

# CHAPTER 1

## OVERVIEW OF STUDY

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### 1.1 Background of Study

Engineering consulting firms play an important role in the economic growth and development of a country. This is well recognised in many countries, particularly developing countries. This is because of their direct contribution of their services to the design and implementation of investment projects, and together with the inter-linkages they produce between the different parts of the economy.

In general, engineering consulting firms only account for a relatively small percent of the project cost, ranging from 5% to 10%. This would depend relatively on the type, size, importance and complexity of the project. However, the bulk of the project cost will be consumed by the construction services, materials and equipment. Nevertheless, engineering consulting firms are of prime importance to the development of countries, particularly developing nations.

The services contributed by engineering consulting firms are in terms of design of systems and products, professional advice, inter-professional assistance, international consulting, forensic engineering and research and development (R&D). This knowledge is transformed into specifications for industrial plants, infrastructure facilities and equipment. Furthermore, the selection of contractors and sourcing of machinery, equipment, manufactured goods and raw materials are influenced by engineering consulting firms.

There are various types of services that can be rendered by engineering consulting firms, which could be categorised as :

1. Designing mechanical, electrical and energy systems, transportation facilities, communications systems and utilities.
2. Analysing client's problems in specific technical areas, such as structural stress and strain, materials defects, equipment lubrication, transport scheduling, and control of energy and power processes.
3. Calculating special structural and design features like piping flexibility, bridge and tower strength, foundation materials, and components for communications products and equipment.
4. Providing computer services for professional firms, such as routine design calculations, specification preparation, payroll, projects completion and cost-evaluation.
5. Developing manufacturing design and analyses, and preparing assessment of the environment impact of specific building projects.
6. Offering miscellaneous specialities in any one of many highly technical disciplines, such as magneto-hydrodynamics, nuclear waste disposal, unique use of electronic chips, all kinds of pollution control, and etc.

Out of these six major types of services, the first – design of mechanical and electrical systems, and structures – is the area that involves the largest number of consulting engineers.

There are four basic methods normally used for implementation of a project, which are the traditional client-consultant method, project management method, in-house consulting and turnkey method.

Under the *traditional method*, the client has total responsibility for the implementation of a project and retains a consultant to carry out professional services required for the execution of the project, including the preparation of plans, cost estimates, detailed engineering, tendering documents and to represent the client's interest in bid evaluation and contract negotiation, as well as in the supervision of the construction and installation. This method is considered to be suitable for the majority of projects and is normally recommended by international financing institution, such as the Asian Development Bank.

Under the *project management method*, the client engages a single consulting firm to handle planning, scheduling, engineering, procurement, construction management and commissioning for the project. The project management firm, thus, acts as the client's executing agency, but does not act as the contractor. This method is said to be the best suited for complex projects involving a tight implementation schedule, such as the development of power plants.

The *in-house consulting method* involves minimal use of independent consultants, which would be brought in to assist in specific aspects of the project where in-house employees do not have sufficient experience.

Under the *turnkey method*, a single company is engaged for the engineering and construction of the complete project. Here, the consultant may act as the advisor to the client, or alternatively as a subcontractor to the turnkey contractor. This method is thought to be best suited for small and simple projects requiring specialised process expertise which can only be provided by a few specialised contractors, or to very large and complex projects such as oil refineries, where the turnkey contractor can facilitate better management, co-ordination and control of the project.

In Malaysia, the construction sector accounted for 4% of GDP in 1998 and 3.7% of GDP from 1999 to 2000 (Economic Report 1999 / 2000). Censuses of the construction industry by the Department of Statistics revealed that the gross output value of the industry, ranged from RM 7 billion to RM 7.5 billion serving the 1998 - 2000 period. These figures show that the construction industry, as a single sector, has provided a significant contribution to the Malaysian economy. However, the GDP had a sudden drop from 1997 to 1998 due to the Malaysian economical downturn, which amount to a contraction of 23% for the construction industry alone.

According to the Census of Professional and Institutional Establishments (Private Sector) by the Department of Statistics, the total revenue for engineering consulting firms was RM 370 million to RM 400 million for the period from 1998 to 2000. Currently, there are a total of 664 engineering consulting firms in Malaysia with sizes ranging from less than 20 full-time employees (small-sized) to more than 300 employees (large-sized).

Management is one of the factors that plays an important role in ensuring the efficient utilisation of the factors of production, land, capital and labour. Management practices often govern the performance of the firms, as it is defined as the process of designing and maintaining an environment in which individuals working together in groups, accomplish efficiently selected aims.

Engineering consulting firms, essentially provide consulting services to their clients, be it the government or private sector. Managing services vary from managing tangible products, because of its characteristics, such as intangibility and inseparability. Therefore, the management of an engineering consulting firm should be handled carefully to ensure the development of its strategic competitiveness.

Based on the above, the engineering consulting firms are an important asset to the Malaysian economy. However, very little study has been conducted on the management practices and problems of engineering consulting firms in Malaysia. Studies on management practices that have been published by various professional institution and societies, focused on project management and are technical in nature. This study attempts to fill the void by examining the management practices and problems of engineering consulting firms.

This study is designed to identify the various management practices utilised to develop core competencies, competitive advantages and hence, the strategic competitiveness of engineering consulting firms. Besides that, it would also highlights the various internal and external problems encountered. Moreover, this study recommends strategic management techniques and the implementation methods to improve the management practices and overcome the problems of engineering consulting firms.

## **1.2 Objective of Study**

This study is exploratory in nature with the aim of achieving the following objectives :

1. To examine the current management practices of engineering consulting firms.
2. To identify the various internal and external problems of these firms, and recommend the possible solutions to these problems.
3. To identify and recommend the relevant strategic alternatives available and the implementation methods for engineering consulting firms to improve their management practices and overcome the problems, while achieving their corporate growth objectives.
4. Lastly, to create a base for the management practices and problems of engineering consulting firms, to enable subsequent empirical research to be conducted to provide more conclusive evidence and recommendation.

### 1.3 Scope of Study

The study would review two engineering consulting firms, mainly, Minconsult Sdn Bhd and Ghazali & Associates Sdn. Bhd. The criteria for choosing both the firms is to ensure that there are remarkable differences between them. Minconsult Sdn Bhd is chosen based on its strong reputation in the industry, its vast expertise and experience, and its long history. Whereas, Ghazali & Associates Sdn Bhd is chosen as the second firm because it is a new and emerging firm, with less than a year experience. It also has lesser disciplines and expertise

Minconsult Sdn Bhd is a leading comprehensive engineering consulting firm. It traces its history to as early as 1962. Minconsult offers a whole range of engineering services for a project, from developing an idea to its design, undertaking the necessary feasibility studies, project planning, tendering and ultimate construction management of the project. It also offers specialist consulting services on the project segment to complete a whole project. Minconsult has a total staff of about four hundred trained personnel. With more than a quarter century of engineering experience built-in, it has proven its professional skills and shown its dependability not only in Malaysia, but also in Africa, India, Nepal and in the South East Asian region. The company has fifteen specialised divisions to render the comprehensive engineering services

Ghazali & Associates Sdn. Bhd. is a newly established company providing services in engineering design and project management for the construction industry. Although new, the principals of the company are very experienced and have been involved in the construction industry, in particular in the provision of engineering and construction management services, in well over fifteen years. The company is wholly owned by Bumiputera professionals committed to provide excellent and value-added engineering services to the industry. Particular expertise of the principals and staff of the firm are in the area of infrastructure and utilities, township and housing development, low and high rise buildings, industrial buildings and institutional buildings.

Besides the review on these specific companies, there would also be a review of the engineering consulting industry in Malaysia and the major problems affecting the industry for the past few years. This investigation is necessary because the direction and problems in the industry as a whole, would subsequently cause some implications to the firms' strategic management and competitiveness.

#### **1.4 Sources of Information**

The material on the company is derived from internal sources and from the authors' personal experiences with the companies. Information on the internal environment comes from the company profiles, financial reports, company reports, press reports and trade and journal publications. There are also interviews with top management to obtain relevant information on the practices, problems encountered and the strategic direction of the company. Besides that, the staffs and experts in the engineering consulting industry are also interviewed to obtain their opinions and experiences.

Data for the consulting industry and the market trends are obtained from trade and journal publication of the Institute of Engineers Malaysia and other professional institutions and societies.

#### **1.5 Brief Literature Review**

The study would cover the internal and external environments of the firms. For the internal environment, there will be an analysis of the financial reports, a SWOT Analysis and Core Competencies Analysis. Also, there will be an analysis of the importance of strategic management, with subsequent identification of the alternative methods of formulating relevant strategies and the implementation methods. Besides that, there will be an analysis of the human resources. This analysis is conducted by comparing the actual system and the ideal system, to identify the strength and weaknesses, and hence its implications. By these analyses, the practices, problems and strategic management of the firms can be established.

For the external environment, there would be a structural analysis of the engineering consulting industry and its market trends. This is to analyse its opportunities, threats and the competitiveness of the industry. Michael Porter's Five Forces Model will be used to analyse the industry. Therefore, the contributing factors to the problems encountered by the firms can be identified.

## **1.6 Limitations of the Study**

The information presented in this study is almost qualitative in nature as it is felt that the presentation of quantitative information may expose the firms to strategic threats.

As the study is purely exploratory in nature, it should not be deemed as final and conclusive. The study is conducted only to clarify and gain a better understanding of the management practices and problems of engineering consulting firms in Malaysia. The recommendations on the strategies and implementations should be viewed only as suggestions. Therefore, subsequent empirical researches need to be conducted to provide more conclusive evidences and recommendations.

Furthermore, due to time and financial constraints, only two engineering consulting firms were taken into consideration. Though these two consulting firms were able to provide useful insights into the engineering consulting firms, the future researches should study more firms in Malaysia to obtain a more complete and overall view of the firms, hence enabling more conclusive recommendations be made.