experience.

The CRT provides clerical services. There is a well-defined procedure for the routing of correspondence, and phone calls. One weakness is that there are no resources dedicated to any one Practice Network. One person handles and routes all incoming phone calls for an office. In an office of 60 or more staff, the number of lines and the ability of front-end staff to deal with the calls can limit incoming calls. Calls are forwarded directly without screening. This eliminates the ability to be prepared for the incoming call.

4.4.7 Human Resource Management

Hiring decisions are often based on individual skills and abilities. Once hired, rewards are largely based on individual performance. (Cross et al, 2002).

ME provides above average compensation for staff. However, contingent rewards are based on individual initiative and performance. Insufficient emphasis is placed on collaborating and networking skills.

ME has one of the most rigorous interviewing and screening processes in industry (see Section 1.12.2.). This enables ME to hire some of the best and brightest talent. The process may homogenize the workforce, based on individual skills rather than collaboration skills.

ME has excellent formal training systems. This is another core competency. Ownership is willing to forgo high short-term profitability for company growth, strategic positioning, and long-term profitability. Training systems include the appointment of a career coach and a technical coach. The company provides University of Mark (U of M) courses, pays for conference sessions, and subsidizes outside training opportunities. U of M courses are presented by senior management and occasionally outside technical experts. The only weakness in the training system is many senior staff are often too busy to mentor staff and share their retained learning on a day-to-day basis.

4.4.8 Technology Development

The IT support function is one of the best. There are network and computer experts in most offices who provide timely solutions to computer and technology issues.

Communication tools such as the Intranet and live video conferencing allow for a means of keeping the company connected. In a process layout, additional communication tools are needed to facilitate team communication.

There is a weakness in data storage and retrieval. A database management tool is required for quick reference of project reports and proposals. This will allow for easy access to old information.

ME is on the bleeding edge of technology. Once learning curve issues are resolved, this allows for quick turnaround in the technical core. A complementary effect is in motivating employees who are able to utilize the latest equipment and software.

4.4.9 Procurement

Cost control is an issue at ME. ME acquires the latest software and equipment.

Periodically there is restraint in areas where project managers need important tools that could make them more efficient and effective.

ME lacks specific competencies in procurement because it lacks scale to command huge discounts. Typically, ME has preferred suppliers with whom it gets preferential terms and small discounts.

4.5 Core Competency and Competitive Advantage

Sustaining a competitive advantage requires that a company either does things consistently better than the competition, does things more efficiently than the competition, or both (Porter, 1998).

From the value chain, ME's competitive advantage is providing integrated and innovative solutions combined with great customer service, skillful use of technology, and project management. In essence, ME's competitive advantage is in its people. This comes from the strengths listed in the value chain and the application of the various skill sets and core competencies through partnering and high performance teams. A weakness, however, is that this strategy has a high cost.

4.5.1 Critical Success Factors

Critical Success Factors (CSF) are tasks "which must be carried out exceedingly well by the organization to assist in the achievement of the strategic objectives" (McCarthy, 2005, p.5). Corporate mission and vision are supported through CSF that support the core strategy. The key CSF for ME is maintaining key personnel. When key personnel leave, they take tacit client knowledge with them. Worse, they could become a competitive threat.

4.6 Structural Analysis

Organizational structure is the framework of authority, roles, and reporting relationships.

4.6.1 Key Structural Elements

"An organization is a cultural tool that allows for increased specialization of labour and coordination of work. An organization is a purposeful collection of human beings, unified by a common set of aims" (Frein, 2005, p.1). The company strategy is developed to achieve the aims.

To understand organizations it must be understood what they do (function), how they relate internally and with the external environment (relationally), and how they change over time (ecologically) (Frein, 2005).

4.6.1.1 Function

The function of an organization is to make money through the successful execution of its strategy. Profitability makes all other things possible. An organization is largely defined by its value chain. Over time, function can evolve based on learning and feedback mechanisms. Learning occurs through interaction, research and performance feedback.

4.6.1.2 Relationally

Social responsibility is evident both through the actions of leadership, management and employees. ME staff maintain an active social culture in terms of events both internal and external to the company. Management fully support this. This allows for a means of building trust among team members and alignment with company culture.

Relationships are a fundamental building block of ME. Core to this fundamental building block are friendships, trust, and partnering.

How managers arrange functions has a strong relational component. A key focus is maintaining 'long hallways.' This means integrating and rotating personnel so interrelationships remain strong. Constantly rearranging office personnel also disbands potential coalitions.

4.6.1.3 Ecology

Current and past leadership saw little need for formal structure, thinking that structure was counter to the ME philosophy of partnering and open communication.

With the growth trajectory, by the mid 1990's there was the need for some structure providing it was consistent with the company vision and philosophy. Structures that ME has implemented include:

1. Implementing roles and responsibilities for the Board of Directors and Managing Partners.
2. Formation of the Corporate Leadership Team (CLT) to address company direction.
3. Development of Service Teams and Service Team Leaders for clerical support.
4. Practice Network (PN) groups, Novice Consultant groups, and CAD technical groups to help staff develop skills, add technical depth, and marketing ability.
5. Development of Client Teams.
6. Personal Performance Plans and designation of career coaches.

In the formal sense, the main organizational structure continues to be the natural boundary of branch offices and geographic locations (Alberta and British Columbia). The

boundary between locations is porous and changing with cross-functional teams. To minimize divisional compartments, branch offices often share resources. Cross-functional teams (Client Teams) may be formed across branch offices. Through the office Intranet, employees from all branch offices can stay connected.

While the PN's do not define the reporting structure of ME, they do define formal relationships based on common areas of practice.

4.7 Types of Organizational Structures

There are four generally accepted organizational structures including Function, Divisional, Matrix, and more recently Network structure. No one organizational model will be a best fit. In practicality, actual structure may be hybrid of one of the four (Nohria, 1991).

The one that would most closely match the environment for ME would be the Network structure.

The Network organization evolved in the 1980s from the need for a more flexible organizational structure that could meet the challenge of increasing competition (Cross et al, 2002). A Network style structure provides the ability to evolve and adapt to changing environmental demands.

Network structures are relationship focused. A network style structure is loosely held together, with multiple relational linkages that may change over time.

ME's common characteristics with a network structure are as follows:

1. Division of labour by knowledge.
2. Coordinating mechanism with cross-functional teams.
3. Decision rights move down the organization chain of command.
4. Boundaries are porous and changing.

5. The importance of informal structure is high.
6. Basis of authority is knowledge.

ME's common characteristics with a network structure are discussed below. Dissimilar characteristics are also identified.

4.7.1 Division of Labour by Knowledge

A core part of the ME strategy is an integrated practice that provides a broad level of client services. By providing an integrated approach in a network, a key goal is to provide innovative solutions that provide a competitive advantage.

The division of labour is largely by specialization in distinct areas of knowledge. While new recruits typically get a more broad level of experience, they are encouraged to focus on areas about which they are passionate. There are also generalists that have a better big picture focus, but usually do not complete specialized tasks. There is some flexibility, depending on individual discretion. Specialization is needed to justify higher hourly charge out rates over industry competition.

ME categorizes the division of labour by the symbol "T." The vertical section of the "T" represents technical competence and ability or the level of vertical specialization. The horizontal part of the "T" represents the breadth of knowledge or horizontal specialization. In aggregate, all employees combine through teamwork to form a perfect "T."

4.7.2 Coordinating Mechanism with Cross Function Teams

Cross-functional teams complete nearly every project at ME. Client Teams are composed of people with different skills and competencies that cut across PN boundaries. This allows for the 'cross pollination' of employees, which promotes innovative and integrated thinking.

These teams are formed based on the expertise needed to complete the project tasks. Teams are assembled based on an individual's expertise, desire to work on a specific project, and current workload demand. For small projects, project managers will seek resources from the technical core on an ad hoc basis, largely based on abilities required and individual desire. For larger projects, project members are selected similarly, but tend to be dedicated to the project, and the particular project manager.

Composing and coordinating project teams can be chaotic. A significant amount of time may be spent trying to assemble and acquire resources to complete a project. If not monitored, a significant amount of time and effort may be spent in meetings to communicate and make decisions. The integration of roles, work and responsibilities are at times unclear.

Formal reporting structures are not clearly defined. Questions of who team members report to can lead to confusion. For example, are team members responsible to the project manager, the EOR (who takes the professional responsibility for the work), the branch manager or the appointed career coach?

In absence of formal hierarchy, the career coach, and branch manager fill the reporting void. Each individual has a career coach and a technical coach that guide and assist employees in developing their skill set. The next responsibility level is the branch manager, who reports to the CEO and Board of Directors. These powerful functions not only support individuals in their growth, but also are the primary means of reporting problems that occur. If issues arise on project teams, the first means of making corrections is through an individual's career coach. If repeat corrective action is required, but is not effective, the career coach will be notified. If necessary, the issue will be discussed with the branch manager and possibly other senior partners and dismissal may result.

4.7.3 Decision Making Rights

Individuals at the lowest levels of the company usually make decisions on proposed work, including initiation, approval and implementation of work. Decision rights are typically distributed amongst individuals on project teams based on knowledge.

Technology, education and specialization have pushed responsibility down in the hierarchy. According to Nohira (1991), decision rights are pushed down as far as possible in a network structure. At ME, all staff are allowed to acquire work, and manage clients, if they have the desire.

4.7.4 Organizational Boundaries are Porous and Changing

Senior management make strategic decisions on work that is within the supply chain integration. However, there is flexibility depending on specific project conditions. For example, outside specialists typically complete survey work, but individual project managers have the discretion to complete this task in house depending on cost efficiencies, internal work allocation priorities and commitments.

In addition, all members of the project team are permitted to interact with clients, and seek their own clients if they desire. If individuals seek their own work they must also secure resources to complete the work. If individuals (billable staff) do not manage clients, then they will play a support role on other project teams.

4.7.5 The Importance of Informal Structure is high

Informal structure is a foundational element of ME. Social interaction and involvement in worthy causes are common. Social interaction is encouraged by formal social and informal social events. Food often symbolizes social gatherings. Some of the formal events include bi-

weekly barbeque lunches in the summer, lunchtime Oktoberfest celebration, wine tasting competitions, Halloween celebrations and costume judging with treats delivered to everyone.

The key corporate social initiative is the Mark Engineering Foundation. Through this program, ME provides corporate donations to various charities, and sponsors disadvantaged people to give them an opportunity to develop work skills and confidence.

Numerous staff are involved in various charitable organizations such as Habitat for Humanity, Big Brothers Big Sisters, and Destination Imagination, to name a few.

Even with social interaction, relationships are formed based on proximity, and shared interests. Shared interests are more common amongst employees in similar age groups. Where these lines cut across functions, there is a higher degree of teamwork.

4.7.6 Basis of Authority is by Knowledge and Positional Power

There is very little vertical hierarchy at ME. The division of labour in ME is virtually all horizontally based on specialization and differentiation according to function and expertise.

In general, decisions are made by committee. Authority is decentralized and participatory.

Elements of power and authority are based on individual expertise, and positional power. The primary basis of authority is around knowledge. The main source of power is entrenched in the expertise of individuals as defined by function. Technical and communication skills are the main components of expertise. Those with technical skills complete work, while those with communication skills get work. Functional power and authority is held in individual specialists, and in technical groups such as the CAD group. The sophistication of software and educational requirements has forced specialization of the various functional groups such as the CAD and GIS (Geographic Information Systems) groups. The power of groups and in some cases individuals

has increased because of technology, and the specialized skill required to operate new technology.

The legitimate basis of authority is at the career coach level, and the branch manager level. For those with less power, power may be secured by linking into the legitimate bases of authority through informal communication channels.

To a lesser degree, authority is based on positional power. Positional power is not so much based on political influence, but more on the individuals down the chain of command who view themselves as having little influence. Senior managers may get priority on resources not necessarily because they abuse their position, but more because of the inability of support personnel to say no.

4.8 Structural Tensions

Nadler et al (1992), suggest that organizational systems will seek equilibrium if an event creates an imbalance. A new force will be required to achieve this equilibrium. A network structure subject to environmental forces will create structural tensions that will result in an imbalance.

ME has a strong entrepreneurial focus where initiative is rewarded. This entrepreneurial focus creates a "centrifugal force" which can cause the core of a network organization to spin apart. If left, this "centrifugal force" will spin the organization out of control. An equal "gravity force" is required to offset this "centrifugal force" to stop the organization from pulling apart. (Nadler et al, p. 269-270).

Some of the structural tensions within ME are discussed below.

4.8.1 Balancing Responsibility and Authority

A fundamental principle of organizational structure is that authority should equal responsibility (Sy & D'Annunzio, 2005). This is violated in a network style organization. It is easy in a network organization to go around the Engineer-of-Record (EOR) or project manager and undercut these responsibility centres.

The forces for authority versus responsibility break down at a number of levels, including quality, communication, trust and formal responsibility.

4.8.1.1 Quality

Quality requirements are defined by several factors including, client requirements, professional guidelines, minimum practice requirements, individual values and by company image. Time issues, client pressures and accountability may also affect quality. Quality assurance is everyone's responsibility, but it usually falls upon senior personnel or the EOR who has a vested interest in maintaining quality.

Quality must meet the needs of both the client (in terms of quality, speed, dependability, flexibility and cost) and of the professional taking responsibility. Quality may be substandard in a network because it is defined by normative values established through client and network interaction. The quality for any particular client and for the professional taking responsibility may be higher, or lower than the baseline set through the network interaction. Based on the principle of equal responsibility and authority, the minimum level of quality should be established by the project manager (based on client requirements), and the EOR (professional requirements).

The level of quality relates directly to the lack of authority, experience and time to complete work. In many instances, quality is very good, but periodically it is poor. This has

occasionally cost the company and damaged its reputation. This relates to decision-making rights filtering down to the lower levels in a network style organization (Nohria, 1991).

With work overload, employees do not always check their own work. Rather, they move from crisis to crisis, getting work done as quickly as possible in order to move on to the next deadline. The problems must then be identified by more costly senior personnel, reducing overall efficiency and effectiveness.

An individual's professional image and reputation are key drivers of quality. Reports and engineered drawings produced by professionals form permanent records of image and professional competence. These tie tightly to the values of individuals. Those that place a high value on their reputation and image will likely have higher quality standards.

4.8.1.2 Communication

In a network environment a 'node' (individual employee) may report, work and interact with numerous other nodes. At any time, communication occurs along a number or formal and informal lines. This provides a great method to disseminate information, but also networks become great balancing acts, with responsibilities to multiple nodes at once.

4.8.1.3 Trust

Informal communications can reduce formal team based communication. Misinterpretation is more common along informal lines. Direct and honest team-based communication builds more trust.

High quality trusting relationships are a critical element in a network style organization. Trust allows efficiency, but also increases risk. Companies with a high degree of trust tend to take on more risk. Trust is built through formal working relationships and informal connections (social channels). When this trust breaks down, informal channels may be utilized outside the

team, which subverts the actual responsibility of individuals on a team. Trust built through outside social interactions, is difficult to manage, control, and promote because individual life circumstances may reduce interaction.

Trust is built through the constant interaction with the same people, who rise to, and overcome challenges together. Quality relationships are built on trust through effective collaboration. In larger networks, there is a limited ability to relate to those outside the direct team. This is because of conflicting forces for revenue production, and client demands. More hierarchy and division result. Jones (2001) illustrates increasing levels of hierarchy with growth. Companies begin in small non-hierarchical forms, but gradually increase in hierarchy as the number of employees increase.

4.8.1.4 Formal Responsibility

Responsibility in a network setting is diffuse, with responsibility typically being placed with individuals, who are responsible to multiple individuals and teams.

The relative power and overall normative values are large components of the decision making process. The professional who takes ultimate responsibility for a design or report may have limited control, depending on the normative values of the company. There is potential for conflict between senior managers and the EOR if trust is not developed. The potential conflict arises because of the great risk and responsibility an EOR assumes, and the desire of a senior manager to develop business and complete work.

Subsidiary nodes (individual resources) of a network organization can have considerable influence, often greater than their level of responsibility. This usually rests on an individual's ability to utilize the informal communication channels.

As networks grow, the opportunity to work with others diminishes and a natural division occurs. Individuals begin to align and identify with a particular component or division, rather that the organization as a whole. Cross et al (2002, p. 70) note, "it is not possible for everyone to be connected to everyone else, nor is it desirable. Rather than leading to improved collaboration and problem solving, an indiscriminate increase in connectedness can be a drag on productivity, as people get bogged down maintaining all their relationships."

4.8.1.5 Strengthening a Network

Network structures may be strengthened by the following actions:

1. Encourage open and direct communication amongst practice teams members and client teams.
2. Better definition of team roles, with an understanding of responsibility requirements.
3. Concentration on activities that build trust within teams.
4. Limiting external interference by other project managers on network resources (dedicated teams).
5. Where possible and cost effective, relocate teams in proximity to each other to assist in trust building. Stakeholder communication prior to relocation should be established.
6. Reallocate team members as work types, volumes and interests change in order to meet changing environmental workloads, and client needs.
7. Establish additional measures of team financial performance in addition to individual revenue centre measures.

4.8.2 Broad Decision-Making Rights Lead to Sub-Optimal Decisions

ME would like to maintain its network style and 'long hallways.' A core force against maintaining the current network style is broad decision-making rights that result in sub-optimal decisions.

The misalignment with company strategy lies between the focus on developing entrepreneurial leaders that seek new opportunities (forcing growth), and maintaining a 'small company feel' with a strong relationship component.

An examination of the two opposing forces is discussed below.

4.8.2.1 Entrepreneurial Focus

The focus on leadership and entrepreneurial attitude stems from market conditions in the 1980's. During this time, many consulting companies had a hard time finding and maintaining work, and core staff. ME became leaner, and focused on working harder to get new work, rather than laying off core personal.

The project manager function is viewed as one of the highest callings at ME. At this level, there is the highest individual control over implementing company strategy. The core strategy of service makes it hard for these entrepreneurs to say no to new opportunities with existing clients. Rewards are largely based on initiative and leadership, so project managers are driven to excel by getting new work.

4.8.2.2 Small Company Feel

ME was founded based on relationships of the founding partners. This philosophy continues today with emphasis on a tight knit organization with a 'long hallways' concept.

When the technical core becomes overloaded, the relational component suffers. Employees tend to work longer, work harder, and take few breaks to interact with others.

4.8.3 Lack of Entrepreneurial Control Leads to Work Overload

Decisions are sub-optimal in that due consideration is not given to capacity before new work is acquired. At the same time, project managers are driven by the service strategy. The main result is that the technical core becomes overloaded, and accelerated company growth reduces cash flow and profitability.

When work overload occurs, the following problems occur:

1. Some projects must be delayed because of insufficient resources.
2. New resources must be added to meet timelines. New resources must be trained, and they consume other resources while being trained. Inefficiencies lead to delays, and cost overruns.
3. Projects may be completed on time, but with reduced quality. Quality problems that crop up later will damage company reputation.

4.8.4 Lack of Resource Control

The sharing of resources can lead to cold wars between functions who share the resources (Beer, 2003). When client service is a key strategic aim, project managers must develop techniques for getting work done. Sometimes the projects that are done are those where managers have political influence, or otherwise use political influence to secure resources. The power of senior managers often outweighs the ability of employees to say no to work.

Senior project managers can exert significant influence on resource allocation. They can often designate whom they will use with little input from other project managers. Other project managers must then do the work themselves, or resort to political means to get work done. The workload planning of the CAD Technician group has reduced the level of politics, but not eliminated it.

4.9 Open Systems Theory

Open systems theory provides a method for handling the complexities of the external environment. Rational systems thinking (closed system) views organizations only in terms of simpler economic terms.

Network structures are open systems, subject to broad environmental forces. An open system is one whose technical core (the core of a company where its specialized work is done) is subject to many uncontrollable or indeterminate variables. To manage effectively, managers need to reduce unknowns and attempt to make open systems rational systems for executing strategy

and making money (Thompson, 2003). Controls are put in place in order to make decision making less complex and uncertain. Certainty is required to make effective decisions.

Organizations seek better fit with their external environment and internal culture by rationalizing. This rationalizing takes the form of buffering of the technical core, balancing input and outputs into the technical core, through adaptation and by rationing.

Each as it applies to ME is discussed below.

4.9.1 Shield the Technical Core with Input and Output Buffers

With an open system all staff is free to interact with the environment and solicit new clients. The fundamental problem is that most of the work is done in the technical core where the workload footprint is the widest.

A buffer is a means of controlling the volume and pace of work coming into the company. In industrial settings with assembly lines, input and output buffers consist of raw material storage on the input side, and warehousing storage on the output side. These input and output buffers allow production to occur at a constant rate based on management control and on the technology implemented. Supplies of raw material on the input side allow for consistent and efficient processing of material into the finished product, and the output buffer provides inventory to meet short-term fluctuations in market demand.

For a service-based company work input is based on the number of clients and their associated work requirements. At ME, the client 'filter' acts as a buffer on the input side. Entrepreneurial project managers use it subjectively. It is ineffective since it is difficult to forecast the timing between work identification and authorization to proceed.

Company output is buffered by the speed of production. Accelerated project schedules send a 'signal' to demanding clients about the speed of production. Similarly, projects that are

not completed on time, or have lengthy schedules send a 'signal' that the client's work is not high priority. These signals establish the volume of repeat work with the client, and expectations of completion time lines. Accelerated schedules become the expectation of aggressive clients. Conversely, tardy projects reduce either client expectations or signal clients to change consultants.

Buffering is effective if project managers are diligent in the use and application of the client filter and managers are realistic with clients regarding project expectations.

4.9.2 Smoothing Input and Output Transactions

Buffering has benefits, but also organizational costs (Thompson, 2003). High demand clients may have limited work. Current buffering mechanisms are unsatisfactory since some clients may get exceptional service while less demanding clients may not be serviced adequately. If the work of a high demand client receives priority over other clients, other good clients may leave. In the end, this is costly.

Smoothing involves reducing the fluctuation in environmental forces (Thompson, 2003). The current strategy for smoothing is by managing client expectations. Project managers apply this subjectively. Decisions do not always consider resource allocation constraints. Some managers may be more diligent than others in conveying this message to clients.

Additional smoothing is required by placing premiums on high demand clients. Exceptional service and accelerated work should come at a premium. This could be by placing overtime premiums when the technical core needs to work in excess of 40 hours per week for one client.

4.9.3 Adaptation

An organization may adapt to a changing environment if it can anticipate changes in demand (Thompson, 2003). The patterns for demand changes in municipal consulting are not pronounced. Leading indicators such as housing starts provide an estimate of economic changes, but are at best a guess in terms of direct impact. Better information is retrieved from client feedback.

Network organizations are naturally adaptable. The lack of structure enables easy adaptation to new environmental demands.

ME adapts by hiring new employees. Usually there is a lag between demand and hiring. Regardless of whether a new employee has experience, there are skill and organizational learning curve deficiencies that must be overcome before a new hire is fully effective.

A greater focus should be placed on integrated training to provide a broader skill set. This would allow employees to adapt more readily not only to new opportunities, but also to a market downturn.

A key concern is over emphasis on large projects. Privately funded large projects can drive company growth during an economic boom, but smaller projects sustain an organization through a market down turn (Abbott, 2005). A greater number of smaller projects must be maintained for stabilization in advance of a market downturn.

4.9.4 Rationing

As a last resort, organizations turn to rationing as a means of shielding the technical core (Thompson, 2003). Rationing is the method of last resort, but essential for core function to be effective if other methods are ineffective. The service strategy cannot change, so buffering will always be ineffective in a buoyant market.

Recent workload demands on the CAD group, prompted management of ME to ration CAD group resources. A CAD manager coordinates all drafting work. Workload meetings are held on Monday mornings to discuss work scheduling and allocation.

Since the implementation of rationing, excessive workload demands on CAD technicians has been significantly reduced. However, overload still occurs when the schedule is short-circuited (project managers still go directly to CAD Technician).

Other technical staff are not shielded. They are open to environmental forces from an unlimited number of project managers.

This is particularly difficult for new employees who lack the skills to deal with work overload, and for seasoned employees who try to balance work-life commitments.

During periods of high environmental stress when other solutions are not effective, rationing must occur. Further rationing may be implemented by limiting resource sharing or 'partitioning.' Individuals may be allocated to one or two PN's, rather than as a general resource to all PN's. As work loads shift, the individual may be reallocated and shared amongst a limited number of other Practice Networks. This would allow the organization to remain adaptable.

4.10 Operational Layout

The role of operations is to meet the quality, speed, dependability, flexibility and cost requirements of the client (McCarthy, 2006). Not all products and services provided by ME have similar volume-variety characteristics. These elements are subjective and open to interpretation.

"Largely, it is the volume-variety characteristics of the operation which dictate its process type." The rate of flow of products and information is also dependent on the volume-variety

characteristics. The volume-variety of the operation will limit layout to one or two layout options (Slack, Chambers and Johnston, 2004, p. 205-206).

Different client needs may require alternate layouts. If the operational layout is wrong, "confused flow patterns, inventory of material, customer queues building up in the operation, customers being inconvenienced, long process times, inflexible operations, unpredictable flows and high cost" may result (Slack et al, 2004, p. 205).

4.10.1 Typical Operational Layouts

Most municipal consultants use a process layout (Slack et al, 2004). A fixed-position layout may be used on large infrastructure projects where on-site engineering services are required.

4.10.1.1 The Process Layout

A process layout groups resources by function. Specific functions consist of individual specialists or a group with common skills such as the CRT, or CAD group.

The process layout allows for greater flexibility and utilization, but products travel farther and take longer to complete. In large organizations, this makes "flow patterns in the operation very complex." (Slack et al, 2004, p. 208). Scheduling and control can be complex, and quality may be an issue. (McCarthy, 2005). Efficiency is lost by the distance team members must travel, either by walking about, or by travelling to other offices to meet with team members. Some functions such as clerical are shared across different PN's so learning efficiencies are lost because of differing client requirements. Typically, it takes longer to learn specific project requirements because of the differing requirements of both different project managers and different clients.

At ME, individual specialists work either alone or in the case of CAD Technicians, with other similarly skilled individuals. A process type layout in professional services normally uses

jobbing processes to deal with the high variety and low volumes of work (Slack et al, 2004). Jobbing processes are defined as "processes that deal with high variety and low volumes, although there may be some repetition of flow and activities" (p. 774). Jobbing processes use shared resources amongst different projects. Usually the needs of each project vary, placing different requirements on individuals. A network configuration provides the needed flexibility but in a large organization such as ME, this leads to complexity and a loss of efficiency since many projects are "one-offs."

4.10.2 Alternate Layout

When the customer (or group of customers) requires fast turnaround, the process and layout may need to change to be more efficient. A change in process and layout may also be required to complete a number of projects in a short time. If projects are similar, efficiency may be achieved by a new layout, which capitalizes on learning efficiencies, and simpler workflow patterns.

A cell layout is one in which the various functions needed to complete a project are grouped together. It is normally used in manufacturing, but may also be used in the service industry. Cell layouts are not common in a professional services setting because of the cost of configuration since reconfiguration to a cell layout may require more space (Slack et al, 2004).

A cell layout configuration is typically how most spin-off or start-up companies lay out operations. Usually because of financial constraints, office space is limited, and each individual is located in close proximity. As the company grows, individuals are relocated by function. These divisions are made by function to maximize space efficiency.

Group work in a cellular type layout provides better motivation than a process layout, reduces complex workflow and increases throughput (Slack et al, 2004). It provides a greater

team focus with greater integrated learning, with less compartmentalization, and reduced travel time between functions. The draw back is that specialization is reduced by being separated from the functional grouping.

Increased specialization, which would suffer in a cellular layout, would be supported through the technical group meetings, and individual training as required. For example, an individual currently tests new software, works the bugs out, and then trains others in its use. This would continue to support the focus on specialization.

A cellular layout could be used for a selected group of projects, with a finite completion time. A cellular layout may use a batch process, where a dedicated team of employees complete a group of similar projects. A batch type process may have a "wider range of volume-variety levels than other process types" (Slack et al, 2004).

The organization must weight the costs of physical rearrangement versus the benefit for each project team. The benefits include increased motivation, increased efficiency, and better team focus. The drawback is that it is higher cost, largely because of space requirements. The social effects of displacement must also be considered.

4.10.2.1 Cell Layout Using Technology (Virtual Teams)

The cost of a cell layout may be addressed using virtual teams linked by technology. Physically separated team members interact electronically (Gould, 2006). Periodic face-to-face meetings are occasionally required. Effective teamwork principles developed by Katzenback and Smith (1991) apply.

The benefits of a virtual team include (Gould, 2006):

1. Work has greater geographic mobility and time flexibility.
2. Greater team competency, since skills are not restricted by physical location.

3. Reduced commuting time to meet with other team members.
4. Reduced fixed cost.
5. Reduces social disruption in local offices.

The virtual team layout may be configured for short-term projects without the need for costly physical relocation. In a physical cell arrangement, fixed costs tend to increase and variable costs tend to decrease by changing the operational layout from process to a cellular configuration (Slack et al, 2004). A virtual layout minimizes both fixed and variable costs.

Team requirements include frequent meetings at the outset to establish trust, to establish purpose, and to establish team goals. At the outset, individual responsibility must be established for both individual and mutual accountability (Gould, 2006).

Face-to-face communication in a trusting environment allows for better motivation and clearer interpretations of communication from visual queues. The limitation of effective virtual communication has more to do with trust and open and honest communication than with physical separation.

Better technology allows for improved virtual face-to-face communication. As technology improves, the need for physical face-to-face communication is reduced. To make the teams efficient, resource sharing must be minimized. Team members may meet on an as needed basis to discuss issues face-to-face.

With current technology, the use of virtual teams may not be optimal. As technology improves communication, virtual teams will be increasingly effective. The ME IT function can play a large role in identifying and leveraging emerging technology.

4.11 Financial

Profitability makes all other things possible. Revenue production and cost control are, therefore, an important component of competitive advantage. Growth reduces profitability by consuming cash. This is in part from investment in plant and equipment, as well as learning curve and inefficiency issues. Large network organizations are difficult to coordinate. Therefore, they are a costly structure to operate. This is evident in the financial ratios shown in Table 4.2.

4.11.1 Financial Ratios

There are few publicly traded consulting engineering companies similar in size to ME. The closest is Stantec Inc. Stantec is used for the comparison of ME financial information.

Being a private company, ME does not have to cater to the whims of shareholders to the same extent as do publicly traded companies. As a result ME has more flexibility in how it groups its accounts, and reports its earnings.

A summary of the key ratios used in the analysis for the period from 2000 to 2004 (analysis period) is shown in Table 4.2.

Table 4.2: Summary of Ratios for Mark Engineering

	2000	2001	2002	2003	2004
Profit Margin	0.96	1.17	1.46	1.30	1.14
Return on Equity	4.70	5.90	8.00	7.40	6.70
Return on Assets	1.96	2.52	3.10	2.35	2.32
Financial Leverage	2.38	2.34	2.57	3.14	2.91
Debt to Equity	1.4	1.3	1.6	2.1	1.9
Current Ratio	1.5	1.4	1.3	1.2	1.2
Revenue year over year increase (%)		11	18	12	19
Accounts Payable year over year increase (%)		5	13	20	27
Unearned Revenue (X1000)	680	730	1000	2200	1860

Ratios calculated by author, data scaled for privacy

ME has set the financial profitability and financial leverage targets as shown below:

Debt to Equity: 1.5/1

Net Income: 10%

4.11.1.1 Return on Equity (ROE)

ROE is the ultimate measure of the return to shareholders. Its constituent parts consist of the product of profit margin, asset turnover, and financial leverage.

ROE has increased significantly over the analysis period. The increase in ROE is primarily due to an increase in financial leverage. It is still well below Stantec's ROE of 15.97% in 2004.

4.11.1.2 Return on Assets (ROA)

ROA measures the productivity of assets. The ROA is approximately one-quarter of Stantec's ROA (8.24%, 2004). ME is over-investing in software and new equipment.

4.11.1.3 Sales Growth and Cash Flow

Sales growth has also increased significantly over the analysis period. Signs of growth include increases in Accounts Payable, and Unearned Revenue.

Significant increases in Accounts Payable over 2003 and 2004, suggests cash flow difficulties because of rapid growth. Cash flow (and debt financing) issues are confirmed in the Statement of Changes in Financial Position, with significant decreases in cash requiring increase bank (debt) financing.

Unearned Revenue increased significantly in 2003. Many of the larger clients require projects in the fiscal year to be fully invoiced or funding will be lost. Project work completed may have been slower due to a shortage of resources to complete work, and the associated learning curve issues from hiring new employees.

4.11.1.4 Debt to Equity

Historically the debt to equity ratio has been stable. From 2002 to 2004 the debt to equity ratio increased significantly. Equity financing increased gradually over the analysis period, largely because of stable increases in retained earnings. The increase in the debt to equity ratio is therefore mainly the result of increased debt required to cover payables.

4.11.1.5 Current Ratio

The current ratio is low. An industry comparison with Stantec suggests that it may be in line with industry norms. Stantec's current ratio for 2003 and 2004 was 1.4 and 1.6 respectively. While ME's current ratio had dipped to 1.2 over this same period, historically it has been approximately 1.5. As ME gets the debt to equity in line with its target of 1.5, the current ratio should increase back to historical levels consistent with industry norms.

Over the short term a low current ratio is not a major concern since ME has a well established, stable business environment, with many long-term clients.

4.11.1.6 Salaries (Wages and Professional Fees)

ME does not exclude indirect costs in the account Wages and Professional Fees, and does not list the Cost of Sales (COS). Direct and indirect costs are lumped together in the accounts.

4.11.1.7 Financial Issues

In recent years, rapid growth has lead to issues relating to financial leverage, liquidity, and increased debt costs. Cash flows show that increased levels of debt financing have been required to cover obligations.

The key issue for ME revolves around managing growth. Monitoring of growth from a financial perspective is necessary to control financial leverage, and improve profitability. Growth consumes cash and reduces profitability because of increased expenditures even if higher salary

expenses are largely absorbed through higher charge out rates. Cash is required to purchase new equipment, and acquire additional office space. In addition, learning curve issues (new employees), resource allocation conflicts, and space limitations leads to inefficiencies. Meeting market place salaries means the cost of new hires may exceed budgets already in place. This may partially explain higher levels of unearned revenue in recent years.

Profitability is well below Stantec's profitability (6.7 % in 2004) and the company target of 10 %. One major factor is that ME does not differentiate employee bonuses from employee salary. For example, in 2004 approximately $ 3.0 Million in contingent rewards was added to the account Wages and Profession Fees. If net earnings are adjusted for this, the profit margin is very close to the company target of 10 %. Changing the bonus plan is difficult to do without adversely affecting morale. To increase profitability, expenditure reductions are required.

Providing employee bonus rewards is considered standard industry practice. The Association of Professional Engineers and Geoscientists of British Columbia salary survey (2006) indicates that the majority of industry practitioners receive some form of additional compensation in the form of stock options, bonuses or profit sharing.

Both Stantec and ME have a rewards program for employees. ME provides contingent rewards to employees. Stantec distributes employee stock options and contributes to a share purchase plan.

There is increasing pressure to provide additional employee benefits to retain employees. Therefore, ME will have to differentiate itself in the market place to attract and retain employees.

Expenditure reductions will also aid in reducing debt to equity. This would alleviate the financing strain, and provide a measure of 'recession proofing.' Alternatively, a significant equity infusion would be required.

4.11.1.8 Financial Improvements

The financial ratios are consistent with what is observed operationally at ME. Expenses are too high. Insufficient emphasis is placed on cost control. This is exacerbated by the flat organization structure, and company philosophy.

The analysis suggests that for ME to maintain financial leverage and cash flows, it must:

1. Reduce expenses.
2. 'Sweat' some of its assets, and limit investment in capital assets with low marginal return.

If ME can reduce expenses, profit and leverage will improve.

By replacing some of the short-term debt with long-term debt, ME can reduce its future short-term debt to within its revolving line of credit limit. This will also reduce inflationary risk of short-term interest rates.

ME invests significantly in capital improvements relating to technology. If it can amortize these over longer periods, profitability will improve.

A company the size of ME should have a better handle on indirect salaries. The accounts should differentiate direct and indirect cost of salaries to provide better monitoring of overhead salaries.

4.11.2 Staff Retention

Employee turnover hurts the bottom line. Costs increase as tacit project knowledge is lost. New employees consume resources while being trained. Fortunately, network organizations are not crippled as can happen in other structural configurations when staff leave.

4.11.3 Capturing Full Value for Services

A weakness has been collecting full value for services provided. Some of the underlying problems relating to revenue production and expenses are shown below:

1. Poorly defined project scope.
2. Improper fee format accounting for these risks.
3. Inflexible owners and review authorities.
4. Inexperienced project personnel, coupled with poor coordination.
5. A lack of resources to complete project work.
6. Pressure for revenue production.
7. Inconsistent project reviews.
8. Growth pressures.

4.11.3.1 Poorly Defined Project Scope

A well-defined project scope has a number of benefits. Firstly, it lays out a plan that transfers project knowledge to those that do the work. A well-defined project reduces the amount of time spent establishing the project requirements. This is particularly beneficial for inexperienced professionals. Secondly, it reduces the project risk, providing justification for additional funding if work is required beyond the original scope of work. Thirdly, it lets the client and decision makers make informed decisions on the level of effort required and the associated cost.

In some cases, proposal submissions have not been sufficiently detailed or not submitted at all. This is evident in the First Nations PN, and the land development PN. A core problem in the First Nations PN is that the level of detail required for proposal submissions has become excessive. Consulting proposals are usually considered a billable task. Rather than a two or three page proposal, the 'Funding Brief' has become as large as most project reports and studies. The cost becomes impossible to absorb for smaller projects. In the land development PN, tight deadlines and a lack of resources, in some cases, have resulted in work being completed without a project scope or proposal being submitted to the client for review and approval. When clients

receive the invoices, they are surprised at the cost, and then attempt to negotiate to reduce the cost. This mainly occurs with new clients that have not established a partnering, trusting relationship. It is more common for land development clients because of their cash flow circumstances since the engineering and planning work precedes the revenue production activities (lot or home sales) of the developer.

A poorly defined work program may be suitable if the billing and payment terms are consistent with the level of risk. For poorly defined work plans, an hourly billing setup transfers more of the risk to the client. For a well-defined work program, a value billing (lump sum) format may be beneficial because the risk is limited by the detail in the work program.

Project budgets may be inaccurate because accounting cost feedback does not provide sufficient detail. Detailed activity costs are not tracked and therefore cannot be used for estimating the cost of future work. Available cost tracking may also not be accurate since actual time spent may be recorded as overhead time, or to another project (with approval of the client).

4.11.3.2 Inflexible Owners and Review Authorities

If owners or review authorities do not agree with professional recommendations, additional effort may be required to negotiate, re-evaluate, and resolve issues. These efforts may not be billable. This is mainly a concern where clients or review authorities are concentrated, and control project funding.

4.11.3.3 Inexperienced Project Personal Coupled with Poor Coordination

Junior project personnel may be limited by a lack of experience, and information asymmetries. They cannot work as efficiently as more senior personnel, and require more guidance from a senior person. They also lack high-level information that both project managers and clients may have which is not relayed to them.

With the high workload volume, project mangers may not have sufficient time to guide more junior staff. With insufficient guidance, inexperienced staff may not be able to work as efficiently.

4.11.3.4 A Lack of Resources to Complete Project Work

With high workload demand, shared technical resources, and scarcity of supply, there may not be sufficient resources to efficiently complete projects. Quality may suffer because work then must be completed in less time.

If work is postponed, there are still project costs that accumulate. There are general project management requirements for project updates and client correspondence even if technical work is not carried out. There are also learning inefficiencies, for project staff must relearn project characteristics once project work restarts.

4.11.3.5 Pressure for Revenue Production

Individuals are measured as revenue centres. Using individuals as revenue centres is a key focus for management to maintain the profitability target of 10 %. This creates pressure to get unbillable proposals out quickly. This increases the potential for poorly detailed work plans.

Individual revenue centres are beneficial in that they bring commitment to the organization, and reduce-principal-agent problems. The drawback is that it is inconsistent with a collaborative strategy. Individual revenue centres may sacrifice the partnering, team-oriented culture. Project managers may seek to manage multiple projects in order to maintain their billable levels, even if work does not satisfy the company 'filter'. A team-based measure should be added to promote collaboration.

Substantial differentiation is required to maintain high revenues (charge outs) over the long term. A market downturn may limit the ability to have higher charge out rates.

4.11.3.6 Inconsistent Project Reviews

Decision rights flow down in a network style organization (Nohria, 1991). This allows individual subjectivity in the level of detail required for proposals, and reports. Occasionally projects are sent out without sufficient review. This increases risk.

4.11.3.7 Growth Pressure

Growth forces financial strain of resources. Growth is detrimental to profitability and cash flow. The ME vision and strategy is one that encourages growth. Highly motivated, entrepreneurial employees force growth.

4.11.4 Improving Revenue Production and Controlling Costs

Revenue production may be improved by task billing, and by establishing suitably detailed terms of reference on project requirements. Ensuring consistent levels of quality support the differentiated strategy and supports higher charge-out rates and total fees.

Strategic costs should be rationalized and other non-strategic costs minimized. Revenue and expenses are linked by cause and effect. Reducing costs will reduce the pressure of meeting revenue targets. This will result in reduced pressure, stress and turnover (loss of tacit knowledge), ultimately reducing the cost of training. This would also allow for additional time to network.

4.12 Summary

The key industry success factor is securing skilled practitioners. ME is fortunate to have many skilled professionals. This is supported by ME's ability to attract new talent in a tight labour market. As a relationship based network organization, it can provide creative and innovative solutions to clients' problems. A key element of effective networking is trust.

ME pursues a differentiated adequate-cost strategy. Differentiation is provided mainly through client service, and providing integrated, flexible solutions. A network structure supports differentiation through effective collaboration using high performance teams. High performance teams are effective providing the level of interaction is limited to a small number of people. Correspondingly, networks must limit interaction to remain efficient. Network organizations need to focus on effective collaboration, and not high levels of interaction.

Competitive advantage is developed through core competencies from performing activities that are different from your competitors or by doing similar activities at a lower cost. ME's core competencies are customer relationship management and communication, providing integrated and innovative solutions through competencies in CAD, design, and project management. Its strength in service and the technical function is offset by the cost of cutting edge technology, and an inconsistent application of the project review policy.

In networks, decision-making rights flow to the lowest levels of the company, with power typically distributed by knowledge. At ME, other power centres include career coaches, branch managers, Partners and the Board of Directors. Care must be taken the professional responsibility of professionals (such as the Engineer-of-Record) are not undermined by other power centres.

ME prizes initiative and an entrepreneurial attitude. Entrepreneurial managers at ME share technical resources to complete work. Structural tensions can develop between entrepreneurial forces and the availability of resources in the technical core. These forces must be balanced to promote harmony.

Methods to balance forces on the technical core consists of buffering and smoothing workload inputs, adapting to demands, and if necessary rationing of resources. Once rationing occurs, it signals the need for change.

The inefficiencies of the current network configuration are evident in the ME financial statements. Profitability is well below that of industry competitor, Stantec Inc. While this is largely a result of giving contingent rewards back to employees, shareholder value suffers. Reducing contingent rewards may not be possible without affecting morale. A strategy is required to increase shareholder returns.

5 IMPROVEMENT OPTIONS

Key options consider financial improvements (Section 5.1) and structural improvements (Section 5.2). The focus of structural improvement should be to shield the technical core from environmental forces. Other improvement options are discussed in Section 5.3.

The primary focus of improvements should be on actions that reduce costs. A secondary focus should be on improving revenues. Cost reduction is a higher priority since it supports a sustained competitive advantage. Reducing costs supports a sustained competitive advantage by providing flexibility in revenue requirements during a market downturn.

Scarcity of skilled professionals could increase industry consolidation, and promote supply chain integration. The flexibility to control revenue requirements also enables control over the threat of vertical integration by customers.

5.1 Key Financial Improvements

Profitability of Mark Engineering (ME) is poor. Financial improvements are required to satisfy shareholders by providing returns similar to other equity investments. A number of key issues need to be addressed as summarized in Table 5.1.

Reducing costs reduces pressure for revenue production thus allowing more time to focus on relationship interaction.

5.1.1 Costs

High costs reduce flexibility. Cost control will improve profitability, allow for continued reinvestment, and recession-proof the company. The focus should be on rationalizing strategically important costs and reducing or eliminating non-strategic costs.

Table 5.1: Cost Reduction Strategies

Improved acounting feedback
Reduce risk through mandatory senior review
'Sweat the assets'
Improve operational efficiency

5.1.1.1 Accounting Feedback

Improved accounting feedback provides management with better information for decision making. Feedback on direct costs, job costs, and team-based performance, is required.

5.1.1.2 Direct Costs

The accounts do not separate direct and indirect payroll costs. These costs should be separated. This information should be used to establish the cost of sales.

5.1.1.3 Job Costs

ME is planning to implement a task billing system. Task billing provides an effective means of recouping value on projects. Current market strength supports task billing. Nevertheless, the cost basis must be well defined. This must include the cost of overtime for clients that demand fast completion. Improved detail on past job costs will enable more accurate job cost estimating. It is crucial to complete well-defined work programs for task billing in order to reduce risk.

5.1.1.4 Team Based Performance Measures

Benchmarking is a process of comparing an operation to other parts of its own company or comparing a company and its operations to other companies' operations. Benchmarking provides feedback on the need for change. It also provides valuable feedback and allows a company to determine if it is overachieving, if it is on track or if it is losing competitive advantage over time. Accounting systems should be configured to give management timely feedback on performance, so effective decisions can be made.

Team-based performance measures should be implemented to benchmark performance. Team-based performance measures would balance revenue measures (individual) where one individual is saddled with proposal writing responsibilities.

Benchmarking of Practice Network (PN) performance is needed to provide feedback to management on where it should target resources to take advantage of profitable work. These measures could be broken into sub-team measures for PN's in each branch office.

5.1.1.5 Risk Reduction-Senior Review and Decision Rights

Many organizations delegate decision rights by limiting a decision maker's rights to a dollar value. The submission of proposals of limited value could be made at lower levels. For larger projects, review and sign off by a senior manager should be required. This will safeguard the company from consequences of poorly estimated work-plans.

5.1.1.6 'Sweat the Assets'

The Return on Assets is approximately one-quarter of competitor Stantec Inc.

Reinvestment should not occur just for the sake of reinvestment. Reinvestment in assets needs to be strategic. The investment in technology, which does not directly support the company strategy, should be scrutinized.

While the latest technology motivates staff, its benefits are muted by learning curve issues and glitches in bleeding-edge technology. The decision to purchase new software and hardware should be based on efficiency improvements and its effectiveness in supporting service.

Organizational objectives would be better served by strategies to reduce overload on the technical core, than by higher investment in new technology. This would retain staff by reducing burnout.

5.1.1.7 Operational Improvements-Flexible Configurations

Operational efficiency can redefine industry expectations, by lowering operating costs. In doing so, operations can help to drive competitive advantage. (McCarthy, 2005).

A cell layout provides increased operational efficiencies (where certain projects have higher volume and lower variety characteristics). A cell layout allows faster throughput, and better team motivation. The key is to meet strategic objectives, and the quality, speed, dependability, flexibility and cost requirements of the client. A cellular layout may be used for select groups of projects. This layout groups the different functions of a team together. Project teams using a cell layout could develop learning efficiencies by completing a number of projects with similar requirements. This would reduce completion time and enhance profitability. While face-to-face team placement is best, technology may be used to link team members. The IT competence may be leveraged to build virtual cell teams. Specialized skill sets could be linked using emerging technologies. By using technology, the draw back of physical relocation (cost and social) could be eliminated.

Dedicated resources on project teams would provide a shield from environmental forces. Once the group of projects is complete, the team could tackle other projects, or be disbanded and new project groups formed. The important element is that the team is shielded from outside environmental influences so they may pursue their tasks efficiently.

A rationalization of costs for training may mean more technology-based conference-type training sessions with all offices connected. ME can use its expertise in computer technology to gain the maximum effect.

5.1.2 Revenue

5.1.2.1 Monitoring-The Revenue Centre

Principal-Agent issues are controlled by monitoring of individual revenue centres. This reduces monitoring costs by managers.

The benefits of individual revenue centres outweigh the drawbacks. The benefits of individual revenue centres are that they provide individual accountability to the team, and to the organization.

A problem with individual revenue centres is that there is no way to measure the contribution of individual value to the organization. The focus is on individual performance.

Monitoring systems and rewards for collaboration and teamwork should be implemented. Secondary measures on team-based performance will balance the stress of individual revenue centres, when he or she is completing unbillable tasks.

5.2 Structural Options

5.2.1 Structural Changes

Shielding of the technical core enables the company to control environmental forces. This reduces burnout, turnover, and the cost of training new employees.

Shielding may be accomplished by limiting resource allocation in a network, or by establishing company divisions. Each option is discussed below.

5.2.1.1 Network Structure

Networks are social systems linked through relationships. They developed from the need for increased flexibility due to increased competition.

For smaller organizations, a network configuration may provide some cost efficiencies by better resource utilization. Small network structures are rewarding since they provide motivation through their relationship focus and involvement on small teams. The also provide adaptability and creativity. They are effective for complex, rapidly changing environments that require creative solutions.

Large network organizations are complex, and costly to operate. The increasing complexity in a growing network organization will increase costs. Growth increases costs and reduces cash flow.

Larger network organizations are complex to manage. The coordination of a network configuration can become cumbersome. As network organizations grow, coordination becomes complex and forces for growth can spin the company out of control. Staff can become overworked trying to keep up with the demands of project managers and clients.

During an economic boom, when work is plentiful, buffering, smoothing and adaptation are not fully effective in shielding the technical core. Rationing of resources is required during these periods. Partitioning of resources along PN boundaries or sharing amongst a limited number of PN's will provide certainty for project managers, and support the service strategy.

Counterintuitive effects of the current network structure are that it may ultimately support strategy by keeping the company small. The forces that drive the core to spin apart will keep the organization small enough to maintain the network style. Employees that burnout, or tire of workload demands, will leave. A strategy to lock in core personnel will be required. A further

drawback is that this strategy will reduce competitive advantage by limiting the ability to do things at a lower cost. Operational costs will remain high, and continue to hurt profitability.

In order to maintain the network style, and the 'small company feel' ME should strengthen the resolve to limit growth in the company. It may wish to retract a little from the market and focus on higher return areas. Improved accounting feedback on PN profitability would help define the profitable areas to focus on.

ME may limit growth in the core company by forming a subsidiary that focuses on higher risk and higher returns. This would help protect shareholder value in the core company, and satisfy entrepreneurial impulses (M. Selman, e-mail to author, December 4, 2006). This would allow additional shielding of the technical core from environmental forces, by reducing the demands of aggressive clients on the core company.

5.2.2 Division Structure

Given the nature of the current market, the need for a network style organization is less pronounced. The need for adaptable solutions through networking should be driven by client needs. Some clients desire flexible and creative solutions. Others do not.

As companies grow, hierarchy also increases (Jones, 2001). With growth, increased structure and divisions are inevitable. In small companies, the level of hierarchy is limited, primarily because interaction is limited to a small group of people, therefore limiting complexity. Natural divisions occur in networks, which reduces uncertainty for managers.

A divisional structure does not mean that networking will completely end. A divisional structure is more efficient, but will limit interaction. As network structures grow, divisions naturally occur, necessitated by the need to complete work.

Typical division structures align more with cellular operational layouts, than with process (functional) layouts. A division type structure dedicates different resource functions to one department. Division structures also provide shielding of the technical core from environmental forces.

Many maturing service organizations use a cellular structure with a junior-senior hierarchy. Major consulting companies adopt an up-or-out model. Lower paid junior employees are expected to drive value. Junior employees either move up to the partner ranks or leave. Junior employees are usually easy to attract because company branding allows for future career opportunities elsewhere. A major component of this model is standardized processes that allow junior employees to be efficient. (M. Frein, e-mail to author, December 6, 2006).

ME could apply a modified junior-senior configuration. The key would be to join entrepreneurial staff with dedicated junior resources. Junior staff could be dedicated to the senior manager (to reduce resource overload), and if necessary relocated in a cellular configuration to improve efficiency. The drawback in relocating in a cellular configuration would be a reduced 'small company feel,' that has been advantageous in delivering integrated, innovative solutions.

5.3 Other Optional Improvements

5.3.1.1 The Value Chain

Engineering costs are only a small component of a project's life cycle cost. A larger focus on earlier stages of the industry value chain will permit capture of greater value, develop better solution for clients, and capture more client intelligence. This strategy will provide a win-win for ME and for the client since value engineering typically reduces life cycle costs.

Currently, there is an emphasis on larger projects, due to strong market conditions. There should be a stronger focus on smaller projects with emphasis on earlier stages of the industrial

value chain. Smaller projects will make the company more recession proof when the large projects dry up. Smaller projects (typically funded by government), are more stable during market troughs.

Currently value is not captured in follow-up operational support of projects. This presents an opportunity, particularly for First Nation clients that do not have capacity for a dedicated maintenance staff. This will also provide tacit knowledge of client operations, and opportunities for further work.

5.3.1.2 Information Sharing

The current weakness in data storage (reports and proposals) may be remedied by a storage system on the Intranet. Functionality can be built in with search and sorting options enabling fast retrieval of information.

5.3.1.3 Quality

"Professional services tend to be people-based rather than equipment-based, with emphasis placed on the process (how the service is delivered) rather than the 'product' (what is delivered)" (Slack et al, 2004, p.116). Nevertheless, quality is still an important driver of a differentiated strategy.

A sustainable competitive advantage may not be possible in the long term without emphasis on quality. In the long term reputation is an important element, developed largely through quality, in maintaining existing clients and developing new clients during a market downturn. Senior reviews and quality systems are an important element of this strategy. The service strategy needs to be coupled with consistent high quality over the long term in order for this strategy to be sustainable.

5.3.1.4 A Note of Caution

We are all creatures of our past. Change is sometimes difficult to implement because of entrenched positions and short-term thinking. In addition, 'Group Think' issues can misdirect or side track decisions, or even kill them. Caution must be taken in meetings to control power dynamics. By limiting meeting size, 'Group Think' can be partially overcome. Emphasis on active listening skills will also help.

5.3.1.5 Budgetary Responsibility

The budgetary discrepancy is most evident for responsible professionals without partnership. These individual carry significant responsibility for project completion, but do not have a commensurate level of financial control.

The principle of equality would best be supported by distribution of a portion of the operating budget based on team value and revenue generation. This would rationalize decision making to those that have the greatest impact on revenue and team performance.

6 CONCLUSION

No organizational structure is perfect. Each has its benefits and drawbacks. Each has its own set of unique challenges. In this paper, I have evaluated some of the challenges of a large network organization.

The profitability of Mark Engineering (ME) dictates the need for change. The profitability in 2004 was 1.1 %, well below that of Stantec Inc., whose profitability was 6.7 % in 2004. The Return on Equity (ROE) in 2004 was nearly 10 % lower than Stantec's ROE. In addition, the Return on Assets (ROA) was roughly one-quarter that of Stantec's ROA. Cost reduction strategies are needed to improve profitability and enhance competitive advantage. A strong cost position will also enable ME to control the threat of downstream vertical integration.

Increased structure of the company is not optional. It will occur regardless of the actions of management to control it. With growth there may come a time when decisions by committee are no longer feasible. As the company grows, an increase in hierarchy will be required to reduce management complexities. Transformational change to traditional hierarchical forms may create more problems than it solves. Structural changes should be incremental.

The only way structure can be minimized is by keeping the company small. This will be difficult because growth is a product of developing motivated entrepreneurial staff. One way to do this would be to form an entrepreneurial subsidiary that focuses on higher risk work. This would protect shareholder value, and help to shield the technical core of the company. Depending on market conditions, rationing may still be required to minimize work overload.

Better accounting feedback will help to define the profitable areas, and unprofitable areas. The core company may then reduce its unprofitable work.

ME's competitive advantage is contained in its people. With its emphasis on personal growth, it develops competent, motivated staff. Competitive advantage may be enhanced by additional emphasis on quality and on cost reduction. The company philosophy may be maintained even with an increase in structure. The fundamental focus should be on effective collaboration, not on the apparent increase in structure.

A network structure provides flexibility to meet changing market conditions and environmental demands. The need for a network structure is less prevalent during strong economic conditions, since work is plentiful, and ME can be selective with opportunities. In a market downturn, a network structure provides more benefit, by being adaptable. The entrepreneurial focus of individuals allows the development of new opportunities.

A balance should be struck on the volume of small and large projects. Increased emphasis on feasibility studies will provide a win-win situation by providing more value to the client, and enhancing profitability. Small projects will sustain the company through market downturns.

APPENDIX: CLASSES OF COST ESTIMATES

Class A Cost Estimate

This is a detailed estimate based on quantity take-offs from final drawings and specifications. It is used to evaluate tenders. A contingency allowance of 5% plus engineering and other allowances is appropriate for this class of estimate.

Class B Cost Estimate

This estimate is prepared after site investigations and studies have been completed and the major systems defined. It is based on a project brief and preliminary design. It is used for obtaining firm financial commitments, budgetary control and design cost control. A contingency allowance of 15% plus engineering and other allowances is appropriate for this class of estimate.

Class C Cost Estimate

This estimate, which is prepared with limited site information, is based on probable conditions affecting the project. It represents the summation of all identifiable project component costs. It is used for program planning to establish a more specific definition of client needs and to obtain approval in principle. A contingency of 25% plus engineering and other allowances is appropriate for this class of estimate.

Class D Cost Estimate

This is a preliminary estimate, which, due to little or no site information indicates the approximate magnitude of cost of the proposed project, based on client's broad requirements. This overall cost estimate may be derived from lump sum or unit costs associated with other

recent similar projects. It may be used to obtain approval in principle and for discussion purposes. A contingency allowance of 35% plus engineering and other allowances is appropriate for this class of estimate.

Extracted from Mark Engineering Cost Estimating Manual

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