ISTANBUL TECHNICAL UNIVERSITY ★ INSTITUTE OF SCIENCE AND TECHNOLOGY

COMPETITIVENESS IN CONSTRUCTION INDUSTRY

M.Sc. Thesis by

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Department : Architecture

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LIST OF ABBREVIATIONS

APP	: Assets Process Performance Model
BOT	: Build-Operate- Transfer
CBP	: Construction Best Practice Programme
CU	: Customs Union
DIE	: State Institute of Statistics
DPT	: State Planning Organization
ENR	: Engineering News Record
FDBOT	: Finance, Design, Build, Operate, Transfer
FDI	: Foreign Direct Investment
ITU	: Istanbul Technical University
KPI	: Key Performance Indicators
METU	: Middle East Technical University
MNE	: Multinational enterprise
MRT	: Mass Rapid Transport
PFI	: Private Finance Initiative
TCV	: Total Competitiveness Value
WCY	: World Competitiveness Yearbook

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COMPETITIVENESS IN CONSTRUCTION INDUSTRY

SUMMARY

The chaotic start of the new century has brought new challenges for firms, industries and countries. Success in such times is demanding new perspectives on competitiveness. Detailed structuring of competitiveness related models and frameworks about construction industry within the thesis, identified weaknesses in the applicability of the concept and missing points in the models. Also, reviewing of competitiveness related literature and classifying it at three levels (national, industry and firm level), clearly indicated the importance of the firm level.

To introduce the content of the study, the thesis identifies effective analytical tools of competitiveness analysis for construction industry and construction firms. Accordingly, appropriate adjustments to a number of analytical models are highlighted due to the unique characteristics of the construction industry. The focus of the study is on review of literature at the national, industry and firm level competitiveness studies (as classified on three levels) and competitiveness-related frameworks and models. After, evaluating selected frameworks and models of competitiveness, they are categorized according to construction business environments. Finally, scope of application, key criteria, and strengths-weaknesses of competitiveness models of all defined levels are analyzed and synthesized in the conclusion of the study.

Accordingly, in *Chapter 1* introduction to the topic, research objectives, the purpose and the content of the study are presented shortly and in *Chapter 2*, the study continues with a description and analysis of the construction industry. Accordingly, production and process characteristics of the construction industry are reviewed with trend analysis and business environment understanding in construction.

In *Chapter 3*, a framework employed which comprises three level competitiveness understanding (*national, industry & firm level understanding).* The concepts and frameworks for competitiveness are described on these three levels and analyzed accordingly. Partial applications of these models for construction industry and firms

are presented within the chapter. In the conclusion part, a categorization is brought by different qualities of the models.

In *Chapter 4*, after a general mechanism of competitiveness explained, core competencies and competitive analysis of construction firms are evaluated, and international construction is analyzed through competitiveness models. Also the validity of the models is evaluated.

In *Chapter 5* firm level competitiveness in construction is assessed along with qualitative and quantitative models. Accordingly, TCV (total competitiveness value) and Key Performance Indicators (KPI) are reviewed and indicator based competitiveness understanding is introduced.

In *Chapter 6*, findings and conclusions of the study are presented; and suggestions for future research are outlined.

In terms of methodology; the frameworks suggested by Porter (1990), Lall (2001) and National Competitiveness Indices (such as IMD, 2003) are used to form a basis of competitiveness understanding in national level. Porter's (1980, 1985) other frameworks such as 'five competitive forces model', 'value chain', 'segmentation matrix' and 'three generic competitive strategies' are reviewed along with 'SWOT' and 'Benchmark analysis' to form a foundation for enterprise level competitiveness. Depending on this literature, applications of these models to construction is investigated. In the national level, Porter's diamond model (1990) and in the industry-enterprise level, Porter's 1980 & 1985 and generic models are covered. Also, in order to exemplify quantifying and qualifying studies of industry-enterprise level competitiveness and competitiveness benchmarking examples, APP model, the TCV framework and KPI are reviewed.

İNŞAAT SEKTÖRÜNDE REKABET

ÖZET

Yeni yüzyılın başlangıcıyla beraber, firmalar, endüstriler ve ülkeler için rekabet edebilirlik anlamında yeni güçlükler ortaya çıkmaya başlamıştır. Bu yeni durumda başarı; rekabette yeni bakış açılarını yakalamayı gerektirmektedir. Tez çalışmasında, rekabetle ilgili modellerin ve çerçevelerin detaylı analizi, inşaat sektörü için modellerdeki ve uygulama noktasındaki eksiklikler ortaya konmaktadır. Ayrıca, rekabet edebilirliğin üç seviyede incelenerek (ulusal, endüstri ve firma düzeyi) ilgili literatürün gözden geçirilmesi, firma düzeyi önemini açıkça vurgulamıştır.

İçerik olarak, bu çalışmada, inşaat sektörü ve inşaat firmaları için rekabet edebilirlik analizine yönelik etkili çözümleme araçları tanımlanmaktadır. İlgili olarak, bazı analitik modellerde inşaat sektörünün özgün karakterine uygun olarak gerekli düzeltmeler yapılmıştır. Çalışmanın odak noktası, inşaat sektöründe ulusal, endüstriyel ve firma düzeyindeki rekabetle ilgili literatürün gözden geçirilmesi ve oluşturulan model ve çerçevelerin analiz edilmesidir. Seçilen rekabet model ve yapıları değerlendirildikten sonra, inşaat endüstrisi için tanımlanan çalışma alanlarının kapsamına göre düzenlenmiş ve sınıflandırılmıştır. Son olarak, incelenen tüm rekabet modelleri; uygulama kapsamı, önemli özellikleri ve güçlü-zayıf noktaları açısından, çalışmada tanımlanan tüm düzeylerde, tablolar yardımıyla, ele alınmakta ve incelenmektedir.

Bu bağlamda, *Birinci Bölümde*, konuya giriş, çalışmanın amacı, araştırma ve kullanılan çalışma çerçevelerinin içeriği kısaca sunulduktan sonra *İkinci Bölümde*, inşaat endüstrisinin tanımı ve analizi yapılmıştır. İnşaat endüstrisinin ürün ve süreç özellikleri, trend analizi ve inşaat sektörünün *iş alanında* (*business environment*) gözden geçirilmiştir.

Üçüncü Bölümde, üç düzeyde rekabet (ulusal, endüstriyel ve firma seviyeleri) çerçevesi irdelenmiştir. Rekabetle ilgili yapılar ve kavramlar bu düzeyler dahilinde açıklanmış ve çözümlenmiştir. Bu bölümde ayrıca, bu modellerin inşaat endüstrisi ve firmalardaki

uygulamaları sunulmuştur. Sonuç bölümünde ise, çözümlenen modellerin çeşitlenen niteliklerine göre bir sınıflandırma için ipuçları verilmiştir.

Dördüncü Bölümde, rekabetin genel işleyiş şeması aktarıldıktan sonra, inşaat firmalarının temel rekabet gücü ve rekabet analizleri değerlendirilmiş, uluslar arası inşaat sektörü rekabet modelleriyle incelenmiş ve bunun yanı sıra tartışılan modellerin geçerliliği değerlendirilmiştir.

Beşinci Bölümde, inşaatta firma düzeyinde rekabet nitel ve nicel modeller aracılığıyla değerlendirilmiş, bu bağlamda, toplam rekabet değeri (TCV) ve ana performans endikatör (KPI) modelleri gözden geçirilmiş ve endikatör tabanlı rekabet anlayışı incelenmiştir.

Sonuç olarak, *Altıncı Bölümde*, çalışmada yapılan saptamalar ve varılan sonuçlar sunulmuş, gelecekte yapılacak araştırmalar için öneriler ortaya konmuştur.

Metodoloji olarak, Porter(1990), Lall(2001) ve Ulusal Rekabet Endekleri (IMD, 2003), tarafından sunulan kavramsal çerçeveler, ulusal düzeyde rekabet anlayışının temelini kurmak için kullanılmıştır. Firma düzeyinde rekabete temel oluşturmak için, Porter'ın (1980, 1985) 'beş rekabet gücü modeli', 'değer zinciri', 'segmentasyon matriksi' ve 'üç genel rekabet stratejisi' adlı diğer kavramsal çerçeveleri, 'SWOT' ve 'Kıyaslama analizi' ile gözden geçirilmiştir. Bu literatüre göre, bu modellerin inşaat endüstrisinde uygulamaları araştırılmıştır. Ulusal düzeyde, Porter'ın elmas modeli(1990), endüstriyel ve firma düzeyinde ise Porter'ın 1980 ve 1985 modelleri ve genel uygulanabilirliği olan modeller ele alınmıştır. Aynı zamanda, nitel ve nicel ve kıyaslama çalışmalarını örneklemek için, APP, TCV modelleri ve KPI tartışılmıştır.

CHAPTER 1 INTRODUCTION

> *"The fact is that symbolism is useful because it makes things difficult. What we wish to know is what can be proved from what…"*
>
> Bertrand Russell, *Mathematics and the Metaphysicians*

The turbulent start of the new century has brought new challenges for firms, industries and countries and competitive strategy is highlighted as an area of primary concern for enterprises to survive. Business strategists are also very much concerned with competitive rivalry and accordingly the success in current business world critically depends on the understanding of industries and competitors. This study is handled with a 'construction industry' point of view and the aim, objectives and content of the research is presented in this chapter.

1.1 THE PURPOSE AND SCOPE OF THE STUDY

Competition is defined as the core concept in non-monopolistic markets for a firm's survival and competitive strategy and competitiveness of firms become important areas of interest for researchers. Various frameworks about competitiveness have been suggested by a range of researchers but these studies are usually performed for manufacturing industries. For this point, *competitiveness* concept for construction industry is evaluated and related models are investigated in this study.

The initial driving question in this research is arisen by noticing the importance of competitiveness in construction industry for being successful. Throughout the time, this concentration attracts some questions. By quoting Porter's words these questions can be stated as follows;

> "What is driving competition in my industry or industries I am thinking of entering? What actions are competitors likely to take, and what is the best way to respond? How will my industry evolve?" (Porter, 1980, p.8)

Also, it is noticed that a practitioner should know how competition occurs in his industry to manage it properly. Competitiveness is reviewed as a dynamic concept and an executive in construction industry should have a specific understanding of competitiveness. Porter (1980) summarizes the essence of this dynamism as follows;

> "Rivalry among existing competitors takes the familiar form of jockeying the position- using tactics like price competition, advertising battles, product introductions, and increased customer service or warranties. Rivalry occurs because one or more competitors either feels the pressure or sees the opportunity to improve position. In most industries, competitive moves by one firm have noticeable effects on its competitors and thus may incite retaliation or efforts to counter the move; that is, firms are *mutually dependent*."

At this junction, this study aims to overview the specific characteristics of construction industry, explore the previous frameworks and models of competitiveness, and analyze their applications for construction industry. It also bears two important points to be recognized;

- Construction industry is one of the major businesses for international trade and improving the living standards of a developing country such as Turkey; can only be achieved by obtaining sustainable competitive advantage on the market.
- Retaining competitive advantage in construction industry is an important topic for developing countries and this could only be ameliorated with an analytical thinking about the industry and competitiveness.

Finally, through the subject matter, the study aims to provide an insight for future executives of construction industry about competitiveness and serve as an initial step for further studies on the topic.

1.2 RESEARCH OBJECTIVES

The competitiveness issue is highlighted in three levels (*international level, industry level and firm level*) within this study and the goal of this dissertation is founded to investigate and understand the competitiveness concerns in construction industry and analyze the issue in all levels.

The objectives of this research are to;

(1) Overview the specific characteristics, trends, markets and business cycles of the construction industry.

(2) Explain the central concepts of competitiveness and basic analytical tools of evaluating competitiveness.

(3) Overview the core competencies and competitive advantages in construction and highlight competitiveness in international construction by national level competitiveness tools.

(4) Outline benchmark and related firm level competitiveness studies for construction industry.

(5) Identify effective analytical tool characteristics for evaluating construction firms' competitiveness.

(6) Conclude general outcomes of the study and identify areas for further research.

1.3 CONTENT OF THE STUDY & METHODOLOGY

After reviewing the purpose, research objectives and content of the study in Chapter 1, the thesis continues with a description and analysis of the construction industry in Chapter 2. This section also includes the important aspects of the construction industry and its market conditions. By taking these features under question, a comprehensive understanding of construction business is provided.

In Chapter 3, the concepts and frameworks for competitiveness are described on three levels (national, industry and firm level) and analyzed accordingly. Partial applications of these models for construction industry and firms are presented within the chapter. In the conclusion part, a categorization is brought by different qualities of the models.

In Chapter 4, core competencies and competitive analysis of construction firms are evaluated, and international construction is analyzed through competitiveness models, also the validity of the models is evaluated.

In Chapter 5, firm level competitiveness in construction industry and quantifying/measuring methods of firm level competitiveness is evaluated. Besides indicator based competitiveness understanding is introduced.

Findings and conclusions are presented in Chapter 6 and the evaluation of possible ways for further analysis of firm level competitiveness in construction industry and general competitiveness concepts are evaluated.

In terms of methodology; the frameworks suggested by Porter (1990), Lall (2001) and National Competitiveness Indices (such as IMD, 2003) are used to form a basis of competitiveness understanding in national level. Porter's (1980, 1985) other frameworks such as 'five competitive forces model', 'value chain', 'segmentation matrix' and 'three generic competitive strategies' are reviewed along with 'SWOT' and 'Benchmark analysis' to form a foundation for enterprise level competitiveness. Depending on this literature, applications of these models to construction is investigated. In the national level, Porter's diamond model (1990) and in the industry-enterprise level, Porter's 1980 & 1985 models and generic models are covered. Also, in order to exemplify quantifying and qualifying studies of industry-enterprise level competitiveness and competitiveness benchmarking examples, Momaya's (2004) APP model, the TCV framework and KPI are reviewed.

CHAPTER 2 CONSTRUCTION INDUSTRY: FEATURES & ENVIRONMENT

Construction industry is considered to be an engine in the national economy. It is a large business and has many important links to the rest of the economy. The role of the construction industry becomes even further important for the countries in the process of industrialization. The apparent reason for this is the requirement of construction activity for roughly all types of investments (Stallworthy and Kharbanda, 1985). Literally, construction industry is considered as a 'locomotive' sector in that it leads and stimulates other commercial activities in an economy. For this reason, it is seen as a crucial sector for most of the countries for a functioning national economy (Oz, 1997).

Construction industry has contributed more than $448 billion dollars (ENR, 1995, Langford 2001) in terms of annual value of direct world construction put in place (Directly and indirectly it is assumed 3.2 trillion dollars) and this constitutes about 6.5 percent of the world's Gross Domestic Product (GDP). To give an idea, in the U.S., the construction industry accounts for 10 to 12 percent of the United States GDP directly or indirectly and employs more than 5.6 million workers (Construction Review, 1994). For UK, there are 170.000 heterogeneous firms undertaking nearly £60billion of work each year and the UK construction industry employs around two million people directly or indirectly in construction related industries, which constitutes nearly %7 of total UK workforce. Construction Industry of UK is also defined to provide %7 of Gross Domestic Product (GDP) (Langford, 2001).

Lastly for Turkey, there are 91.400 contractors registered in Public Works Ministry. If non-practicing firms are excluded, nearly 70.000 registered contractors can be found. Whenever non-registered contractors are included, the number can be seen approximately 200.000. However, %70 of the total national workload is completed by just 115 contractors in terms of value and these 115 firms comprise the %90 of the international construction workload of Turkey. In terms of domestic product of Turkey, construction services are defined by accounting of the %6.4 to %4.6 band of

GDP (data of 1992 and 2002 relatively, Yapi 2003) and directly employs 676.000 workers. (Yapi, 2003)

2.1 CHARACTERISTICS OF THE CONSTRUCTION INDUSTRY

Every industry has its own characteristics. Construction Industry has also its unique ones. In literature there are various definitions for the characteristics of the construction industry. Here, the classification made by Sugimoto (1990) is employed as the main framework and tried to be enhanced by adding other items to shape a quick list of more theoretical and fundamental understanding of construction industry.

2.1.1 Established Characteristics of the Construction Firms Production

The following list is formed to address the well-known characteristics of construction. They are as follows;

(1) *Experience-Good and Customization Characteristics:* It is defined by Sugimoto (1990) that each output of construction production is customized to best fit the *features*, *quality*, *cost*, and *location* a client requires and a whole set of construction activities occurs only once for one particular output. Consequently, customization of construction activities makes the output of construction production an 'experience good' and compared to a 'manufacturing good', whose quality is evident on inspection before purchase, the quality of an 'experience good' is determined only by using it after purchase. Customization of production also makes the services an 'experience good' provided by a construction firm from the client's perspective because the quality of the services cannot be established by the client until a planned output is completed and actually used. The 'experience good' characteristic of services provided by a construction firm makes the *past experience* and *reputation* of the construction firm an important source of competitiveness. Also, costs incurred in searching for the most appropriate construction firm seems to be closely related to bidding procedures and from submission of a pre-qualification to the final decision-making. (Sugimoto, 1990)

(2) *Immobility of the Final Outputs of Construction:* Ultimate outputs of construction are usually immobile and once they are built, they remain in place principally. Certainly, there can be some mobile outputs, such as floating plants etc. However, they are

rather exceptional and are transported like other capital goods, e.g., heavy machines and equipment, ships and airplanes. Immobility of the final output necessitates the production at its planned location. A large part of construction production, not only physical production activities but also services, such as project management activities and supervision of design, must take place at the location where the output is to be built. (Sugimoto, 1990)

(3) *Large Fixed Capital:* A final construction output requires a substantial capital expenditure compared to final outputs in other industries, such as consumer products. It should be noted that the size of the capital expenditure depends on the size, type, and planned features of an output and it begins to gain more value, when the client does not have enough sources for financing its demand.[1] (Sugimoto, 1990)

(4) *Specialization and Diversification in Product Segments:* Construction firms construct physical facilities in all industrial sectors so that the final outputs of construction are of many kinds. Traditionally, these outputs have been conveniently divided into two categories by type of owners, *private* and *public*. The former includes individual, commercial, and production facilities while the latter is intended for public uses. Since different segments require different expertise and such expertise assures acquisition of contracts, firms in the construction industry have a motivation to specialize in certain segments both in physical production and management. On the other hand, demand for a particular kind of facility is defined generally being influenced by two different factors, those specific to *the industry* to which the facility belongs and *the country* in which is located (Hillebrandt, 1974). Consequently, demand for a certain kind of facility is subject to complex fluctuations and to minimize such risks, firms may diversify into several product segments[2]. However, determining the optimal degree of specialization and diversification is defined by Sugimoto (1990) as a complex decision and the segments in which a firm chooses to compete may depend on the balance between its internal resources and the competitive environment in the segment. (Sugimoto, 1990)

(5) *Specialization and Vertical Integration in Functions:* According to Sugimoto (1990), in the construction industry, there are in general, four kinds of firms. First, there are

[1]Demacopoulos and Moavenzadeh (1985) suggest that financing ability is an important competitive advantage in construction markets. See Chapter 4 for more information.
[2] Note that this item is directly subjected to investigation in Porter's framework.

specialty contractors specializing in physical erection of facilities and each usually specializes one of different kinds of work, such as erecting concrete or steel structures, placing concrete forms, pouring concrete, finishing floors and walls, and so on. Second, contractors specialize in managing labor. Third, design firms specialize in designing architectural and engineering facilities. Fourth, engineering firms specialize in designing and performing feasibility studies and other pre-construction activities for industrial and other complex facilities and these firms perform different functions in constructing a facility. Nevertheless, the distinction between these types of firms is defined by Sugimoto (1990) as often blurred through *vertical integration* in functions. To illustrate, an engineering firm, which is considered as a design firm 'vertically integrated' with all sorts of pre-construction activities and may engage in project management and a contractor, can acquire the ability to design a facility and perform many pre-construction studies. Moreover, the border of the construction industry itself is defined as blurred as firms gain the ability to provide a financial package, which might otherwise be provided by a client or financial institutions. The degree of a firms specialization against vertical integration of functions depends on the types of contracts in which the firm engages, a client's request to a construction firm to perform particular functions, or on a decision of firm as a part of its competitive strategy. (Sugimoto, 1990)

(6) *High risks and uncertainties:* During construction processes, there are several uncertainties including the design process, the bidding process, the awarding of contract, and so on. Thus risk and uncertainty put a major factor in the construction procedure. For instance, the owners or authorities may suddenly throw out all bids for some reason. Additionally, at the work site conditions may be quite different from the original plan, also accidents, unpredictable disasters, such as earthquake, and fire add up some risks in the construction procedures.

(7) *Flexible prices of structures:* Unlike many other industries, which issue a catalogue of their products with accompanying prices, there is no catalogue of prices of buildings or structures. Pricing in the construction industry is unique and the sales prices of the products cannot be decided in advance. It is only when the nature of the desired product is determined through designed plans and specifications that it can be priced exactly and correctly.

(8) *Unique bidding basis:* Bidding arrangements are used for each construction structure and every project is priced separately and distinctly in the form of a bid for that particular project. Bidding provisions can vary, depending on whether the contract is let on a lump-sum, fixed cost, cost-plus, guaranteed maximum price basis or etc.

(9) *Relative subcontracting system:* General contractors cannot do everything in a construction project effectively. They do not have the expertise, enough manpower or supervision; so, they rely on the subcontractors. The subcontracting system is special in the construction industry in that it permits the kind of flexibility required whereby various mixes of contractors and crafts must be mobilized to suit the unique requirements of a particular project. Also, subcontractors make possible the rapid mobilization and dismissal of crafts for a project as changes in the kind and volume of the project varies.

(10) *Contingent, informal communication system:* In some industries formal communication is possible; however for the construction industry it is a hard one. The formal system supposes that everything is clear on the plans and in the specifications. Since most of problems which happen on the site have to be solved quickly, acceptance of verbal decisions and face to face relationships without formal procedures are normal methods of operating construction projects. These things may require shifts in plans and decisions and there is no time to follow the formal lines of communication. Even though construction is increasingly becoming formalized, with a stress on documenting decisions and lots of letter writing, the predominant mode of operations on the job site is still be named as contingency and informality.

(11) *Considerable hand tool technologies:* Automation can bring industry revolution and this is happened in manufacturing industries. However, the construction industry is one of the few industries which still relies heavily on hand tools and a handicraft technology. Depending on the craftsmen, leads contractors to rely on the skilled workers to create the product and even the engineers and architects have to rely on the craftsmen to interpret their plans and carry out their intentions.

2.1.2 Provisional Characteristics of the Construction Firms Production

In addition to the above eleven characteristics, there are three aspects of the production of construction firms, referred by Sugimoto (1990) as provisional

characteristics and they have received relatively little attention in the literature. They are as follows.

(1) *Ambiguity of goods and service production of construction firms:* Particular to the specialization of functions of construction firms, there is a difficulty in defining their production: Although the construction industry is usually categorized as a service industry, firms in the construction industry produce both goods and services. Like manufacturing firms, most of the contractors produce a large amount of physical output while architecture and engineering firms may not produce any physical output directly. In addition, there are significant physical inputs, such as materials and equipment, into the construction process from suppliers, and the final outputs of the industry are goods. According to Sugimoto (1990), theoretical treatment of construction production has not been sufficient enough to address this ambiguity in a systematic way and it is important to determine whether the construction industry is a service, manufacturing or distinctive industry which involve aspects of both. According to Sugimoto (1990), if the construction industry and its production are unique, it is theoretically misleading to apply ideas established for other industries to the construction industry and its firms.

(2) *International Involvement of a Construction Firm:* Manufacturing firms usually supply foreign markets in three primary modes: export, foreign direct investment (FDI) including equity-base joint venture, and others requiring a loose commitment with a local firm (e.g., technical training, patent licensing, franchising, management service agreements, and non-equity cooperative agreements). These alternatives enable manufacturing firms to serve foreign markets and selection of one of these modes is subject to the economic, political, and strategic judgment of the management of these firms.

In the construction industry, the ways of serving a foreign market is defined to be less straightforward by Sugimoto (1990) because of the unique production process and subsequent industrial structure of the industry. To illustrate, Seymour (1987) defined modes of foreign involvement based on the terms and concepts used in manufacturing firms for construction, such as FDI, joint venture, licensing, etc. However, for this point Sugimoto (1990) found Seymour's (1987) straightforward application of such modes unsuccessful for providing an appropriate interpretation for construction. According to Sugimoto (1990), Seymour's analysis (1987)

underestimates the importance of the fact that production in the construction industry is basically carried out on a contractual basis, even in a turn-key contract. He defines some exceptions such as a B.O.T.(Build-Operate-Transfer) contract where construction on an equity basis exists.

(3) *International Organization of a Construction Firm:* The international organizational units of the construction firms are typically classified into three primary forms, *headquarters*, *foreign subsidiary*, and *project office*, based on the roles played. According to Sugimoto (1990), in previous decades, a construction firm might be organized in such a way that headquarters performed all pre-construction activities and exported construction services while the project offices sourced all necessary inputs in the host country and performed the remaining project management activities. In this situation, the competitive advantages of construction firms would be nothing more than the static ones but he explained the current situation as being a more complex one. He also states that parallel to the changing technology the role of each organizational unit has also changed dramatically, and the rigid distinctions between headquarters, subsidiary, and the project office may mean little to construction firms. In addition, technological advances in communication not only allow firms to transmit work done at one location to multiple locations simultaneously but also give them the flexibility to decide where to perform a particular activity. Most importantly, the reasons for giving to headquarters and subsidiaries duplicated roles may diminish; each project office may not need a whole set of engineering and project management capability.

He concludes that to complete a project at one location firms are required to coordinate activities performed at several locations thus, construction firms which compete on the basis of firm-specific knowledge may need to coordinate such knowledge over their whole organization to be competitive in contemporary markets.

2.2 THE ENVIRONMENT OF CONSTRUCTION INDUSTRY

The structure and the environment of an industry directly influence the nature of competition between firms in that industry and accordingly the competitive strategies available to them (Porter, 1980). In this section, the environment of construction

firms, and changes in processes and the market structure briefly stated along with some analytical concepts developed for the industry.

2.2.1 Business environment of construction industry

Construction is often reported as being a fragmented industry and a fragmented industry is defined as 'one in which no company has a significant market share and is able to influence considerable outcomes within the industry' (Langford, 2001). Within this frame, a large number small and medium-sized companies and a small number of large companies usually inhabit a fragmented industrial structure. Porter (1980) defines a fragmented industry as inhabited by many competitors who are in a weak bargaining position[3] with respect to both buyer and supplier groupings, and profitability is marginal[4].

Contracting is also defined as a geographically dispersed project-based industry with markets that operate from local to the international level. As project size, complexity, technology and international location enter the frame of reference, there are fewer and fewer companies able to undertake particular types of projects and accordingly fragmentation tends to decrease along the way. Flanagan & Norman (1993) used the concept of 'contestable markets' in analyzing tendering strategy and explain the firm behavior in the contracting industry's project based market structure. A contestable market is characterized by 'where oligopolistic competition operates and where the danger of a potential entrant constrains companies' behavior such as their pricing policy' (Flanagan 1993, Langford 2001). Construction is also a hierarchical industry designated by size of firm, where many small companies are tending to act as sub-contractors to large companies, and it is at the small firm end that fragmentation is most outstanding. (Langford, 2001)

Therefore, the construction industry can be characterized as first, geographically dispersed and over-lapping market structures and second, is hierarchically structured in terms of company size. Large firms with specialist divisions and regional offices can manipulate resources to compete in a trendy sector of the market, however without a specialist division or a regional structure; a firm usually may find it difficult to break into new market areas. Also, the traditional medium-sized building firm,

[3] See Chapter 3 for bargaining power, buyer and supplier groups etc.
[4] Marginal profitability may not be the real case in developing countries, as evidenced by a real case. See *factor driven countries* definition of Porter (1990)(YT)

based in a depressed region has been worst hit by changes in demand (Langford, 2001). In this regard, competitive thinking and strategic planning could equally have helped these firms to survive during periods of market change.

2.2.2 External environment of a construction firm

The external environment of a firm is considered to be anything outside the boundaries of the company. Within this frame, Langford (2001) defines a firm's environment with two parts; (1) *General Environment* (2) *Task Environment*. The general environment is defined as 'anything that can potentially or indirectly affect the company and would include the economy, demographic variables, society's values and attitudes, and technological change at the public level' with further variables such as legal and cultural framework of a country. The task environment is defined with variables that have a direct and immediate impact on the company's activities and thus considered as the primary source of opportunities and threats for a company.

Table 2.1Environment characteristics in an analytical framework (Adapted from Langford, 2001)

Environmental Types		Characteristics	Comments
General Environment	Common Industry/National Environment	▪ The economic and social background of firms ▪ The industry's existing and potential clients ▪ Suppliers ▪ Labor and respective trade unions ▪ Trade associations ▪ Central and local Government departments ▪ Professional Institutions ▪ Industry Task Forces and initiatives.	▪ Common to all firms in the industry. ▪ Impacts firms both directly and indirectly. ▪ Impacted by demographics, technological and societal changes.
	Competitive Environment	▪ Structure of demand ▪ Procurement forms used by clients ▪ Competitors ▪ Availability of materials ▪ Labor ▪ Subcontractors and suppliers	▪ Localized to the firm. ▪ Determined by Porter's five industry forces.[5] ▪ Dealing with industries and markets.
Task Environment	Operational Environment		▪ Unique to each firm.

[5] See Chapter 4 for, Porter's five competitive (industry) forces.

Lansley et al. (1979) provided another analytical framework for thinking about the external environment in construction while studying the survival strategies of contractors. He separated the external environment into three broad categories; (1) *common industry/national environment* (2) *competitive environment* (3) *operational environment*.

The '*common industry/national environment*' comprises the economic and social background of firms, the industry's existing and potential clients, suppliers, labor and respective trade unions, trade associations, central and local government departments which are common to all firms. The *competitive environment* is more localized to the firm and describes the environment in which the company is in direct competition with other firms. Here key factors are listed as *the structure of demand, competitors*, *availability of materials*, *labor*, *sub-contractors* and *suppliers*. Lansley et al. (1979) noted that the periphery between the 'competitive' and 'common industry/national' environments becomes vague while company size increases. The operational environment is unique to each company and deals with the position of the firm in the competitive environment. Its origins rely on the strategic choices made by the company, the business activities which it undertakes, the geographic areas within which it chooses to compete and the suppliers with which it deals (Langford, 2001). In Table 2.1, environment characteristics can be seen within an analytical framework.

2.2.3 The processes & professions in construction

Construction is essentially a large industry of small firms which is staffed by predominantly young, male and casually employed operatives (Langford, 2001). The professions related with the construction industry may be seen as 'generalists' as similar with contractors, in order to increase and maintain flexibility. They tend to adopt a generalist attitude to their work in the face of changing market. To illustrate, architects are not inclined to specialize in one particular building type or method of construction. Langford (2001) states that the strategic choices of professions are related to their markets and most of them have chosen flexibility as a mechanism for survival and growth similar to contractors. He also adds that the generalist attitude is mainly related with the *product* ('the building being built) rather than the *service* being provided to the clients.

In terms of design practices, important changes have taken place for the strategic role of the architect in the construction process. Traditionally architectural work

undertaken by private practices varies with the size and turnover of the practice. To generalize; the smaller practices deal mainly with private individual clients or with larger clients requiring small-scale works and the larger practices are able to deal with corporate clients.(Langford, 2001)

According to Langford (2001) by 1990's the perceptions of the architect's role in the construction process has started to change with new procurement methods introduced such as, management contracting, construction management, project management, prime contracting and design & build methods. Moreover, the old tradition of design as a separate entity from production is in the face of integration with processes such as *design and built arrangements* and *prime contracting* where *turnkey* approaches are evident.

Another point for professions is that current construction processes are replacing 'historically strong craft tradition' with the increasing role of prefabricated components. This change brings a new set of skills for workers at the site and the craft process being transferred to off-site production centers. (Langford, 2001)

2.2.4 Market structure and price determination in construction

One of the most important characteristics of the construction industry is that it is not a single industry and made up of several different market areas. Accordingly, the workload undertaken by construction firms typically includes general construction, engineering and architecture works, and repair & maintenance of buildings. These works are undertaken by a large number of small firms and a small number of large firms competing for the largest projects. Langford (2001) defines construction industry with four different market areas for a classification purpose: (1) Building (2) Civil Engineering *and Architecture Services* (italics added) (3) Repair and Maintenance (4) Materials manufacturing. In terms of market segments these areas can be sub-divided into separate ones such as; building field can be seen as a composition of *housing*, *industrial* and *commercial markets*[6].(Langford, 2001)

A *market* is defined to bring together a *buyer* with a need for an end-product and a *seller* who can meet that need. The seller can satisfy the buyer's need at a price that is mutually agreed through an economic and social exchange relationship. Thus a

[6] In Turkey a general classification is used as *residential, non-residential, and sub-structure* buildings (Yapi Journal, 2003).

market can be defined as a demand side concept. In construction the market is client-generated and clients may have different degrees of knowledge, thus for *the need of a single point responsibility* and *bringing construction expertise earlier in the project delivery process*, they choose a procurement route for their projects. So, for construction, a market involves an economic exchange relationship to deliver a facility through a project process that requires firms to come together for the benefit of the client, normally through a procurement process that may or may not involve competition. Hillebrandt (1985) and Kay (1993) both, also provide some useful definitions for market. For Hillebrandt (1985) it has both an economic and social dimension, which organizes an exchange relationship between buyers and sellers of a commodity to determine price. According to Kay (1993) a *market* is defined by *demand* conditions. It is based on consumer needs and is characterized by the 'law of one price'. It is encircled by the ability of the consumer to substitute one product for another. However, an *industry* is determined by *supply* conditions. It is based on production technology and is defined by the markets chosen by firms[7]. Industries are determined by the manner in which production is organized. (Langford, 2001)

To Kay (1993), the chief concern for the firm is its choice of markets in terms of *product* and *geography*. According to him, *industries* are relatively stable and based on outputs from production capabilities whilst *markets* are transient; they are determined by consumer needs and encircled by substitute products.

Ball (1988) also defined two separate types of market structure in construction according to different economic forces operating in each one. (1) *Contracting*, which involves a company in constructing a facility to a customized design where the roles and responsibilities of each party are contractually defined. In this market structure, the method of price determination is the reverse of manufacturing in that the contractor determines price prior to production. Under this system, built structures are pre-demanded by the client. (2) *Speculative construction,* which involves foreseeing or prediction, responding to a demand or anticipates demand with its features. This type of market structure can be seen as a typical of a traditional manufacturing approach and speculative house building is of a typical example.

[7]Note that by this definition we can use the term *Turkish Construction Industry* regarding *Turkish Construction Market.*

For each type of market structure diverse skills are required. In former one, the emphasis is more on managerial and technical skills. In latter, entrepreneurial activity involves *market forecasting*, with market research, the assembly of financial packages and land banks. (Langford 2001)

Langford (2001) also asserts that, products of the construction industry tend to be fairly homogeneous and as a result the finished product cannot be visually identified as being the work of a particular builder (designers are excluded). He explains the situation in theory as 'a uniform knowledge of the market'[8]. He concludes; in practice the construction industry can be seen as a series of overlapping markets for a particular service, and these markets may be divided by *geography, size, type,* and *complexity* of work[9].

2.2.5 Procurement and tendering strategies in construction

Procurement strategies are the options available to the client in the market place for obtaining a facility through a managerial and administrative framework (Langford 2001). These are usually arranged to handle the project processes on behalf of the client. In terms of integrating design and site production there are six generally recognized procurement options can be defined, along with a four which are either slightly different, invented or sourced from two or more options. These can be listed as (1) *Traditional (separating design from construction),* (2) *Management Contracting,* (3) *Construction Management,* (4) *Project Management,* (5) *Design and Construct,* (6) *Develop and Construct,* and a further four as; (1) *Turnkey*, (similar to design and build but includes full fit-out and may include financing), (2) *Build-Operate-Transfer* (BOT), (3) *Private Finance Initiative*, (primarily finance, design, build, operate, and transfer) (FDBOT) (4) *Prime Contracting*, (a contractor leads supply chain management for the client). These procurement options systemized different organizational, managerial, administrative and risk relationships between the client and the client's advisors and the contractor. (Langford 2001)

[8] Note that homogeneous products can be seen as a *commodity* with marketing terms, and this is completely an undesirable situation in modern marketing understanding.
[9] In Turkey a general classification is used as *residential, non-residential, and sub-structure* buildings.

Tendering strategy is defined as the market mechanism for selecting, choosing and appointing a contractor. In this regard, mainly two approaches are identified for contractor selection, with a series of sub-options; (Langford 2001)

(1) "By negotiation": where only one contractor is involved.

(2) "By competition": with sub-sets as follows:

-"Open competition", where any number of contractors can compete.

-"Selective competition" (single stage), with normally between four and six contractors in competition, based on a pre-qualification process to ensure they have the competence to undertake the work.

-"Two stage tendering": combining selective competition in the first stage and then negotiation in the second stage.

-"Serial/continuity contracts": combining competition initially and then negotiation for a series of similar projects. This type of contract facilitates project learning but has considerable risks attached during periods of high and rampant inflation.

Another important issue related with tendering is *pre-qualification* process. Pre-qualification establishes the qualifying level for the construction work to be handled, and any form of pre-qualification involves assessment of a contractor's ability to and competence to undertake the work. As a result, the company reputation and the expertise become important factors along with other identifiers (refers to *experience-good and customization characteristics* of construction) while in the pre-qualification processes and thus these factors become important forms of competitive advantage. Once *pre-qualification* has happened the assumption is that all those selected are serious competitors and competent to undertake the work. (Langford, 2001)

There is a general understanding of a lowest-price culture in the construction industry traditionally. The domination of this understanding brings an axiom that the price is seen as an 'ultimate determining level of service'. However, currently this perspective is being challenged by *best value model*[10] arrangements in which soft issues such as relationship with the parties are highly considered besides the price and

[10] EU has also taken precautions against the lowest price understanding with government regulations.

introduce a new outlook for construction industry. Related with the best value models and competition, Gasttorna & Walters (1996) introduce *qualifying level of service* as a new analytical concept for service delivery by representing the basic assets to survive and compete, which can also be used to give an insight to the service side of the construction industry. (Langford, 2001)

2.2.6 Forecasting demand and wisdom of trends in construction

Another important feature of the construction industry can be defined as the variability of demand. To illustrate, the volume of commercial market in UK decreased by %68 from 1990 to 1993, and increased by %43 from 1996 to 1998. Since the variability of demand bears so much importance, assessing the significance of trends gains higher importance in strategic thinking and for staying competitive in the industry. Langford (2001) notified that 'demand in the construction industry' is created in a different way from many manufacturing industries. He defined that the nature of competition in construction is determined substantially by the actions of the client and consultant and gives some characteristics about the nature of demand in construction as follows.

(1) The exercise of *single-customer market* (monopsonist) power by clients in pre-contract stages.

(2) A shift to private sector demand, which is more variable and involves contractors in speculative construction to create demand.

(3) Industry sectoral workloads may vary and have equal or opposing effect on each other which in the end provide a total (aggregate) industry workload.

(4) A consistent and upward trend in the workload for repair and maintenance (R&M).[11]

Hillebrandt (1984) argues some factors for these changing conditions that may help to understand and contribute to the changing conditions of demand, these are;

- The populations of users of built facilities and any demographic changes of these populations,
- The rate of usage of built facilities and the change in the rate of usage,

[11] Note that this characteristic is conceptualized for British Construction Industry and may not be relevant for Turkish Construction Industry.

- Standards for facilities and any changes in standards,
- Replacement of stock due to aging or technical factors,
- Increases in or replacement of stock due to technological change or changes in standard.

Related with the demand, Stokes (1982) also has argued that strategists should focus primarily on the trends in the national and international construction industries.

2.3 CONCLUSION

In conclusion, it is understood that the construction industry must operate in constantly changing environments and conditions. Uncertainty and imprecision are critical elements in the nature of the construction industry and such a complex industry is characterized by instability and wide fluctuations of activity. Its technology and social base also tends to foster informality, personal relations, and community. All these characteristics make competitive understanding and strategic planning critical issues in terms of staying competitive and alive in the future markets.

It is also seen that typical characteristics of construction firms' final outputs makes it divergent according to manufacturing industries and the difference should be understood first while a theoretical framework developed for manufacturing industry is applied to construction industry. Moreover, these characteristics make feasible various analytical approaches both for the *processes* and *production* of the construction industry, along with analytical issues such as *demand conditions*, *business cycles* and *trend analysis*. These characteristics also provide a basis for understanding current *competitiveness models* which are analyzed in the forthcoming chapters and help to improve their imperfect parts and present tips for individual competitiveness models for construction industry. Also, by presenting a perspective to understand the *environment types*[12] of a construction firm, this section provided a basis for further classification of competitiveness issues.

Finally, further links with these characteristics of construction firms are introduced in following chapters and all presented points have high potential to bring clues about further research possibilities.

[12] Note that environment types will be extended in the final part of the thesis and a parallel competitiveness understanding is provided through these environment types.

CHAPTER 3 BASIC ANALYTICAL CONCEPTS AND TOOLS FOR COMPETITIVENESS

In the early 1980s, after the second oil price shock, the USA and many European countries were greatly concerned about the competitiveness of their national economies. Official concern showed itself in the UK in the report of the House of Lords Select Committee on Overseas Trade (HMSO, 1985) and in the same year, the report of the President's commission on Industrial competitiveness (US GPO, 1985) was published in the USA (Francis, 1989). Within the same years the Brookings Institution had published Robert Lawrence's study with the name of "*Can America Compete?*". Which show the increasing interest of governments about their national competitiveness, and it is interesting that firstly the governments of industrialized countries expressed worries about the erosion of their industrial leadership (OECD, 1997; Lall, 2001). With liberalization and adjustment, the concern has also spread many developing countries and it has evolved into new concerns about economic competitiveness in a more general sense. Today, competitiveness is acknowledged as a 'legitimate basis for policy discourse' for governments (Lall, 2001).

After considering the significance of the term *competitiveness* in current political discourse, to distinguish it as a result of a long history of thoughts, the following list may help to observe the 'evolution of the term'[13] till our day. The list can also be used to understand the various aspects of this more modern and complex concept.

- The classical economist Adam Smith has identified the four input factors: land, capital, natural resources and labor as the source of wealth of a nation. (Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations,* 1776)
- David Ricardo with his 'Law of Comparative Advantage' underlines how countries should compete. (David Ricardo, *Principles of Political Economy and Taxation,* 1817)
- The Marxist economists highlighting the impact of the sociopolitical environment on economic development conclude that the communist idea that

[13] Adapted from IMD world competitiveness yearbook

changing the political context should precede economic performance. (Karl Marx, *Capital: A Critique of Political Economy*, 1867)

- Max Weber, the German sociologist established the relationship between values, religious beliefs and the economic performance of nations. (Max Weber, *Ethic of Protestantism and the Spirit of Capitalism*, 1905)
- Joseph Schumpeter emphasized the role of the entrepreneur as a factor of competitiveness and underlined that progress is the result of disequilibria, which favors innovation and technological improvement. (Joseph Schumpeter, *Capitalism, Socialism and Democracy"*, 1942)
- Alfred P. Sloan and Peter Drucker have further developed the concept of management as a key input factor for competitiveness. (Alfred P. Sloan, *My Years at General Motors,* 1963*;* Peter Drucker*, The Age of Discontinuity*, 1969)
- Robert Solow has studied the factors underlying economic growth in the US between 1948 and 1982 and highlights the importance of education, technological innovation and increased know-how for competitiveness. (Robert Solow, *Technical Change and the Aggregate Production Function*, 1957)
- As an effort to combine different ideas, Michael Porter has tried to aggregate all these ideas into a systemic model, namely '*Competitiveness Diamond*'. (Michael Porter, *The Competitive Advantage of Nations*, 1990)
- Nicholas Negroponte and numerous modern economists are further refining the concept of "Knowledge" as the most recent input factor in competitiveness. (Nicholas Negroponte, *Being Digital*, 1995)

As noticed from above, there is a long history of debate to understand the advancement of a nation or an institution against others. Currently, the perceived problem of *competitiveness* is studied and debated mainly among economists along with some industry leaders and the analysis of it is mainly aimed at the emergent policy need by governments (Lall, 2001). Accordingly, Lall (2001) described that countries have always competed for *markets*, *investment*, *technology*, *skills*, and *resources* and governments have always tried (well or badly) to improve their national competitive positions. She also adds that many governments seriously inspect national competitiveness rankings produced by bodies like the *World Economic Forum* and the *International Institute of Management* and the study of competitiveness strategy is now a flourishing and remunerative industry as itself so, many countries now have high-

level official committees to deal with competitiveness through ministerial divisions to devise international, national or regional policy[14]. However, the output of these studies is seen of variable quality by Lall (2001) that is from *serious analysis* to *ideological tracts*, 'low-level business school reports' to banal data mixture, and 'applications of impressive but blank formulae' to straightforward 'bashing(*condemn*)-the-foreigner' outcomes. (Lall, 2001)

Having seen the long history of debate on competitiveness or similar terms, this does not mean that the current competitiveness concern is simply 'old-wine in new bottles'. As a result of rapid liberalization of trade and investment plus falling transport and communication costs, economic space is shrinking and competition is more intense and immediate in the current world. Finally, the novelty can be seen as leaning in the speed and suddenness of the international competition and changing individual economies. (Lall, 2001)

To outline the structure, this chapter includes 6 sub-sections. Following the introduction part, definitions for competitiveness are covered in section 2. In the following two sections (sec.3, sec.4) 'national level' and 'industry and enterprise level' competitiveness concepts are categorized and analyzed. In the fifth section, 'three generic competitive strategies' defined by Porter (1985) are overviewed. Finally, in the last section 'competitiveness concepts' that are presented are partly[15] applied to construction.

3.1 DEFINING COMPETITIVENESS

Despite growing concerns, 'competitiveness' is a diffuse concept, and subject to many interpretations and so to confusion (Lall, 2001). It has also a multi dimensional notion and according to Momaya (2004) it can be looked at from three different levels: *country, industry* and *firm level*. It originates from the Latin word '*competer'* which means involvement in business rivalry for business markets and currently, institutions and academicians have been very prolific in proposing a definition for

[14] In UK a high-level committee submitted the Third White Paper on competitiveness in 1996 (UK Cabinet Office, 1996). This committee was moved to the Department of Trade and Industry and submitted the fourth competitiveness report shortly after (DTI, 1998). Also, the Office of Technology Assessment of the US Senate analyzed and benchmarked US technological performance and policies, until 1996. (Lall, 2001)

[15] The application of Porter's 'National Competitiveness Model' to construction is presented in Chapter 4, and application of 'benchmark analysis' to construction is presented in Chapter 5.

competitiveness (Momaya, 2004). This diversity can be seen as an indicator of the popularity of the subject but also of its complex nature. The following list for definitions of national competitiveness has been adapted from IMD World Competitiveness Yearbook depending on the US National Competitiveness Council's publications.

Table 3.1 Definitions of competitiveness in different sources (Source IMD Yearbook, 2003)

Definitions of Competitiveness[16]	**Source**
A field of Economic knowledge, which analyses the facts and policies that shape the ability of a nation to create and maintain an environment that sustains more value creation for its enterprises and more prosperity for its people.	IMD's World Competitiveness Yearbook, 2003.
The ability of a country to achieve sustained high rates of growth in GDP per capita.	World Economic Forum, Global Competitiveness. Report, 1996, pg. 19.
Competitiveness is relative and not absolute. It depends on shareholder and customer values, financial strength which determines the ability to act and react within the competitive environment and the potential of people and technology in implementing the necessary strategic changes. Competitiveness can only be sustained if an appropriate balance is maintained between these factors which can be of conflicting nature.	Feurer, R. and Chaharbaghi, K., "Management Decision", 1994, Vol. 32, No. 2, pp.49 -.
A firm is competitive if it can produce products and services of superior quality and lower costs than its domestic and international competitors. Competitiveness is synonymous with a firm's long-run profit performance and its ability to compensate its employees and provide superior returns to its owners.	Report of the Select Committee of the House of Lords on Overseas Trade, 1985.
The immediate and future ability of, and opportunities for, entrepreneurs to design goods worldwide whose price and non-price qualities form a more attractive package than those of foreign and domestic competitors.	European Management Produce and Market (also used for defining Competitiveness of Enterprises in the World Competitiveness Report, 1991, IMD and World Economic Forum.
National competitiveness refers to a country's ability to create, produce, distribute and/or service products in international trade while earning rising returns on its resources.	Scott, B. R. and Lodge, G. C., "US Competitiveness in the World Economy", 1985, pg. 3.
Competitiveness includes both efficiency (reaching goals at the lowest possible cost) and effectiveness (having the right goals). It is this choice of industrial goals which is crucial. Competitiveness includes both the ends and the means towards those ends.	Buckley, P. J. et al, "Measures of International Competitiveness: A Critical Survey", Journal of Marketing Management, 1988.
Competitiveness implies elements of productivity, efficiency and profitability. But it is not an end in itself or a target. It is a powerful means to achieve rising living standards and increasing social welfare - a tool for achieving targets. Globally, by increasing productivity and efficiency in the context of international specialization, competitiveness provides the basis for raising peoples' earnings in a non-inflationary way.	Competitiveness Advisory Group, (Ciampi Group). "Enhancing European Competitiveness". First report to the President of the Commission, the Prime Ministers and the Heads of State, June 1995.

[16] Adapted from IMD World Competitiveness Yearbook 2003, p712

Definitions of Competitiveness[16]	**Source**
(Continued from previous page)	*(Continued from previous page)*
Competitiveness should be seen as a basic means to raise the standard of living, provide jobs to the unemployed and eradicate poverty.	Competitiveness Advisory Group, (Ciampi Group). "Enhancing European Competitiveness". Second report to the President of the Commission, the Prime Ministers and the Heads of State, December 1995.
Competitiveness is the degree to which a nation can, under free trade and fair market conditions, produce goods and services which meet the test of international markets, while simultaneously maintaining and expanding the real incomes of its people over the long-term.	OECD
Industrial competitiveness is the ability of a company or industry to meet challenges posed by foreign competitors.	US Department of Energy.
The ability to produce goods and services that meet the test of international markets while citizens earn a standard of living that is both rising and sustainable over the long-run.	The First Report to the President and Congress, 1992. US Competitiveness Policy Council.
Supporting the ability of companies, industries, regions, nations or supranational regions to generate, while being and remaining exposed to international competition, relatively high factor income and factor employment levels.	OECD, 1996. "Industrial Competitiveness: Benchmarking Business Environments in the Global Economy".

According to Lall (2001), the ability of a country (as a whole) to compete internationally is affected by countless economic and non-economic factors and for having a coherent analysis of competitiveness, 'several things such as *define what competitiveness means*, identify the most important *factors affecting it* and *their interactions*, *measure them* and *provide a rational explanation of their determinants'* must be done. The needed and feasible policies outline strategies and prioritize and implement relevant interventions must be found then.

Bearing in mind the aim of this study as to analyze the micro-level competitiveness analysis of construction firms, the national competitiveness models will be analyzed from the 'firm-level' perspective through the rest of the study. Indeed, the potential range of interactions and influences between the corporations and the nations are highly important but vaguely studied (Lall, 2001) and this fact is confessed in OECD report as follows;

> "…While in many countries government action continues to be based on the theory of comparative advantage, countries are bereft (*deprived*) of any alternative conceptual frame of reference which might enable them,…, to envisage links between corporate competitiveness and national economic performance." (OECD, 1994, pp.19-20) (Lall, 2001)

Lall claims that the 'competitiveness of a firm' is easier to define since there is an ability to compare firms in *sales*, *market share*, or *profitability* (Krugman, 1994; McFetridge, 1995) and she finds 'competitiveness of an economy' a much more difficult concept to define and concludes as follows;

> If 'national competitiveness' is interpreted in very broad terms, as the ability to produce income or productivity growth, it simply becomes development or growth strategy. If a narrower definition is used such as to take the country's ability to compete in trade (particularly exports, which is the way most governments understand competitiveness) it also must be handled carefully, since increasing the exports of unprocessed resources have a count in exports but may not count as enhanced competitiveness, often the contrary is relevant. (Lall, 2001; p9)

Here Lall (2001) differentiates the term 'processed and unprocessed resources' and also points out that, 'improved short-term performance in manufactured exports based on the exploitation of a static advantage like cheap unskilled labor may not be regarded as a real improvement for competitiveness'. Though beyond the major topic, this statement is also important for the content of this thesis hence a parallel outline can be drawn for the construction industry as well[17].

To Lall, many competitiveness strategies may have excuses for blaming foreigners and usually fail to take account of *evolving comparative advantage* or the *efficiency of the markets* and *institutions*, and do not define the legitimate role of government policy and rarely consider the capability of the government to build up a strategy at all[18]. Similar criticisms can be directed at many *business school approaches* to competitiveness. They usually switch strategic ideas from the corporate to the national level and often describe constituent elements of competitive success (innovation, clusters, and skills) without grounding it in theories of markets, market failures and the ability of governments to overcome the failures. Also, national competitiveness does not suggest just being a low-cost producer, but being competitive in activities that lead to long-term income growth, as incomes and wages rise. As stated before, building industrial competitiveness consists of moving away from static sources of cost advantage; moreover, the growth produced by competitiveness activities should be *sustainable* rather than short-lived. Sustainability necessitates that countries elevate on

[17] Note that Oz (2001) defined the cheap labor force as a competitiveness side of Turkish Construction Industry (see Chapter 4)
[18] Note that Porter (1990) defines government as an exogenous factor in his diamond model.

the technological ladder (the 'value-added chain') in their competitive activities and Lall (2001) defines this change with a historic analogy as a shift from agriculture and other primary producing activities to manufacturing industry. (Lall, 2001)

To draw upon the common elements of these approaches Lall (2001) defined *competitiveness* in industrial activities as a means of *developing relative efficiency* along with *sustainable growth*. Accordingly, she states competitiveness should be understood more like a *process*[19] than an absolute state, and can only be assessed in a *relative* sense (Lall, 2001). Momaya (2004) have also similar approach to competitiveness with a *process* point of view and elaborates his approach with 'Assets Processes Performance' (APP) model[20]. He uses D'Cruz's (1992) definition for firm level competitiveness as 'the ability of firm to design, produce, or market products superior to those offered by competitors, considering the price and non-price qualities'. Along with *sustainable growth* and *process* approaches, D'Cruz's model can also be used as a working definition of firm level competitiveness in this thesis.

3.2 NATIONAL LEVEL COMPETITIVENESS CONCEPTS

The introduction of the UK Government's third competitiveness White Paper illustrates the importance of national competitiveness and the approach of the industrialized countries to it (UK Cabinet Office, 1996).

> "Improving competitiveness is central to raising the underlying rate of growth of the economy and enhancing living standards. …It means giving people the freedom to grasp new opportunities. It involves benchmarking all our activities against the best of our competitors to see how well we are doing compared to them and what we can learn from them. …The need to improve our competitiveness is not imposed by Government, but by changes in the world economy. Improving competitiveness is not about driving down living standards. It is about creating a high skills, high productivity and therefore high wage economy where enterprise can flourish and where we can find opportunities rather than threats in changes we cannot avoid." (p.10)

Accordingly, this section describes national level analytical tools for competitiveness and starts with analyzing the interaction between firm level competence and national

[19] See section '3.3.5' for *process* approach in *Benchmark analysis.*
[20] See Chapter 5 for APP model of Momaya.

competitiveness. Afterwards, Porter's diamond model and National level Competitiveness Indices will be analyzed.

3.2.1 Firm Level Competence and National Competitiveness

Competitiveness of nations focuses on the policies implemented by nations to shape the environment around enterprises. Therefore there is a difference of economic objectives pursued by a nation and by enterprises. In other words, it can be assumed that some nations support competitiveness more than others by creating an environment which facilitates the competitiveness of enterprises and encourages long-term sustainability. (Lall, 2001)

The fundamental principle, which allows the distinction between concept of competitiveness of nations and competitiveness of enterprises, concentrates on where the creation of economic value takes place. In current literature it is assumed that economic value is only created within the context of an enterprise and a nation's environment hinders or supports this process through its policies.

Lall (2001) illustrated the move from firm (micro) to the national level analysis of competitiveness in a simple diagram. Firms are shown to interact with three sets of markets, *incentives*, *factors* and *institutions* and a *triangle of competitiveness* is figured out (Figure 3.1).

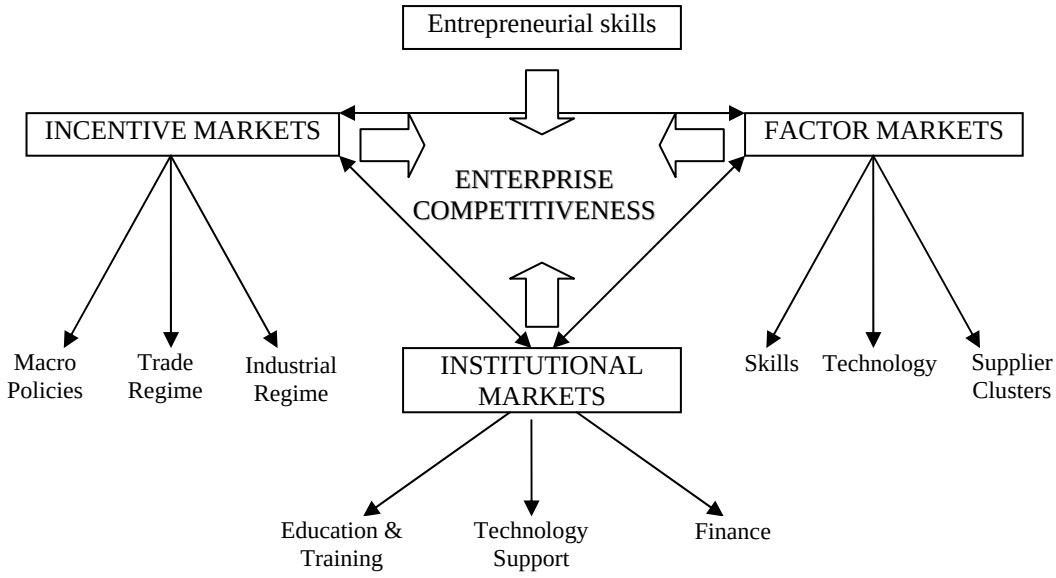


Figure 3.1 Triangle of competitiveness (Source: Lall, 2001. p20)

Unlike the conventional neoclassical economics, Lall (2001) defines that the analysis of national competitiveness must have a sound micro foundation that is it has to depend on competitiveness which is acquired by individual firms. She also adds that the learning process is highly important for analyzing firm competitiveness. The presented *competitiveness triangle* is similar to the 'diamond framework' proposed by Porter (1990), but there are some differences exist. First, the focus of the *competitiveness triangle* is put on *markets* within which *enterprise learning* takes place and the *failures*[21] that each market is liable to suffer. Second instead of introducing government as an exogenous variable, the triangle puts government policy in the centre of the action. Another difference is, Porter's business school approach has no place for market failures; however Lall (2001) accentuates the importance of it.

For the competitiveness triangle model, each determinant of competitiveness can be subdivided into three. Under '*incentives',* macroeconomic management, trade policy (including transactions costs of training), industrial rules and regulations; under '*factor markets*', skills, technology, suppliers are situated. Lastly, under '*institutions*' segment education & training, technology support, financial institutions are positioned.

3.2.2 Porter's National Competitiveness Model

The best known national level *model* of competitiveness can be distinguished as 'the Diamond Framework' and formulated by Michael Porter in 1990. It is based on a simplistic view of business dynamics and competition and has become widely accepted within business surrounds. In order to understand in full 'why a nation succeeds in particular industries but not in others'[22] he argues that there is a need for a new paradigm. In order to derive this new analytical framework he conducts a study of ten nations namely; *Denmark, Germany, Italy, Japan, Sweden, Switzerland, United Kingdom*, *the United States*, *South Korea* and *Singapore*. Accordingly, Porter constructed *the diamond framework* by case studies selected from these countries and tries to capture the major determinants of competitive advantage as well as their interaction with each other. Finally, he claims that the economic progress of nations depends mainly on continual increases in productivity realized by group of companies which are in

[21] See Lall (2001), for more information on market failures.
[22] Note that this model is aimed for analyzing current situation rather planning procedures (as concluded in Chapter 4)

search for competitive advantage within certain industry segments (Betts & Ofori, 1994).

Within this context, Porter (1990) identifies that the home base plays a critical role in competitiveness since firms tend to build up competitive advantage in industries for which the local environment is the most dynamic and challenging. He finds out that four attributes of the home environment (that is: *factor conditions, demand conditions, related and supporting industries,* and *firm strategy, structure and rivalry*) play a major role in shaping the context which allows domestic firms to gain and sustain competitive advantage. He also includes the roles played by the *'government'* and *'chance'* as exogenous factors which are influencing the functioning of these four major determinants (Figure 3.2).

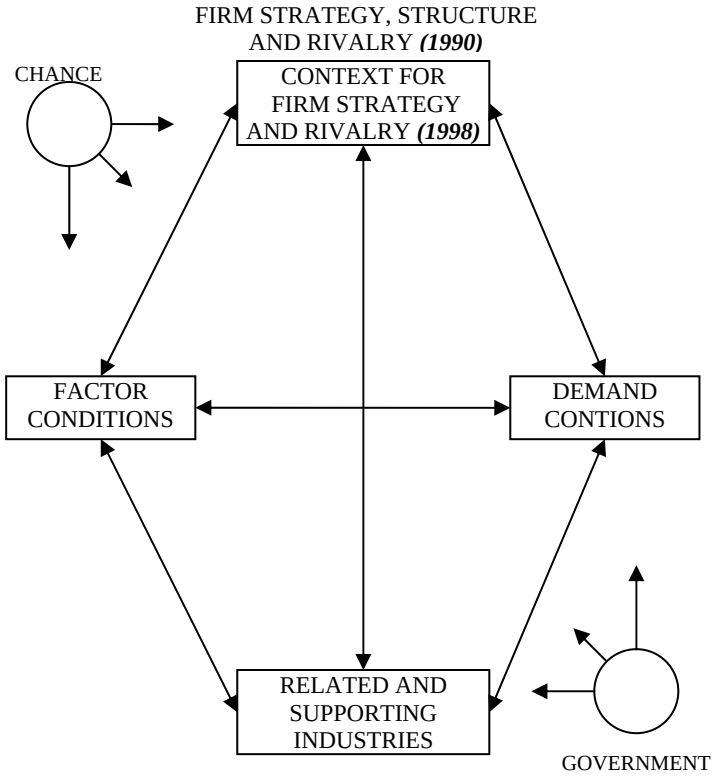


Figure 3.2 The Diamond Framework (*Source:* Porter, 1990, p. 127, revised in 1998)

These determinants are summarized as follows:

1) *Factor Conditions*: Two basic divisions are defined within the framework regarding factors of production. In the first one, they are grouped into two as, *basic* and *advanced* factors. The *basic factors* include *natural resources, climate, location, unskilled* and *semi-skilled*

labor, and *debt capital,* while the *advance factors* include *modern digital data communications infrastructure, highly educated personnel* and *university research institutes in sophisticated disciplines*. The second distinction made within the definition is built on specificity which includes *generalized* and *specialized* factors. Generalized factors include *the highway system, a supply of debt capital, or a pool of well-motivated employees with college educations* and specialized factors include *narrowly skilled personnel, infrastructure with specific properties, knowledge basis in particular fields* and other factors with relevance to a limited range. Porter (1990) declares that though not sustainable*, basic* and *generalized* factors are either hereditary or easy to create and the advantage growing from them is not that difficult to replicate. On the other hand, *advanced* and *specialized* factors are viewed as being more crucial and sustainable basis for competitive advantage. (Porter, 1990; Oz, 1998)

2) *Demand Conditions:* Porter (1990) defined that home demand has a substantial weight on competitive advantage, and he presents *the composition*, *the size and pattern of growth*, and *the internationalization* of home demand as three broad characteristics of it. Also, the composition of home demand relating to its qualitative features are regarded as highly important; to illustrate, the more sophisticated and demanding the buyers, the more likely the firms in this industry are to create and sustain competitive advantage. Porter (1990) also defines that 'the presence of a number of independent buyers in a nation creates a better environment for innovation than is the case where one or two customers dominate the home market for a product or service'. In a similar way, a rapidly growing home market supplies a vibrant advantage to local firms, mainly because it encourages investment. The third way the home demand conditions add to the competitive advantage of an industry is throughout the mechanisms 'by which a nation's domestic demand internationalizes and drags a nation's products and services abroad'. (Porter, 1990; Oz, 1998)

3) *Related and Supporting Industries:* The subsistence of internationally competitive, related and supporting industries in a country, is defined as an important determinant of *creation* and *sustainability* of competitive advantage. The related industries that share common *technologies, inputs, distribution channels, skills, customers or activities*, or *provide products* may be beneficial for competitive advantage. Their similarities might promote *technological spillovers* and *interchange* as well as the process of innovation by a free and open information flow within a geographically and culturally proximate environment.

Besides, a wider distribution of business information may allow firms to perceive new business opportunities. Another reason is that firms can share activities such as technological development, manufacturing, distribution and marketing and there are *pull through* effects which occur when international success in one industry creates demand for complementary products or services as well. (Porter, 1990; Oz, 1998)

4) *Firm Strategy, Structure and Rivalry:* The fourth broad determinant of national competitiveness in an industry is defined by explaining the strategies and structures of firms (within the nature of domestic rivalry). It is distinguished that there are noticeable distinct patterns of goals, typical strategies and ways of organizing firms in a nation; and the resulting argument is that there should be a good fit between an industry's sources of competitive advantage due to its structure, strategies, structures and practices favored by the national environment. On the other hand, the existence of intense domestic rivalry is seen of particular significance as it encourages firms in the industry to break the dependency on basic factor advantages. (Porter, 1990; Oz, 1998)

5) *Government and Chance:* The role of *government* in the competitive development of an industry is distinguished as an important but indirect one in the diamond framework. It is suggested that this indirect influence is mainly through influencing the four major determinants of competitive advantage and the proper role for the government should be strengthening the underlying determinants of national advantage rather than trying to create the advantage itself[23]. The second *outsider* of the diamond is the role of *chance*. It is defined that 'the chance events are the ones that have little to do with circumstances in a nation' and are often 'largely outside the control of firms'. Chance events may create forces that change the industry structure and may alter the way the diamond operates. As a result shifts in competitive position can be seen. (Porter, 1990; Oz, 1998)

Domestic rivalry and *geographic industry concentration* is stated as having the most exaggerated affects on the dynamic character of the diamond in that domestic rivalry encourages improvements in all other determinants whereas geographic proximity intensifies the interaction between the sources of competitive advantage. Another thing is that *pressure* and *challenge* are regarded as of special importance in the

[23] As stated before, this can be seen as a typical 'business school' approach.

emergence and sustainability of competitive advantage, and both are driven by intense domestic rivalry and felt more heavily in the case of physical proximity.

Finally, in the complete framework of diamond, each determinant is influenced by the others and turns the system into a dynamic one in which all elements interact and reinforce each other. It is stated that this *systemic feature* makes it difficult to replicate the exact structure of the industry in another country therefore, while identifying an *advantage* it should be based on the entire system rather than only one determinant. Porter (1990) also states that where a nation has a drawback in one determinant, national success normally reproduces unusual advantage in others and some way of balancing for the drawbacks.

After analyzing the competitive industries and clusters of them for each of the ten nations, Porter extends his theory to the national economy as a whole and tries to 'provide some ways of thinking about how entire national economies progress in competitive terms'. In spite of accepting the uniqueness of the case of each country, he thinks that it is possible to classify the economic development process into four broad stages: *the factor-driven, investment-driven, innovation-driven and wealth-driven stages*, which are identified according to the existing sources of advantage in the nation.

The *factor-driven* concept is especially important for developing countries like Turkey since Porter makes some generalizations about this stage which can be seen highly relevant for Turkish construction industry. One of the generalizations within the factor driven stage is that the major advantage for all successful industries stemming from *basic* and *generalized* factors of production such as abundant natural resources and low cost labor. This factor-driven advantage is also defined with its vulnerability to changes in costs and it is defined that within this stage firms usually compete on the basis of price and technology is imported from other nations. Lastly, the role played by the government is usually more direct within these economies.

3.2.3 National Level Competitiveness Indices

'Competitiveness Index' of IMD is used to be the best known national level measure and index of competitiveness. It is produced annually in the *World Competitiveness Report* by two Swiss Institutes, the 'World Economic Forum' and the 'International Institute for Management Development'. These indices are based on a huge number

of variables and many of these are subjective and impressionistic mainly for depending extensively on comments of business executives. (Lall, 2001)

The two institutions separated their indices in 1996, and have been using different variables and weights; 'both widely used and cited'. However, the essential analytical frameworks of these indices remain unchanged, weak and suspect (Lall, 2001). To illustrate, the connections between the variables in terms of producing growth or structural competitiveness are unclear. Moreover, countries often receive high marks because of being good places for international investors that is the liberal environments for business are the only criteria of good policy, and that free markets are always the most favorable within the underlying theory. Another problematic area of these indices is that interventions which are actually promoting competitiveness in deficient markets are ruled out. Thus, interventionist governments (like Korea) are given low marks compared to more laissez-faire ones (like Hong Kong) simply because they are interventionist. The emphasis on current macroeconomic factors and perceptions also makes the index volatile so, rankings are usually changing significantly from one year to the next which reveals the lack of a sound concept of *structural factors* underlying competitiveness. (Lall, 2001)

Instead of trying to construct a comprehensive index, Lall (2001) advised that to aggregate and settle a less ambitious but more manageable indicator will be better for the purposes of assessing industrial competitiveness, which is also concluded at the end of this thesis study. In IMD World Yearbook, indicators are classified under four broad categories namely; *economic performance*, *infrastructure*, *business efficiency* and *government efficiency*. Then the scores of individual countries are connected in a spider chart with reference to the best score achieved in the class (Figure 3.3)

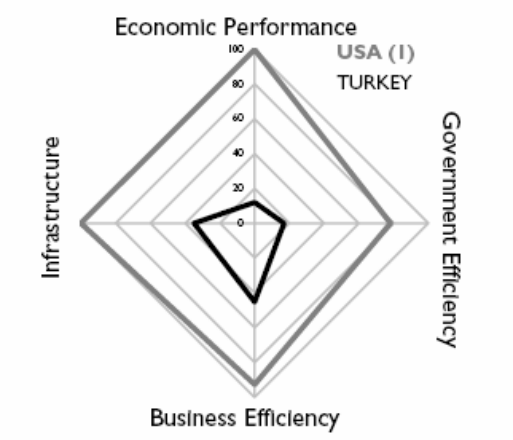


Figure 3.3 Turkey's competitiveness score in comparison with USA scores (IMD World Yearbook)

Finally, in Figure 3.4 Turkey is shown as ranked in IMD World Yearbook scoreboard among countries whose population is greater than 20 million (25th rank for 2003, 2002 rankings in brackets).

Here, the author believes that, though they have unreliable points, the important items for these indices are (1) they are continuing to appraise countries and outline rankings for more than 15 years, so even a subjective one they present a continuous data base (2) They established a systematic questionnaire as a methodology and present it every year and through analyzing the questionnaires it can be used as a basis for other models.

After analyzing the main points of national level competitiveness models and indices, in the next section company level competitiveness tools will be analyzed. Also in the *conclusion part* of this chapter some major criticisms about the diamond model are explained with the aim of presenting evidence about construction industry.

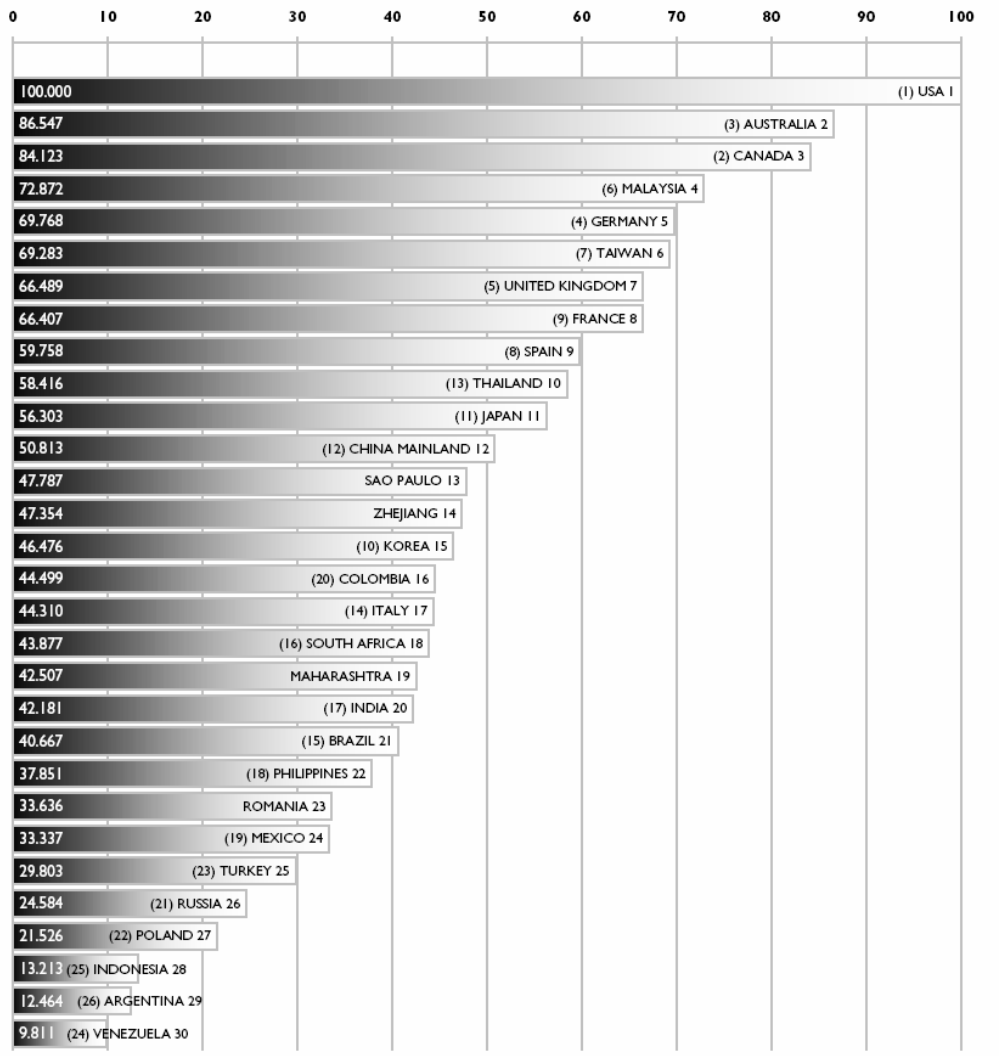


Figure 3.4 The World Competitiveness Yearbook ranking in 2003[24]

3.3 ENTERPRISE & INDUSTRY LEVEL COMPETITIVENESS CONCEPTS

This section describes some useful enterprise and industry level analytical tools for competitive thinking and explains what these tools are for and when to use them. Actually, these tools have been extensively applied in manufacturing industries, and are continuously refined. However, for construction industry, they are relatively new and hold great potential to help construction enterprises to meet the challenges and opportunities in our competitive era.

[24] The ranking is done within the countries whose population is greater than 20 million. Source IMD World Yearbook p.344

3.3.1 The Five Competitive Forces Model

The five forces model is developed by Michael Porter in 1985 and is basically a tool to show the state of competition in an industry and includes five basic competitive forces namely; *the threat of new entrants*, *the threat of substitute products*, *the bargaining power of suppliers*, *the bargaining power of buyers* and *rivalry among existing firms* (Figure 3.5).

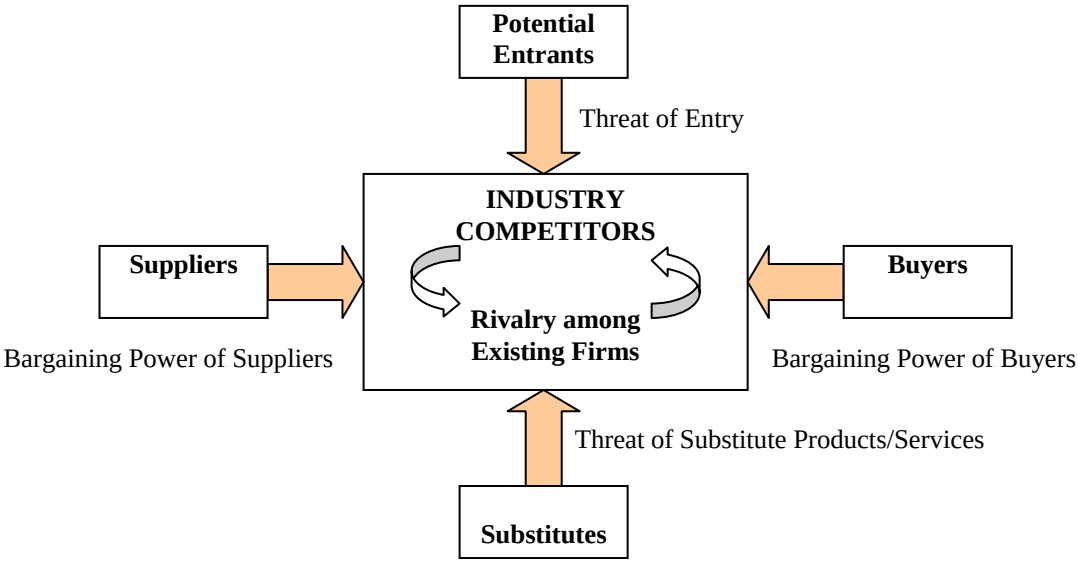


Figure 3.5 The Five Competitive Forces Model (Source: Porter, 1985)

Once a company needs to know the *potential industry profitability* and quickly discover the *crucial structural features* determining the nature of competition in the industry, the five forces model provides relevant information. This information can also help the firm to find a position in the industry where it can best defend itself against these forces. (Porter, 1985)

The strength of these 'five forces' vary from industry to industry, and from country to country and the collective strength of these five competitive forces determines the *ultimate profit potential* of an industry. In general, it is defined that the weaker the forces collectively organized, the greater the opportunity for superior performance. To cope with these forces each corporate must analyze the sources of each force and take related actions (Lin, 1995). This pressure also stimulates the positioning of the company in its industry and clarifies the areas where strategic changes may yield the greatest opportunity. Also, understanding these sources will help the firm for considering areas of diversification. (Porter, 1985; Lin, 1995)

Characteristics that are related with the strength of each competitive force are discussed in more details in the following sub-sections.

3.3.1.a The Threat of New Entrants

This concept depends on the barriers to entry that are present and can be defined with the reaction from existing competitors that the entrant can expect. If barriers are high or a newcomer can expect sharp revenge from fixed competitors, the threat of new entrants as a competitive force is low for existing firms. The threat of new entrants within an industry can be influenced by six major sources of barriers. (Lin, 1995)

(1) *Economies of scale:* economies of scale discourage entry by forcing the candidate either to bid for a large scale operation or to accept a cost disadvantage.

(2) *Product differentiation:* Brand identification creates a barrier by forcing entrants to spend heavily to overcome customer loyalty.

(3) *Capital requirements:* The need to invest large financial resources creates a barrier to entry, particularly if the capital is required for unrecoverable expenditures in up-front advertising or R&D.

(4) *Cost disadvantages independent of size:* Entrenched companies may have cost advantages not available to potential rivals. These advantages can stem from the effects of the learning curve, proprietary technology, access to the best raw materials sources, or favorable locations.

(5) *Access to distribution channels:* A difficulty to entry can be seen by the new entrant's need to find distribution channels for its products. To illustrate, existing channels may have already been served by established firms and the new firm must convince the channels to accept its product through price breaks and so on.

(6) *Government policy:* The government can limit or even foreclose entry to industries with such controls as license requirements. To illustrate, the construction firms in Turkey need to obtain the licenses from the government to perform construction works.

Lin (1995) defined Taiwan construction industry by having high entry barriers and a low threat of entry. In contrast, by considering the fact that there are as much as 200.000 contractors registered in Ministry of Public Works (Yapi, 2003), it can be concluded that a relatively low entry barrier exist in Turkey. To illustrate different outcomes by researchers, Langford (2001) defines that the entry and exit barriers of the construction industry as several but exist in subtle form and concludes that the entry barriers for construction firms as low[25].

3.3.1.b The Threat of Substitute Products

By placing a ceiling on prices, substitute products or services limit the potential of an industry (Lin, 1995). The more attractive the price-performance alternative offered by substitutes, the stronger the pressure placed on industry's potential.

Identifying substitute products is a matter of searching for other products that can perform the same function as the production of the industry. According to Langford (2001), *substitute products or services* are not easy to apply in construction industry in that Porter (1980) defines the critical issue in deciding what a substitute is or not as the substitute must undertake the same function. For this option Lin (1995) evaluates it for the building industry and concludes that as every day brings new building materials and alternative techniques which in turn affect this competitive force.

At this point of view, substitute products that deserve the most attention strategically are defined by Lin (1995) are (1) subject to trends improving their price-performance trade-off with as compared to the industries traditional product, or (2) produced by industries earning high profits. Substitutes often come into play rapidly if some development increases competition in their respective industries and causes price reduction or performance improvement.

Since the construction industry is a very traditional industry and the products that the construction firms provide to buyers are so special, it can be concluded similar with Langford (2001) and pronounced that the threat of substitute in the construction industry is relatively low compared to the manufacturing industry.

[25] See Langford 2001 p.45 for a complete discussion.

3.3.1.c The Bargaining Power of Suppliers

Suppliers can use bargaining power on participants in an industry by raising prices or reducing the quality of purchased goods and services. Powerful suppliers can thereby reduce profitability of an industry which is unable to recover cost increases with its characteristics of market situation (Porter, 1985) and a supplier group is defined as powerful if (1) it is dominated by a few companies and is more concentrated than the industry it sells to, (2) it is not obliged to contend with other substitute products for sale to the industry, (3) the industry is not an important customer of the supplier group, (4) the suppliers' product is an important input to the buyer's business, (5) the suppliers products are differentiated or it has built up switching costs, (6) the supplier group possesses a credible threat of forward integration. (Lin, 1995)

In the construction industry, the bargaining power of materials suppliers is variable. It depends not only on what kind of materials the firms need to buy but also on where the materials suppliers' locations are. Accordingly, there are many different suppliers of many products and services within different regions or countries. For instance, building glass industry in Turkey has a monopolistic character; and this can easily result in the strong bargaining power of the supplier.

3.3.1.d The Bargaining Power of Buyers

Buyers compete with the industry by forcing down prices, bargaining for higher quality or more services. They can play the competitors against each other and this directly affects industry profitability. The power of the industry's buyer groups depends on a number of characteristics of its market situation and on the relative importance of its purchases from the industry (Porter, 1985). A buyer group is defined as powerful in buying action if (1) it is concentrated or purchases large volumes relative to seller sales, (2) the products it purchases from the industry represent a significant fraction of the buyer's costs or purchases, (3) the products it purchases from the industry are standard or undifferentiated, (4) it faces few switching costs, (5) it earns low profits (6) buyers pose a credible threat of backward integration (7) the industry's product is unimportant to the quality of the buyers' products or services; (8) the buyer has full information (Lin, 1995). Also, consumers tend to be more price sensitive, if they are purchasing products that are

undifferentiated, expensive relative to their incomes, or where quality is not particularly important. (Porter, 1985)

The buyers are various and include individual house buyers to private companies and governments in the construction industry. Therefore, the bargaining power of buyers is related to the types of the projects, the quality level that the buyers require, and the methods of payment that the buyers choose. Basically, the types of buyers could be grouped into the *public* and *private sector* clients. The former category includes central government departments, local authorities, housing associations and various other public corporations. The private sector consists of private households on the one hand and firms and corporations on the other. This latter group is itself diverse, with manufacturing organizations generating a demand for factories and warehouses, and commercial organizations demanding offices and shops. A further division can be made between those buyers requiring *new construction work* and requiring *repair and maintenance services*. (Lin, 1995)

Due to the unique bidding basis of the industry and the flexible prices, contractors tend to be most prepared to talk about price. The *price* is still an extremely important factor in the selection of a contractor is unquestionable, but it is no longer necessarily the most important factor[26]. To illustrate, in developed countries the manufacturer of a high-technology item may consider a non-fixed-cost, fast-track approach that result in an early production preferable with additional construction cost which compensate itself on the long run for market share[27]. An owner may be most interested in construction methods and materials that will result in lower operating costs and long-term savings. Therefore, it can be concluded that, if projects are awarded by lump-sum competitive bidding the bargaining power of buyers is usually strong in that general contractors have to cut down their prices to get the jobs. Alternatively, the bargaining power of buyers can be named weak when the buyers ask for high quality level and award the projects by single-source negotiation, the general contractors get the opportunity to bargain for higher prices. (Lin, 1995)

[26] See Egan Report (1998) and Construction Best Practice Programs in Ch4.
[27] Note that this is also very much related with price, and remains quantitative. For further discussion we can think qualitative values such as reliability, quality etc.

3.3.1.e Rivalry among Existing Firms

Rivalry among existing competitors takes the familiar form of 'jockeying for position' and they use tactics like price competition, product differentiation, and so on. Rivalry occurs because one or more competitors either feels the pressure or sees the opportunity to improve position. In most industries, competitive moves by one firm have noticeable effect on its competitors and thus may stimulate retaliation or efforts to counter the move[28]. (Porter, 1985)

Intensive rivalry is related to the presence of a number of factors namely: (1) competitors are numerous or are roughly equal in size and power[29], (2) industry growth is slow, precipitating fights for market share that involve expansion-minded members, (3) the product or service lacks differentiation, (4) fixed costs are high or the product is perishable and creating strong appeal to cut prices, (5) capacity is normally augmented in large increments, (6) exit barriers are high, (7) the rivals are diverse in strategies, origins, and personalities. (Lin, 1995)

In the construction industry, the rivalry among existing firms is strong. Particularly, if the firms have undifferentiated products and services, a large number of similarly sized companies will become competitors and this is the case for construction industry. In order to reduce the rivalry among existing firms, some construction companies will focus on specific marketplaces and try to differentiate their products. For example, some Japanese construction firms focus on large projects and high-technology end of the construction sector, and spend lots of money in computing and engineering technology. (Lin, 1995)

3.3.2 Value Chain

The value chain is a tool that can recognize *competitive advantage* and find ways to *create* and *sustain* it. Value activities are *technologically* and *physically* distinct activities performed within a firm. The value chain disaggregates a firm into its *strategically relevant activities* ('value activities'), and each of these activities can contribute to the firms *relative cost position* and create a basis for *differentiation*. By performing these important activities, the firm can gain competitive advantage more cheaply or better

[28] Note that; a Game Theoretic Approach to competitiveness will be beneficial and new in construction sector and offered in the 'suggestions for future research part'.
[29] This is also a definition of a 'fragmented industry'.

than its competitors. Once a firm wants to understand the behavior of costs and the existing and potential sources of differentiation, the value chain can help the firm to analyze the sources of competitive advantage by examining all the activities the firm performs and how they interact. (Porter, 1980)

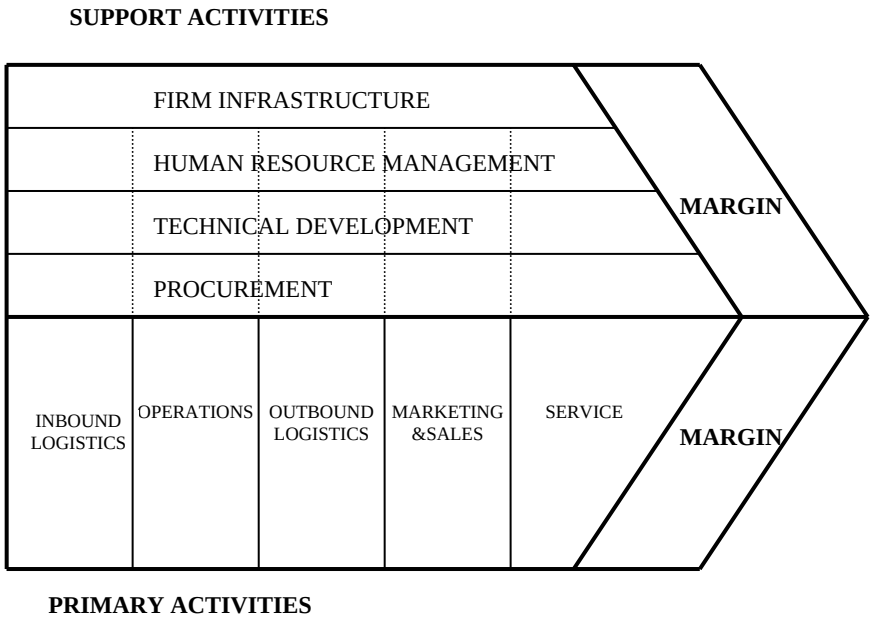


Figure 3.6 The Value Chain (Source; Porter, 1980)

An entire value chain represents the total revenue, and consists of a total cost (a collection of value activities) and a profit. Value activities are the physically and technologically distinct activities a firm performs. From this point of view, it is stated that every firm has a group of activities that are performed to *design, produce, market, deliver*, and *support* its product. All these activities can be represented by using the value chain. The *margin* is the difference between total value and the collective cost of performing these value activities (Figure 3.6) (Porter, 1980).

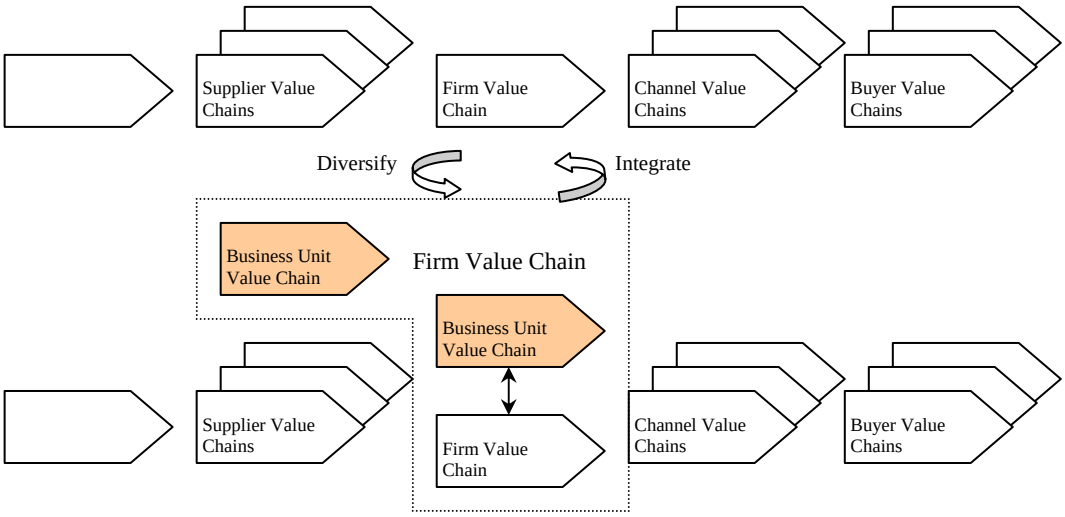


Figure 3.7 The Value System (Source; Porter, 1980)

Moreover, a firm's value chain is embedded in a larger stream of value chains. Thus, from these value chains, we also can get another idea "*the value system*", which can show a firm its upstream and downstream industries (Figure 3.7). (Porter, 1980)

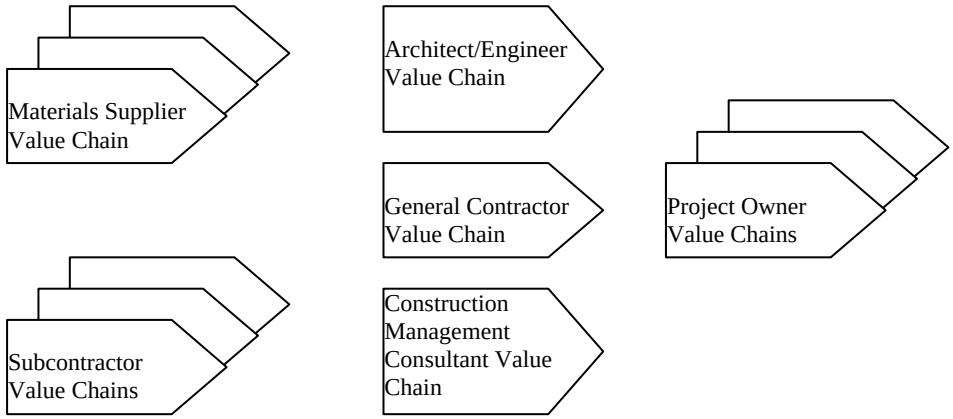


Figure 3.8-The typical value system of the construction industry (Source; Lin, 1995)

Sugimoto (1990) defined some advantages of Porter's value chain concept. Accordingly, it makes it possible to analyze (1) a firm's cost competitiveness gained from each value activity; (2) relationships between activities within a firm, (that is, linkages between up-stream and down-stream activities), and activities in different product segments; (3) relationships between activities of a firm (buyers of the outputs and sellers of the inputs) and (4) activities separated by geographic distances.[30]Additionally, the value system can provide a firm the related information

[30] This item is seen as the most important one by Sugimoto (1990) for the study of globalization of construction activities.

that shows the possibilities of the firm's integration and diversification. Figure 3.8 shows the basic value system of the construction industry.

All *value activities* are directly influenced by the *integration* and the *diversification* of companies in the value system. Basically, they can be divided into two broad types: *primary activities* and *support activities*. (Porter, 1980)

3.3.2.a The Primary Activities

The primary activities are the ones involved in the physical creation of the product and its sale and transfer to the buyer as well as after-sale assistance. There are five generic categories of primary activities involved in competing in any industry, as shown in Figure 3.6. Each category may be vital to competitive advantage and can be divisible into a number of distinct activities that depend on the particular industry and firm strategy. The five generic categories of the primary activities are as follows: (Porter, 1980)

(1) *Inbound logistics:* activities associated with receiving, storing, and disseminating inputs characterize the inbound logistics. In the construction industry, for most general contractors, early feasibility studies, estimating quantities of construction materials, and more details of project planning are included in their inbound logistics. (Lin, 1995)

(2) *Operations:* activities associated with transforming inputs into the final product form, such as machining, packaging, assembly, exemplify operations. For the general contractors, the construction management and the general construction work can be named as operation areas. (Lin, 1995)

(3) *Outbound logistics:* activities associated with collecting, storing, and physically distributing the product to buyers such as finished goods warehousing, material handling, order processing, and scheduling typify outbound logistics. Most general contractors have to go to the work sites where the owners select to build their projects. Even though general contractors do not need to distribute their products to the buyers in the same way as manufacturing firms do, some other activities could be included in their outbound logistics, such as recording data related to all finished projects. Because 'construction buyers of all types want contractors with experience

on similar projects, by keeping all related information on finished projects, the contractors will have more opportunities to get their next jobs'. (Lin, 1995)

(4) *Marketing and sales:* activities associated with providing a means by which buyers can purchase the product such as advertising, promotion, sales force, channel selection, channel relations, and pricing describes Marketing and Sales. In the construction industry, marketing and sales are very important but the activities could be very different since, different marketing focuses are decided by several reasons, such as type of the project, geographical location of the project, and type of the service. Basically, bidding, analyzing marketing information, and establishing relationships with clients are the main activities of general contractors for marketing and sales part. (Lin, 1995)

(5) *Service:* activities associated with providing service to enhance or maintain the value of the product, such as installation, repair, training, parts supply, and product adjustment exemplify service. The main activity for the construction industry is the maintenance of the projects during the period of guarantee. (Lin, 1995)

3.3.2.b The Support Activities

The support activities involved in competing in any industry can be divided into four generic categories *procurement, technology development, human resource management* and *firm infrastructure*. The support activities support the primary activities and each other by providing purchased inputs, technology, human resources and various firm wide functions. The dotted lines shown in Figure 3.6 reflect the fact that procurement, technology development, and human resource management can be associated with specific primary activities as well as supporting the entire chain. Firm infrastructure is not associated with particular primary activities but supports the entire chain (Porter, 1980). The four generic categories of the support activities are as follows.

(1) *Procurement:* It refers to the function of purchasing inputs used in the firm's value chain, not to the purchased inputs themselves. Purchased inputs include raw materials, supplies, and other consumable items as well as assets such as machinery, computers, office equipment, or operation buildings. In the construction industry the types of projects which are the companies' focusing markets and the technology applied to these projects are the key points for decisions of purchasing what kinds of construction machinery and other assisting equipment. (Lin 1995)

(2) *Technology development:* This consists of a range of activities that can broadly grouped into efforts to improve the product and the process. The array of technologies employed in most firms is very broad. Technology development in the construction industry has also been improved but comparing with the manufacturing industry and the computer industry, it can be concluded that the speed of development is fairly slow. Three areas of technological advancement can be named in the construction are the application of CAD systems, the improvement of information systems, and the automation of the construction work. (Lin 1995)

(3) *Human resource management (HRM):* It consists of activities involved in the recruiting, hiring, training, development, and compensation of all types of personnel. Like procurement and technology development, HRM supports both individual primary and support activities and the entire value chain. In the construction industry, engineering, designing, marketing, financing, estimating and contracting are the main issues for most companies. Hence, the activities in the human resources management are focused on the employees who have expertise in these areas. (Lin 1995)

(4) *Firm infrastructure:* This consists of a number of activities including general management, planning, finance, accounting, legal and government affairs, and quality management. Firm infrastructure not only supports individual activities but the entire chain. In the construction industry, the activities in the firm infrastructure are the overall executive actions, such as setting up firm's goals and missions, carrying through some procedures such as total quality management (TQM). (Lin 1995)

All value activities either in the value chain model or the value system can also be classified into *three activity types* that play a different role in *competitive advantage*. All three types are present not only among primary activities but also among support activities. The three activity types are: (1) *Direct activity*, which involves creating value for the buyer, such as assembly, parts machining, sales force operations, advertising, product design, recruiting and so on. (2) *Indirect activity*, which continuously performs direct activities on a normal basis, such as maintenance, scheduling, operation of facilities, sales force administration, research administration, and so on. (3) *Quality assurance*, which ensures the quality of other activities such as monitoring, inspecting, testing, reviewing, checking, adjusting, and reworking. (Lin 1995)

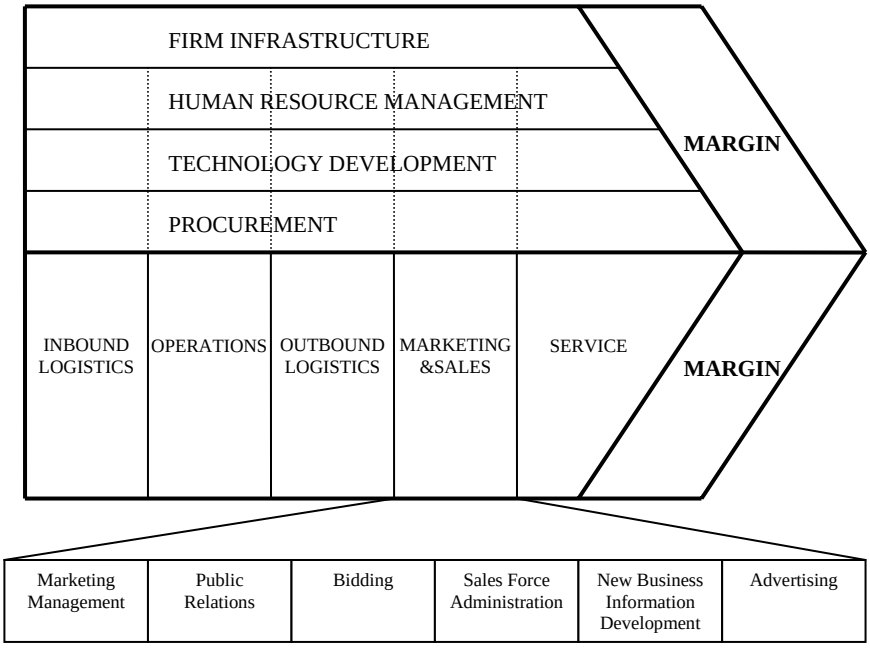


Figure 3.9-Subdiving a Value Chain (Source; Lin, 1995)

Yet, by approaching the value activities through different point of views, the companies can identify their activities more effectively and efficiently. According to Lin (1995) for many construction companies, the marketing and sales section probably has become the most important primary activity in future markets. Therefore, he analyzed this section initially in the value chain.(Figure 3.9)

According to Lin (1995), because of the finite size of local market and limited sources of construction materials and in order to pursue the growth of companies, many big construction firms have been beginning to exploit international construction markets. The emphasis on the value activities might be different; hence, the appearance of the value chain could be modified. It depends on the type of industries and the features of a company. Sugimoto (1990) also defined value activities of a hypothetical construction firm. (Figure 3.10)

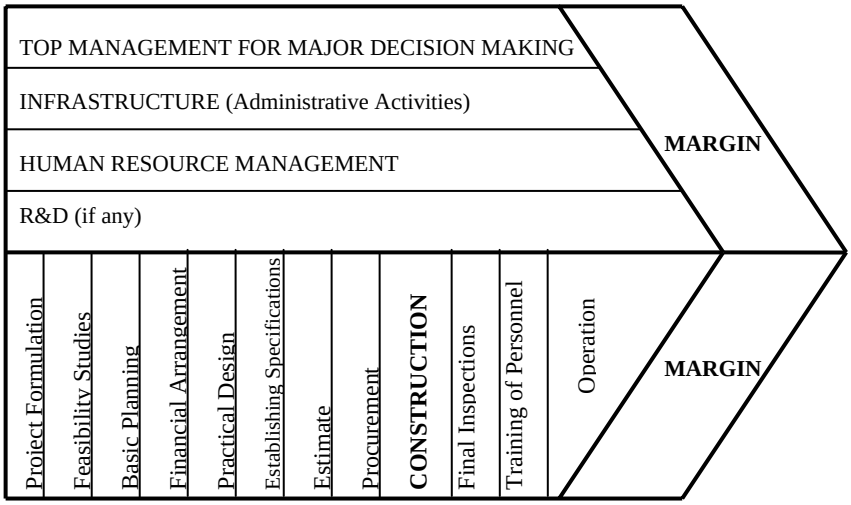


Figure 3.10 Value Chain of a Hypothetical Construction Firm (Sugimoto; 1990)

3.3.3 Segmentation Matrix

The segmentation matrix is a tool that shows where in the industry a firm should compete and in what segments focused strategies will be sustainable. The reason that an industry has to be segmented for *competitive strategy formulation* is that; the products, buyers or both within an industry are different in their 'intrinsic attractiveness'. So, the segmentation matrix is a tool that can be used to draw industry boundaries and explore for narrower industry definitions by exposing structural heterogeneity within an industry. (Porter, 1985)

For construction industry, the construction market is exceptionally fragmented along several lines; categories of project types, such as residential and non-residential buildings; types of owner, such as private and public sectors and project geographical locations. When a firm wants to identify and isolate its various services and the needs of its clients, the segmentation matrix can show the firm which of the segments are being addressed by the firm and which ones have the most profit potential. (Lin, 1995)

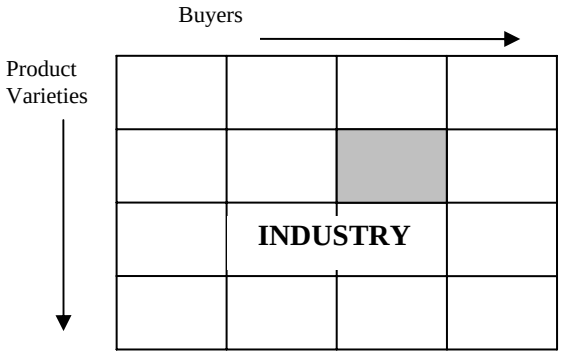


Figure 3.11 An Industry as an Array of Product and Buyers (Porter, 1985)

An *industry* is a *market* in which similar or closely related products are sold to buyers[31]. Differences in requirement for competitive advantage among an industry's products and buyers create industry segments. Therefore, an industry can be defined as an array of products and buyers. In the segmentation matrix, the horizontal axis defines buyer type according to buyers, and the vertical axis defines product variety refers to what products a firm can offer (Figure 3.12). (Porter, 1985)

In 'Five Competitive Forces Model', it is mentioned how these forces determine overall industry attractiveness. The five competitive forces analysis can also be applied to industry segments. (Figure 3.13) (Porter, 1985)

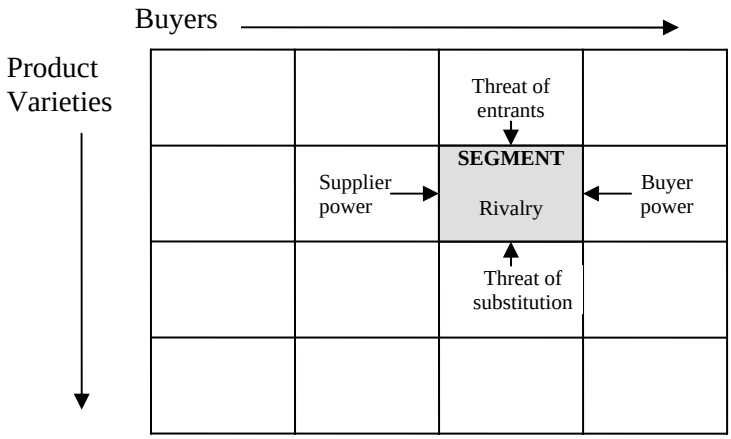


Figure 3.12-Five Competitive Forces on Segments (Porter, 1985)

In addition, a firm can also use the segmentation matrix to test its understanding of interrelationships among segments by showing competitors on the segmentation matrix. For example, in Figure 3.14, the firms A, B, C, and D are competitors. If all

[31] Note that Kay puts a useful distinctive definition between industry and market is useful for further study in adapting the terms for construction industry (Langford 2001, p.37),

of them focus on the center block area in the segmentation matrix, it means this block is the most competitive marketplace. The figure immediately shows the intensity of competition by plotting segments in different ways. For example, the cell in the middle of the matrix, which is the market wanted by all firms: A, B, C, and D is obviously the most competitive marketplace. (Porter, 1985)

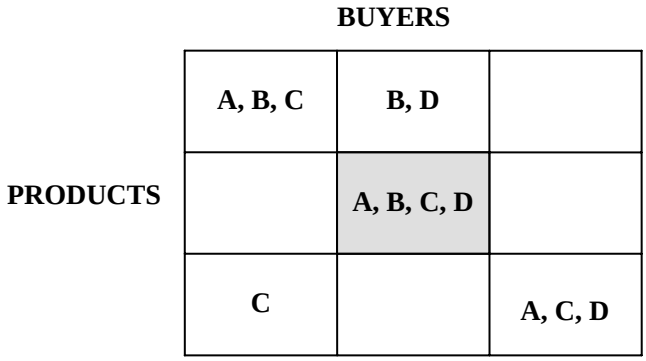


Figure 3.13-Competitive Positions of Firms: A,B,C,D in the industry (Porter, 1985)

There is no single best means of segmenting the buyer type and the product variety. The whole process of segmenting the matrix usually involves trying a number of different segmentation schemes in which the *buyer* and *product* differences that are the most important for industry structure are gradually exposed. (Lin 1995, Porter, 1985)

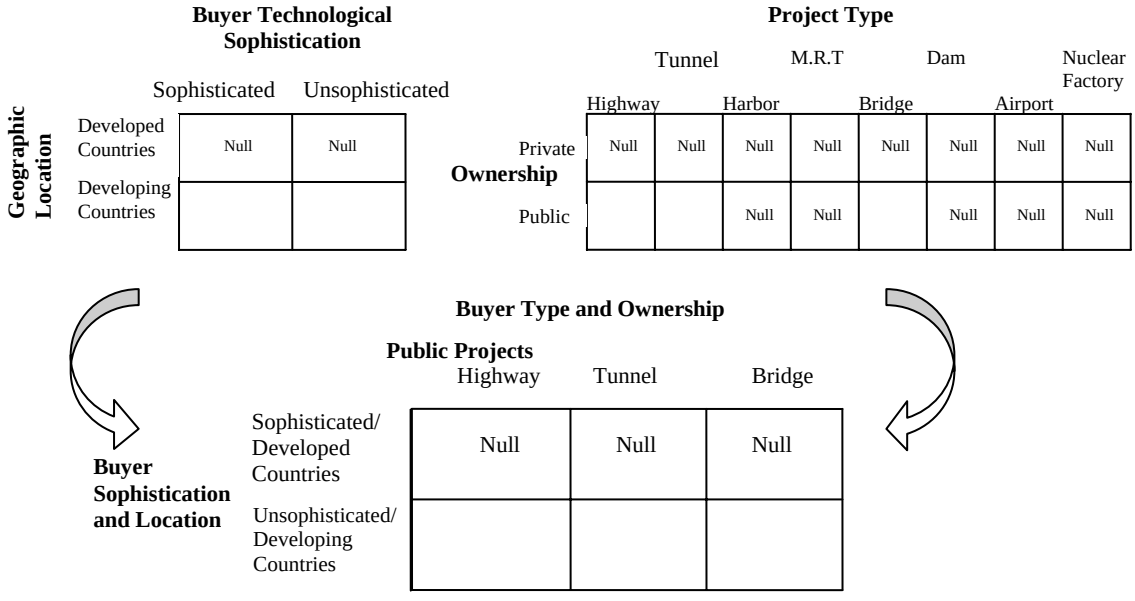


Figure 3.14-Combined Segmentation Matrix for a Model Construction Firm (Lin, 1995)

In general, whether the emphasis is on buyers or products, both segmentations should reflect the underlying *structural* and *value chain differences* among buyers or

products rather than any single classification scheme and when a company deals with more than two segmentation variables, it is usually useful to create combined segmentation matrices to help the company figure out its final target markets (Porter, 1985). Lin (1995) applied segmentation matrix to a model construction company and is useful to understand how to apply the *segmentation matrix* to the construction industry (Figure 3.15). The final result of the analysis of the segmentation matrix is shown in Figure 3.16.

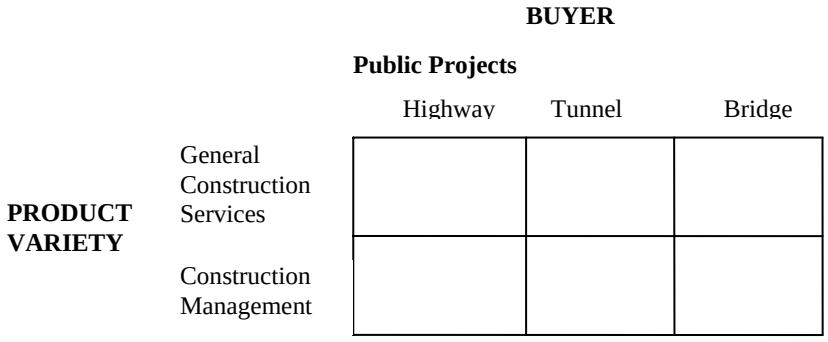


Figure 3.15-The Segmentation Matrix of a Model Construction Firm (Lin, 1995)

Additionally, when a company applies this analytical tool, it can also depend on its own requirements to show different related information in the same segmentation matrix. Lin (1995) illustrates comparisons of a hypothetical construction firm's *expertise market*, *strategic market* and *growth market* in Table 3.2.

Table 3.2 The Comparative Segmentation Matrix of a Construction Firm (Lin, 1995)

Project Types / Product Varieties	Highways	Tunnels	Bridges	M.R.T.	Subways	Nuclear Factory	Dams	Airports
General Construction Services	A, B, C	A, B, C	A, B, C	B, C	B, C	C	C	C
Construction Management	A, B, C	A, B, C	A, B, C	B, C	B, C	C	C	C

A: Expertise Market B: Strategic Market C: Growing Market

3.3.4 SWOT Analysis

The SWOT analysis is a tool that a company can use for understanding its *strengths*, *weaknesses*, *opportunities*, and *threats* by scanning its internal activities and external environment. When a company wants to examine its intended mission and decide whether to revise its original mission or not, the SWOT analysis can be applied to offer a brief overview of the firm's performance in the industry and present relative information. (Andrews, 1980)

The SWOT analysis allows management to see quickly and clearly where strengths lie and how important these strengths are. It helps the company to determine whether its current resources are used in the best possible way and whether its intended mission is sufficient to achieve the greatest return on investment. It also reveals gaps between planned targets and projected performance. (Andrews, 1980)

In contrast to the 'value chain model' which gets into the details of a firm's activities, the SWOT analysis provides a company with a broad survey of its overall performance in four basic areas namely; *marketing, producing, financing,* and *organizational strengths* and can be used as a generic analysis tool for competitiveness. Each area includes several factors which can be used for evaluating a firm's strengths and weakness. For example, a firm may include reputation, costs, marketing share, location and R & D, in the *marketing area*; financial availability, profitability and stability, in the *financing area*; facilities, capacity, and technology, in the *producing area*; and leadership, human resource management, and response to changing condition, in the *organizational area*. To describe the company's capabilities in dealing with both the internal and the external environment makes it possible to examine relative strengths and weaknesses, determine gaps in performance, and see where opportunities exist for further utilizing current resources. (Andrews, 1980)

A clearly defined mission specialized enough to distinguish the firm from other competitors in the marketplace is essential for being successful in current highly uncertain and competitive marketplace for construction. Therefore, for construction companies, it has become more important than ever to clearly understand the firms' *strengths* and *weaknesses* (Table 3.3).

Table 3.3 The SWOT Analysis (Sources from Andrews, K.R., Rowe Alan J 1980; Lin 1995)

	Performance					Importance		
Strength to Weakness	**+2**	**+1**	**0**	**-1**	**-2**	**Hi**	**Med**	**Low**
Marketing Strengths								
Company is well-known & highly regarded	■					●		
Company has strong relative					■	●		
Good reputation for quality		■					●	
Good reputation for service	■					●		
Low labor costs		■				●		
Low distribution costs			■					●
Effective R&D and innovation				■			●	
Effective sales force				■		●		
Geographical Advantage		■					●	
Raw material advantage		■					●	
Producing Strengths								
New, well-equipped facilities		■					●	
Strong economies of scale				■				●
Capacity to meet demand		■				●		
Ability to deliver on time		■				●		
Ability and dedicated workforce		■					●	
Technical Skill				■			●	
Financial Strengths								
Low cost of capital		■					●	
High Availability	■					●		
High Profitability				■				●
Financial Stability		■					●	
Organizational Strengths								
Enlightened, visionary leadership		■					●	
Capable managers		■					●	
Dedicated workers		■					●	
Entrepreneurial orientation		■					●	
Speedy response to changing conditions			■			●		
Flexible and adaptable organization	■						●	

Basically, both the opportunity analysis and the threat analysis should focus on the trends which are affecting the firm's business now or might affect it in the future. In

the construction industry, some of the following trends could be a company's opportunities, such as a joint venture on a large project, a new construction management division, and acquisition of another firm, a build-operate-transfer (BOT) project, a drop in interest rates, international work, new services and positive political change. Others could be a company's threats, such as new competition, lawsuits, loss of an important client, program changes, bad financial arrangements, and negative political change. (Lin, 1995)

Every organization has actual and potential strengths and weaknesses. Since it is practical in formulating strategy to extend or maximize the one and contain or minimize the other, it is important to try to determine what they are and to distinguish one from the other. By viewing the SWOT analysis form, systematically, a company can easily know what its strengths and weaknesses are, and find what its opportunities and threats are. (Lin, 1995)

3.3.5 Benchmark Analysis

Benchmarking is one of the latest hot topics of management literature. According to Watson (1993) unlike many of its predecessors, benchmarking has its roots in fundamental business activities that have been practiced for years. He states:

> "Upon discovering the meaning and application of benchmarking, many senior managers sense déjà vu – they recognize that this method represents something similar to their *competitive analysis* techniques and feel comfortable implementing it."(Watson 1993, p1) (italics added)

Like other management terms, benchmarking also has many definitions. Roger Milliken (1992) has called benchmarking "stealing shamelessly" [32] . However Westinghouse envisions benchmarking as an integrated tool within its Total Quality Improvement Process. The Westinghouse Productivity & Quality Center's course on benchmarking uses the following definition.

> "Benchmarking is a continuous search for and application of significantly better practices that leads to superior *competitive performance*." (Adam, P.R., 1992)(italics added)

[32] Roger Milliken, CEO of Milliken Company, stated in his address at the National Quality Forum following his company's receipt of the Malcolm Baldrige National quality award.

There are also some other definitions made by various people. Fred Bowers (1992), to illustrate, links benchmarking with the *learning organization*. He defined it as 'the process by which organizations learn, modeled on human learning processes'. Finally, the definition that is developed by the International Benchmarking Clearing-House (IBC) can be used for a working definition, that is;

> "Benchmarking is a systematic and continuous measurement process; a process of continuously measuring and comparing an organization's business processes against business process leaders anywhere in the world to gain information which will help the organization take action to improve its performance."[33]

As Watson (1993) stated, in the late 1800's Frederic Taylor's work on the application of the scientific method of business had encouraged *comparison* of *work processes* and it became a common business practice during World War II for companies mainly to determine standards for pay, work loads, safety, and other factors. According to him, these procedures can be seen as a root for newly invented management technique by Xerox Corporation in 1979.

Table 3.4 Benchmarking Terminology (Adapted from McGeorge &Palmer, 1997) [34]

Author	Within the organization	Product-to-product comparison	Different companies in the same industry	Different Industries
Camp	Internal	Competitive	Functional	Generic
Spendolini	Internal	-	Competitive	Functional (Generic)
Karlof&Ostblom	Internal	-	External	Functional
Blendell et al	Internal	-	Competitor and Functional	Generic
Copling	Internal	-	External or best practice	External or best practice
Watson	Internal[35]	Reverse Engineering	Competitive	Process (Generic)
Peters	Internal	Benchmarking	Benchmarking	Benchmarking
McGregor&Palmer	Internal	N.A. for construction	Competitive	Generic

[33] *Planning Organizing, and Managing Benchmarking*: A User's Guide, Houston, TX, 1992.
[34] Watson also includes two other categories of strategic benchmarking and global benchmarking which can be seen below
[35] McGregor & Palmer did not refer internal and generic benchmarking as a thought of Watson, though he mentioned and gives application examples of internal, functional and generic benchmarking studies in their book.

Xerox case is reasonably known for its introduction benchmarking as a new management technique and by Robert Camp[36] in 1989 it is introduced to wide public. At last, in 1992 Malcolm Bridge National Quality Award introduced a category of benchmarking and competitive comparisons as a criterion of the award and the technique is widely accepted by scholars.

In terms of types of the benchmarking analysis, there is a different terminology used in some of the major benchmarking texts. In Table 3.4 these differences are summarized. Accordingly, Watson (1993) defined five generations of benchmarking in terms of *business process*, and concluded with currently being in the fourth generation for 1993 (Figure 3.16). According to him, the first generation of benchmarking may be interpreted as comparisons of product characteristics, functionality, and performance between similar products or services of competitors and mostly had an engineering-based approach. The second generation, competitive benchmarking, (was refined into a science by Xerox corp. during 1976-1986) moved beyond product-oriented comparisons to include processes with those of competitors. The third generation of benchmarking developed during 1982-1988 parallel to the quality studies. The fourth generation of benchmarking is named with *strategic benchmarking* defined as a systematic process for *evaluating alternatives, implementing strategies,* and *improving performance* by understanding and adapting successful strategies from external partners. In a sense, strategic benchmarking is defined as a learning process that helps to feed process reengineering. Finally, Watson (1993) defines a future generation of benchmarking as global benchmarking where international trade, cultural and business process distinctions among companies are connected in a global scale and their implications for business process improvement are understood[37].

[36] Camp worked with the benchmarking initiative of Xerox for seven years, and he formalized his ideas in *Benchmarking: The search for Industry Best Practice that leads to Superior Performance.*
[37] Watson also states that across the span of these generations of benchmarking a fundamental shift has occurred in the *model for competition* between businesses

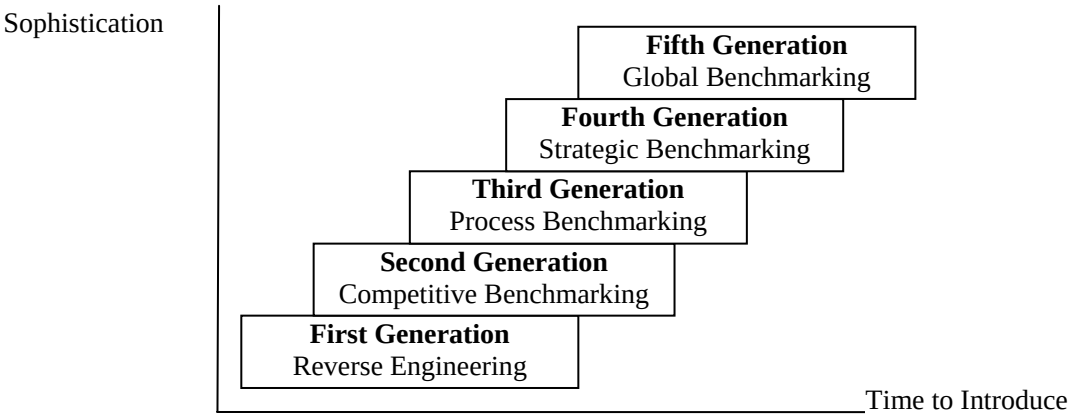


Figure 3.16 Development of benchmarking as a business process (Source; Watson, 1993, p6)

Benchmarking can be conducted either between different departments within the company, or with other companies in the same industry, or finally with other industries. McGeorge and Palmer (1997) also defined comparison as the basis of benchmarking and see the aim of the whole process is to achieve superiority (Figure 3.17).

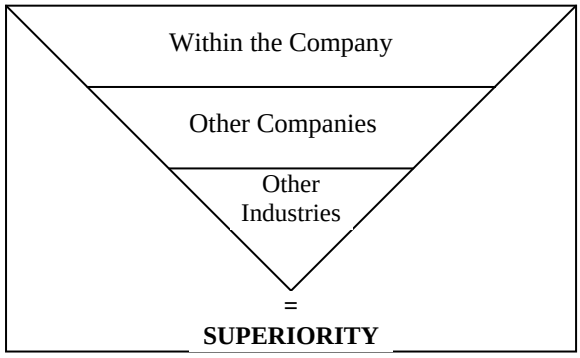


Figure 3.17 Benchmarking, the Pyramid of success (McGeorge &Palmer, 1997)

The benchmarking pyramid of success outlined that an organization could look into internal divisions, other companies or other industries. These three types of comparison would involve different procedures and are generally classified as 'three distinct types of benchmarking'. For the construction context these three distinct types can be named as; *internal, competitive, and process or generic benchmarking.*

(1) *Internal Benchmarking:* As its name corresponds; this type of benchmarking is used to compare different processes within the same organization. Actually, the essential component of benchmarking is the search for best practice in the external environment. However in this case, it is done internally, and the use and the process

information flow of this kind of benchmarking is defined as high. (McGregor &Palmer, 1997)

(2) *Competitive Benchmarking:* This kind of application involves a comparison between the *processes* of companies within the same industry. Competitive benchmarking studies target specific product designs (in manufacturing), process capabilities, or administrative methods used by a company's direct business competitors. Studies of this type differ from process benchmarking studies in terms of their depth and the fact that their goals tens to end with measurement rather than with implementing *process enablers*[38] (Watson, 1993). Often these kinds of studies are conducted by a third party to sanitize competitive information and McGregor & Palmer (1997) identified the major advantage of this type of benchmarking with its applicability. To exemplify, it is highly relevant to compare the marketing operations of two companies offering the same product and working within the same client base.

(3) *Process/Generic Benchmarking:* This kind of application compares the business processes of organizations regardless of the industry they belong to. Reasonably, generic benchmarking represents the broadest application of data collection. While conducting a generic benchmarking study, a company is not confined with industry border, it is confined only by its ability to develop an analogous process and understand how to translate across industries. The advantages of generic benchmarking are that it breaks down the barriers and offers a great opportunity for innovation. This most innovative approach to benchmarking can result in changed paradigms and reengineering of business operations. The disadvantages can be named as being difficult, time-consuming, and expensive. (McGregor &Palmer, 1997)

Lastly, a company could carry out a generic benchmarking exercise without having carried out either internal or competitive benchmarking. Also, a company may carry out only internal or competitive benchmarking without doing the other two types. So there is no prerequisite relationship between these three. (McGregor &Palmer, 1997)

[38] Watson (1993) defined process enablers with where 'strategic value improvement' lies for the company

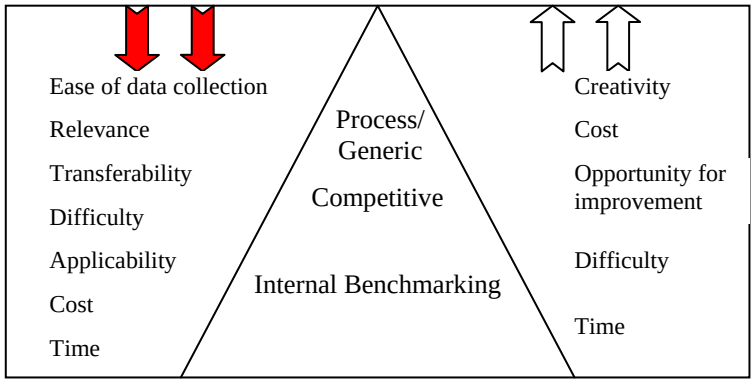


Figure 3.18 Types of Benchmarking with changing properties (Source; McGeorge & Palmer, 1997)

Figure 3.18 shows the level of difficulty with several other factors through internal and generic level benchmarking and vice-versa.

In the benchmarking process, as a central idea, *business processes* have great importance and stressed by various authors. Accordingly, any organization is defined to be broken into a series of functions. In business, function refers to the performance particular section of the organization such as marketing, sales, estimating, etc. All functions have an *output* or *deliverable*, for a construction firm the output of the estimating function can be seen as the total number of submitted bids. On the other hand, a *business process* is referred to the action that takes place within the function. In construction case of estimating, this can be the decision to tender, the obtaining of subcontractor quotes or the final submission of a bid. Outputs of all the processes are defined the product or deliverable of the function and the sum of all products delivered by all functions creates the final product. In the construction case this could be a 'completed building'. Another important topic for benchmarking is *metrics* versus *processes*. The major difference between metric versus process is that even a metric indicates a performance gap exist it does not give any indication about why. On the other hand, if processes were analyzed, the reasons for the performance gap would be clear. (McGregor &Palmer, 1997)

For construction, benchmarking is relatively a new topic. There has been little research carried out on the technique. However there are some studies conducted mainly by UK universities and research centers. To illustrate, Building Research Establishment (BRE) has conducted a Construct IT study which benchmarks the use of IT in site processes among 11 leading construction companies in UK. The BRE

work is mainly concentrated on producing methodology for evaluating construction industry and Key Performance Indicators (KPI)[39] studies are also seen under the benchmarking studies in construction. Another benchmarking study is commenced in July 2003 by BSRIA (Building Services Research and Information Association) in UK and aimed to highlight 'worldwide KPIs' and make a benchmark study of construction companies[40].

Finally, it can be concluded that benchmarking and SWOT analysis are alike tools in that both of them can be used for multiple purposes and various levels for competitive and strategic thinking. Another point is that, though benchmarking is studied with other analytical *tools*, it is rather a *technique* and thus has a more general application area. Also, definitions of benchmarking are stemmed from competitiveness issues; so, though studied under different headings, basic measurement studies of competitiveness should be understood within benchmarking studies and techniques. A final point for benchmarking is, though *processes* are highly emphasized, *the product* side should not be omitted to prevent myopic considerations understanding[41].

3.4 THREE GENERIC COMPETITIVE STRATEGIES

The three generic competitive strategies are defined by Porter (1980) and is a tool to constitute strategies for competitiveness. Accordingly, a firm can possess one of two basic types of competitive advantage: *low cost* or *differentiation*. These combine with *the scope of a firm's operations* to produce the *three generic competitive strategies*. These three are the *overall cost leadership strategy*, the *differentiation strategy*, and the *focus strategy*. (Porter, 1980)

When a firm wants to take offensive or defensive actions to create a defendable position in the long run, the three generic strategies can be used alone or in combination to help the firm to do better than other firms in an industry.

[39] Key Performance Indicators are reviewed in Chapter 5.
[40] First steering group meeting of this study is held on 22 September 2003 and the topic is further analyzed in Chapter 4.
[41] In Momaya's (2004) APP (Assets, Processes, Performance) model, the author sees a myopic consideration in terms of product side of competitiveness. See Chapter 5 for more information.

Table 3.5 The Three Generic Competitive Strategies (Source; Porter, 1980)

Competitive Advantage / **Competitive Scope**	**Lower Cost**	**Differentiation in Quality and Service**
Broad Target Market	(1) Cost Leadership	(2) Differentiation
Narrow Target Market	(3.1) Cost Focus	(3.2) Differentiation Focus

This simple two-by-two matrix is effective in describing how the firm competes. *The horizontal axis* refers to how a company intends to compete. For example, a company can compete either by providing lower costs than anybody else or by providing more quality and service. *The vertical axis* refers to competitive scope. Within the context of competition based on *cost* or *differentiation*, a company can target a broad range of clients; others might focus on a specialty market (Table 3.5). (Porter, 1980)

For construction industry, the awarding methods which are chosen by the owners directly influence the firm's three generic strategies. For example, in the *open bidding system*, construction firms probably should pay attention to their overall cost leadership strategy; whereas in the *nominated bidding system,* firms must emphasize their quality and services which is a differentiation strategy. In the *pre-qualification bidding system* firms had better focus on specific markets and achieves their targets in both lower costs and higher differentiation. In addition, the three generic strategies are directly or indirectly related to other analysis of strategic and competitive planning. To illustrate, Lin (1995) defines that the importance index in the SWOT analysis can be seen as related with generic competitive strategies. If a company chooses the differentiation strategy, the importance indexes of the reputation for quality and service will be high. (Lin, 1995)

The three generic strategies are further described below.

3.4.1 The Overall Cost Leadership Strategy

Overall cost leadership requires of vigorous pursuit of cost reductions from experience, efficient-scale facilities, tight cost and overhead controls, cost minimization in areas like R&D, service, sales force, advertising, and so on. (Porter, 1980)

Quality, service, and other areas are important to a company, but low cost relative to competitors is the theme running through the entire firm strategy. Having a low-cost

position yields the firm above-average returns in its industry despite the presence of strong competitive forces. A low-cost position protects the firm against all five competitive forces because bargaining can only continue to erode profits until those of the next most efficient competitor are eliminated. Low cost position also gives the firm a defense against rivalry from competitors, because its lower costs mean that it can still earn returns after its competitors' basic costs. (Porter, 1980)

In the construction industry, within the bidding system, if companies choose the overall cost leadership strategy, some issues related to their financial situations become critical, such as labor costs, sales force, cost of capital, basic earning power, profit margin on sales, return on total assets, and so on (Levy & Sarnat, 1990). In order to achieve the target of cost leadership and survive within the lowest price bidding system, the firms tend to be conservative in their financing performance and pay close attention to their expenses in each corporate activity. (Lin, 1995)

However, when a company pursues a cost leadership strategy, there are several risks which must be considered. Some of these risks are: (1) low-cost learning by competitors through imitation; (2) technological changes that invalidates past investments or learning; (3) inability to see required product or marketing change because of the attention placed on cost; and (4) inflation in costs that narrow the firms ability to maintain enough of a price differential to offset competitors' approaches to differentiation. (Porter, 1980)

3.4.2 The Differentiation Strategy

Differentiation requires a firm to create something from its *products* or *services* that can make the firm *unique*. A firm differentiates itself along several dimensions, such as *technology*, *price*[42], *quality*, *customer service*, *dealer network*, *product design*, and so on. Differentiation also creates a defensible position for coping with the five competitive forces. For instance, differentiation can moderate buyer power, since buyers lack comparable alternatives and are thereby less price sensitive. (Porter, 1980)

Even though differentiation can bring stronger competitive capability to a company, it must be recognized that to achieve differentiation implies a trade-off with overall

[42] Note that 'Cost leadership', can also be seen as a product of differentiation. So; it can be asserted that there is just a single strategy exists namely 'Differentiation'. Though, the separation of generic strategies by Porter is useful.

cost position if the activities required in creating it are inherently costly, such as high quality raw materials, extensive research, product design, or intensive customer support. In other words, a company has to find the balance between cost leadership and the differentiation. (Porter, 1980)

In the construction industry, within the bidding system, if the firms choose the differentiation strategy, some issues become critical such as firm's reputation for *quality, service, technical skills, facilities, economies of scale,* and so on. If the firms have good reputation, high technical skills, or bigger economies of scale, normally, the clients of construction prefer these firms' features and elect the firms to attend the bidding or even directly select them to without going through the bidding process (Lin, 1995).

When a company pursues a differentiation strategy, there are also several risks have to be considered. Some of them are as follows; (1) imitation can narrow perceived differentiation, (2) buyers' need for the differentiating factor can fall, (3) the cost differentiation between low-cost competitors and the differentiated firm could become too great for differentiation to hold brand loyalty. Thus, buyers sacrifice some of the features, or services possessed by the differentiated firm for large cost savings. (Porter, 1980)

3.4.3 The Focus Strategy

The focus strategy aims to be able to serve a narrow strategic target more effectively or efficiently than competitors who are competing more broadly. In other words, a company achieves either lower costs in serving a particular target, or higher differentiation, or both. (Porter, 1980)

The entire focus strategy is built around serving a particular target very well, and each functional policy is developed with this in mind, whereas the *low cost* and *differentiation* strategies are aimed at achieving their objectives industry wide. Through the preceding sections, it is stated that the cost leadership and differentiation strategies both can provide defenses against each competitive force. The focus strategy also can provide defenses against competitive forces by selecting targets where competitors are the weakest or where they do not pay attention. (Porter, 1980)

In the construction industry, under the pre qualification bidding system, if the firms choose the focus strategy, some additional critical issues have to be considered, such

as firm's relative market share, R&D, geographical location and so on. Also, while pursuing a focus strategy, one should know that there are some risks which the company has to consider, such as the differences in desired products or services, and narrowing strategic target and market (Lin, 1995), thus the issues highlighted in Chapter 2 for demands, trend analysis and business cycles gets higher importance. Also the vulnerability of this strategy is relatively high according to portfolio management strategies.

This analytical tool (though referred as strategy) is useful for explaining intuitive concepts and helping a firm describe how it should compete. When a firm applies this model, it should be aware of even though the three generic strategies are alternative, the firm should always keep away from becoming '*stuck in the middle*'. In other words, the firm should not try to compete in two different squares of the matrix (Lin 1995, Porter 1980). For instance, a general contractor might attempt to win highway work with high cost reduction and also effort to negotiate 'sole source repeat work' for hospitals. Porter (1980) defines this situation as being s*tuck in the middle* and as an extremely poor strategic situation since the firm failed to develop its strategy in at least one of the three directions. Macomber (1991) warns this kind of attitude with 'lead to a corporate schizophrenia' because of conflicting requirements when hiring personnel, writing contracts, preparing correspondents or interacting with designers.

3.5 CONCLUSION

In this chapter, basic concepts and tools of competitiveness are analyzed with three levels, namely; *national*[43]*, industry and firm level.* Though not identified clearly, this classification can be seen within the context of referenced texts but again can be regarded as an original issue. The classification is important for the theme of this thesis since competitiveness is a challenging and diffuse concept and only by appropriate classification it is understood. Moreover, as an essential point of this

[43] There is confusion between the terms *national* and *international*. Here, *national level* defines international competitiveness issues/models of a national industry. *International level* also encompasses firm level involvement, and this point should be noted for final part of the thesis.

study, a further classification will be brought over this classification and Lansley's (1979) *environment definitions*[44] in the final part of this thesis.

Within these three levels, Porter's (1990) 'diamond framework' and 'National Competitiveness Indices' are analyzed along with Lall's (2001) 'Competitiveness Triangle' to have an understanding of the link between the *firm level* and *national level* competitiveness issues. The strengths and weaknesses of these national levels models are also covered in this section according to, *business school, and power school approaches*; *static* and *dynamic characteristics of models*; plus *analysis* and *deterministic* point of view of models.

Within Porter's diamond framework two basic divisions are also defined under *factor conditions*, and this division is important for *competitive advantage* understanding. In the first one, there is a classification of, *basic* and *advanced* factors and in the second one the distinction made with *generalized* and *specialized* factors. It is also concluded that, *advanced* and *specialized* factors are viewed as crucial and having *sustainable* basis for competitive advantage whereas *basic* and *generalized* factors are replicable and *not sustainable*.

In terms of national level competitiveness models and studies, Porter's (1990) study has attracted so much attention in the academic literature. The model is also applied for construction industry by several researchers (Oz, 2001; Ofori, 1993) for different reasons; however other models are not used for evaluation of construction industry[45]. There is a large amount of criticism held about diamond framework and some of them are relevant to the central issues of this study so; the model and the criticisms will be analyzed in Chapter 4.

Continuing with *industry* and *firm level* competitiveness concepts, *five competitive forces model, value chain, segmentation matrix, SWOT* and *benchmark analysis* and *three generic strategies* are reviewed with a construction industry point of view. Here it should be noted that, depending on microeconomics *five competitive forces model* and *value chain* provides a backbone for all level of competitiveness studies and issues covered in this study. It is also important to see that *SWOT* and *benchmark analysis* have a very broad and generic application areas. SWOT has a tool characteristic and can be applied

[44] See Chapter 2 for more information.
[45] National competitiveness indices are aimed to use for industries, but as a background study they may be used in construction.

even to competitiveness models; however benchmarking is relatively a *technique* and has very close links with the definitions of competitiveness so, basic measurement studies of competitiveness should be understood within benchmarking studies and techniques. One more point is that, within benchmarking analysis the importance of *processes*, *products* and *metrics* are equally highlighted and more considerations will be introduced in the forthcoming sections. *Segmentation matrix* and *three generic competitive strategies* are also useful tools for *market understanding* and *competitive strategy formulation*.

Finally, the writings of the Porter (1980-1990) are considered to be among the most influential of their subject and among the most critiqued ones. Porter had a permanent influence on strategic management with his books about competitive advantages, which were written in the eighties. His models like the *five competitive forces*, the *value chain* and *diamond framework* have become standard equipment of the business books on competitiveness. However, the rise of the internet and of various e-business applications had strongly influenced nearly all industries and Porter's ideas became more and more subject of critique under the impression of the developing internet economy. In fact, Porters theories base on the economic situation in the eighties and this period was characterized by strong competition, cyclical developments and relatively stable market structures and hence, these models are criticized for not explaining or analyzing today's dynamic changes.

As a final mark, since the analysis of any tool directly or indirectly influence the results of other analytical tools of competitive planning, during the process of planning; firms have to consider all analyses together. In the following chapters 'competitiveness in construction' will be analyzed with *international* and *firm level metrics side*.

CHAPTER 4 COMPETITIVENESS IN CONSTRUCTION AND MODELS FOR ANALYZING INTERNATIONAL CONSTRUCTION

In the majority of the relevant literature, the word *competitiveness* can easily be seen as linked with a large amount of the modern management terms. In this thesis, as it is noticed in the previous section, competitive tools are categorized for *national, industry* and *firm level* application areas. It is also seen that most of the previous work on competitiveness issues target this kind of application areas, either directly or indirectly. However it is important to notice that since value can be assumed basically created in the firm level, competitiveness understanding of it is critically important. Another point is that models can also be classified according to users. Accordingly *national* and *industry level* competitiveness understanding is mainly important for *policy makers & researchers;* and *industry & firm level* understanding is important for enterprise *owners* and *managers*. In this study, a general outline is tried to be drawn for all users.

This chapter covers two basic sections. In the first part *core business*, *core competencies* and *competitive advantages* in construction is studied along with identified points in chapter 3. In the second part, *international construction* and its *competitiveness analysis* is considered.

4.1 CORE BUSINESS AND CORE COMPETENCIES IN CONSTRUCTION

'Core competencies' are those capabilities that are critical to a business achieving '*competitive advantage'*. The starting point for analyzing core competencies is recognizing that competition between businesses is as much a race for competence mastery as it is for market position and market power. Senior management cannot focus on all activities of a business and the competencies required to undertake them. So the goal is for management to focus attention on competencies that really affect competitive advantage. (Prahalad, CR. & Hamel, G., 1990)

Core competencies are defined by vitally supporting the organization's competitive advantage and are the collective learning in the organization in relation to the coordination of diverse production skills and integrating multiple streams of technologies. Core competencies differ among organizations and will depend on its competitive position and the strategies that it is pursuing. There are *threshold competencies* and *resources* that are required to remain in the game but these alone will not provide a competitive advantage. Core competences go beyond threshold competencies, beyond individual business units, and are those that are critical for success in a particular market or industry. They must provide value to the customer, should be difficult for competitors to imitate and are therefore likely to be rare, complex and embedded in organizational knowledge and practice (Langford, 2001). They are therefore likely to be implicit but need to be made explicit in order to provide a clear understanding of competitive advantage for the firm. Core competences are not about delivering end-products, to illustrate not an office building for a contractor but as an example the ability to integrate the on-site construction of complex mechanical and electrical installations additionally installing information technology requirements. (Prahalad, CR. & Hamel, G., 1990; Langford, 2001)

Prahalad & Hamel (1990) differentiate between core competencies, core products, and end-products. In a contracting case, there could be a *core competency* in constructing complex technology-driven designs through onsite production capabilities and here, the *core product* for the contractor could be offering a capability in *design and build* or *construction management* and the *end-products* could be office blocks, hospitals and so on. In defining a core competency Prahalad & Hamel (1990) proposes three decisive tests. *First*, a core competency should provide access to a number of markets. *Second*, a core competency should make an important contribution to the perceived benefits that the customer wishes from the end-product. *Finally*, it should be difficult for competitors to imitate.

For construction business, an empirical analysis conducted by Hillebrandt *et al* (1995) in UK construction industry identified perceived *core business activities* by practitioners. From this, Langford (2001) concludes that, managers viewed their *core business* as those activities that possess some or all of the following characteristics:

- Where the firm has had a long standing interest and has built up a considerable expertise,
- Generating a fairly substantial turnover,
- They are either profitable or expected to be so,
- Where reasonable market growth can be expected or where the firm has a captive market,
- Where there are low capital requirements.

Another classification made by Kay (1993) and he defines a firm by its *contracts* and *relationships*. According to him *added-value* is created through the success the firm has in putting these *contracts* and *relationships* together. Moreover, he defined that it is the *quality* and *distinctiveness* of these contracts and relationships to a firm that provide added value to customers. Kay (1993) also defined *core business* with 'those activities where the firm's distinctive capabilities give it a competitive advantage' and defined distinctive capabilities as stemming from three primary sources that are *organizational architecture*, *reputation* and *innovation*.

Organizational architecture is defined as being easier to sustain than create and described by some sets of *relational contracts* within or around the firm. *Organizational architecture* has both a social and commercial aspect and allows the firm to create an *asset* through using these aspects. It generates and sustains *organizational knowledge* and *routines* that are distinctive to the firm and hence allow it to respond to change and these may be generated from the use of technology, skills or knowledge that resides in people's attitudes. Added-value is therefore created from the ability to sustain long term relationships using that knowledge. (Langford, 2001)

The second important facet of distinctive capabilities, defined by Kay (1993), is *reputation* and it expresses information to customers and goes beyond quantifiable characteristics of any product. To illustrate for construction, most firms use pictures of completed projects[46] for their marketing efforts and use them as a mechanism to communicate with clients and these pictures present what the firm has achieved. Reputation is built out of the continued successful completion of projects and it is easier to lose reputation than build it. The properties of products and services that

[46] Note that *reputation* is linked with *experience good* characteristics of construction production.

build reputation can emerge through customer search activity and through comparisons with other similar types of product or service, through immediate consumption and hence immediate experience in manufacturing or through long-term experience in construction. The added-value of reputation and the building of it come more critically where judgements on quality are based on long-term experience rather than from those simple market exchange relationships such as in the construction. The value of reputation as a source of distinctive capability is defined as first, the premium available to be charged and second, the likelihood of repeat business from a market that is likely to continue once reputation has been built. In terms of the characteristics of core business mentioned by Hillebrandt *et al.* it is those markets where a firm has a long standing interest that reputation will provide a distinctive capability. (Langford, 2001)

Innovation is defined as the third source of distinctive capability and firms may have organizational architectures that encourage a continuous process generating innovation or are good at implementing it. Langford (2001) defined that it is often difficult to create competitive advantage through innovation since it is a costly and uncertain process. It is also defined that it is usually hard to manage and difficult to secure rewards from innovation for a firm. As a result, innovation is stated as being insufficient to obtain a competitive advantage on its own but when linked with other distinctive capabilities it could become a powerful tool. *Organizational architecture* is critically linked to innovation, either through generating innovation or implementing it. It is stated by Langford (2001) that innovation often occurs at the workface on complex projects for contractors and thus the extent of sub-contractor use is highly important for this item.

4.2 SOURCES OF COMPETITIVE ADVANTAGE IN CONSTRUCTION

A competitive advantage is an advantage over competitors gained by offering consumers greater value, either by means of lower prices or by providing greater benefits and service that validates higher prices. Following on from his work analyzing the competitive forces in an industry, Porter (1990) suggested three 'generic' business strategies that could be adopted in order to gain competitive advantage and recovered in Chapter 3.

Langford (2001) defined that finding out spots of *competitive advantage* requires an analysis of the value activities of a company when competing in a particular industry and value activities stem from the way the company manages its people, the technical system and organizational structure and processes. The key concern for competitive advantage is the extent to which the firm is 'able to sustain a long-term advantage through either reducing costs or offering something unique' in the way of managing its value chain. (Langford, 2001)

Porter (1980) suggests that competitive advantage can be sustained by setting up a possible hierarchy of sources and being clear about the sources of competitive advantage within this hierarchy. As stated in previous chapter, *low order sources of advantage* are easily replicable by competitors and basically include low labor and material costs. Other easily replicable sources include *economies of scale* stemming from *technology, equipment and methods*, which are all together, form a common basis of competition in construction. High order sources of advantage include *exclusive process technology*, and *product differentiation*. The *former* one is of particular relevance for competing in *engineering and architecture processes* and the *latter* stems from unique *products or services*. (Langford, 2001)

Brand reputation based on cumulative marketing efforts and *customer relationships* are other examples of high order sources and are relevant in many areas of construction. In order to achieve high order sources of advantage, more *advanced skills* and *capabilities* are required and this is achieved usually by involving specialized and highly trained personnel or an internal technical capability or close working relationship with leading customers. It also requires sustained, cumulative investment leading to the creation of both tangible and intangible assets in the form of *specialized knowledge*, *reputation* and *customer relationships*. The number of distinct sources of advantage that a company possesses and constantly improving and upgrading these advantages are more important in construction. (Langford, 2001)

Male (1991), using the work of Azzaro *et al.* (1987), proposed a value chain analysis of the bidding process within the business strategy system of a contracting company. The value activities in a project for a contracting company are sharply divided between the *pre-* and *post-contract* stages. In the pre-contract stage two major value activities proceed in parallel, namely, *estimating*, and *contract planning and management*. For post-contract stages, they adopt a time and resource-based analysis that involves

programming of site activities and determining the method of working. As part of this overall process, one of the key value activities for the contractor is defined as the subcontract pricing process and major decisions include the number of sub-contract work packages and sub-contract quotations. (Langford, 2001)

As stated before, innovation is defined as one of the key issues in sustained competitive advantage (Kay, 1993). Langford (2001) reported two types of innovation, *radical shifts* and *gradual incremental* (Clark, 1989). Radical shifts involve short, painful periods of transformation. In a construction context, Boyd & Wilson (1995) concluded that incremental innovation is common in construction whereas radical shifts are rare. Fleming (1980) has concluded that product and process innovation in construction is outside the industry's control due primarily to its service nature and the split between production and design, manufacture and construction. It is also noticed that the forms and methods of construction are largely in the hands of the designers. (Langford, 2001)

Male & Stocks (1989) identified four distinct types of innovation to summarize their views on competitive advantage in construction.

- *Technological innovation*: Utilizes new knowledge, techniques to provide a product, service at lower cost *or* higher quality.
- *Organizational innovation*: It does not require technological advances but involves *social technology* which changes the relationship between behaviors, attitudes and values.
- *Product innovation*: It may provide better utilization of resources and involves advances in technology resulting in superior products or services.
- *Process innovation*: It substantially increases efficiency without significant advances in technology.

Here, the important point is that much of the innovation in the construction industry occurs at the workface, with individual craftsmen, especially on special projects. Thus, contractors that pursue a strategy of a high level of sub-contracting lose this incremental innovation since it is also available to their competitors by sub-contractors (Langford, 2001). Another important point is that threaten of shifting

places between the sub-contractor and the main contractor may become a real case if innovations creates a major core competency for sub-contractors.

Another important source of advantage for construction is defined as '*management resource*' in that construction relies extensively on project team working and problem solving. It is often stated that people are one of the key resources in construction and therefore an area of distinctive competence for a contractor could be located at site management level. Thus, isolating competitive advantages in construction can be difficult since there is a high incidence of knowledge-based advantages residing in project teams at different levels in the firm's structure. This would be translated into a distinctive capability that can be termed a *team-specific advantage*. Other areas of distinctive competency that are team-based can also occur in bidding strategy during the negotiation process where key personnel from the middle line and strategic apex come together to produce the final project tender price and also in the selection of plant and equipment and in the planning and scheduling of resources. These are distinctive capabilities that are team-based and reside in the middle line of the firm. (Langford, 2001)

Hillebrandt *et al.*(1995) are of the view that the essential technologies of construction are embodied in the people employed. This is unlike manufacturing businesses where this is vested in plant and machinery. Most plant and equipment in construction is non-project specific, is interchangeable and the important issue is the way that it is used on-site that will determine project success. This is rooted in good selection and planning of equipment for the on-site production process and the use of that technical system compared to potential competitors. (Langford, 2001)

Finally, in order to formulate a competitive strategy it is important to isolate are as where the company has distinctive capabilities that provide it with an edge over its competitors (i.e. a competitive advantage). Construction is a knowledge based industry where similar technologies are available to competitors but it is the way they are used that provides the competitive edge. Knowledge resides at regional subsidiary level in terms of detailed market knowledge and client contacts. Knowledge also resides with specialist subcontractors and again this will be available to competitors through the subcontracting process. However, through the use of relational contracts and the use of key supplier lists, contractors are in a better position to retain preferential access to such knowledge. To summarize, *organizational architecture,*

reputation, innovation, management resource and *low &high order factors* related with *products and processes* are presented as sources of advantage in construction.

4.3 INTERNATIONAL CONSTRUCTION & COMPETITIVENESS ANALYSIS

For many industries, large scale internationalization began after the Second World War, due to the great need for the transfer of technologies, skills and infrastructure. Accordingly, many of the domestic firms easily operate in overseas markets and sought opportunities. For Turkey, many construction firms specifically began to explore opportunities by 1970s in dominantly Middle East and North Africa locations. This is mainly due to two reasons (1) the decline in domestic demand, and (2) new opportunities emerged as industrial, commercial and infrastructure expansion in Middle East Countries as a consequence of soaring oil prices and wealth.

Bon and Crosthwaite (2000) estimated that the global construction market is over US$3000 billion annually and according to Drewer (2001), US$800–1000 billion of the global construction output is undertaken by the '*international construction system*' currently; comprising firms operating throughout the world.

4.3.1 Classification of International Construction

International competition can be seen in many forms. In one extreme it can take the form of multi-domestic international competition which is largely independent within each country. An example of this type of international activity would be banking where in a country it has its own distinct customers, own assets and own reputation. At this end of the scale the international construction industry can be seen as a collection of domestic industries. Even though there may be *multinational* firms operating in the industry, each firm's competitive advantages are basically confined to that country or region. At the other end, there exist *global* industries in which a firm's competitive position in one country or region affects its position in other countries or regions. Rival firms compete against each other on a truly *global basis* and firms attempt to *combine advantages in the international arena with those in the domestic arena.* Here, Flanagan (1994) distinguishes between *international, multinational* and *global* firms in the

construction arena[47]. Accordingly while many construction firms can be described as international in scope few would be typified as being global or even multinational. The international firm has *a large domestic market* and *dependent satellites* in several countries. The *global firm* has a home base, but brands *independent companies* around the world, e.g. Sony, Hewlett Packard, Toyota. (Langford, 2001)

For Turkey vast majority of construction firms operate mainly in the domestic environment and internationalize their services on this basis. It is usually very difficult for the majority of Turkish firms to operate in a foreign country as a multinational and global basis, thus most of their activities can be classified as being in the first stage of internationalization. However, firms such as GAMA and ENKA have significant international presence and they may be classified as *multinational firms* with their new branches in Ireland, Holland respectively.

Strassman and Wells (1988) and many other authors suggest the definition of an *international construction project* as one undertaken by an enterprise outside its home-country ('firms from one country building under contract in another' by Strassman and Wells, 1988). However, Ofori (2003) stated that this description is currently out of date, and that now the definition is to include projects in a home-country involving foreign firms as competitors.

4.3.2 Size, Structure and Major Players in the Market

In 1995, the global market for construction, expressed in terms of contracts, awarded to the world' s top 225 contractors exceeded $448000 million (ENR, 2000).This market is defined extremely attractive, not only for its size and direct potential for earning profit and generating foreign exchange, but also for the suppliers of equipment, materials and related construction services(Langford, 2001). Accordingly, most researchers acknowledge that the global construction industry is large. While the ENR report suggests that the size of the global construction industry in 1995 was around $448 billion, Bauml (1997) suggests that this figure may be somewhat overstated due the degree of sub-contracting among the top 225 construction firms (Langford, 2001). Yet, he acknowledges that;

> '…the global construction industry is large, mature, highly fragmented and very competitive…no reliable data currently exists for the total global construction

[47] Note that we will use this classification in the conclusion part.

> industry. …then the size of the industry is…likely to be far larger than reflected in the ENR survey…'

Langford (2001) generally attributed the increasing demand for construction related work on the global scale to a number of factors which include, world population growth, higher lifestyle expectations of developed countries and for basic needs of third world nations, greater demands for infrastructure and services and growth in aid programs for agriculture and commerce. Seymour (1987) modifies this background by referring to 'two factors' which have had a significant effect on the international construction environment in recent years. He hypothesize that (Langford, 2001)

> '…the first factor to have emerged in international contracting…is the influx of contractors into the industry from less developed countries…and the second factor…has been the lower level of demand world wide for international contractors services.'

These two factors, together with the historical view of the industry, suggest that, in order to operate successfully in the global construction market, it is necessary to be in possession of a complete, detailed and realistic understanding of the industry and the factors which influence it (Langford, 2001). As noted previously, the global construction industry is large, mature, highly fragmented and very competitive and this background should also be viewed as the nature of international or global construction.

It is also vital to understand that where the leading players originate when examining the global construction market. Therefore, a detailed understanding of shifts in the size and structure of the market is crucial for obtaining a working knowledge of the global construction market. Here, Langford (2001) pointed out that from the mid to late 1980s, there was a shift away from highly industrialized countries, as international construction providers, towards less industrialized countries. He provides some data which contains the *market share* of the top international contractors over the period 1990-1999 and categorized by the country in which the contractor is in residence (Table 4.1).

Langford (2001) noted by the help of the data that US resident contractors has decreased significantly from 36.3% in 1990 to 16.6% in 1995, but had recovered to 24% by 1999, while the aggregated European contractors' share has marginally

increased from 43.2% in 1990 to 54% in 1999. While comparing these figures with the figures for China and Korea he noted that both countries showed increases from 0% in 1990 to 2.8% and 4.4% respectively in 1995. Considering the European group he states that only the UK has shown a marked drop in share from 10.4% in 1990 to 4.9% in 1995, but again revives[48] by 1999. Langford (2001) interprets these figures with;

> 'there would appear to be a shift away from certain industrialized countries as international construction providers, i.e., the US, towards other industrialized countries, e.g. Japan and Germany, as well as towards less developed countries such as China and Korea.' (p125)

Table 4.1 Top international contractors market share of awards (%) by country of residence (Source: Langford, 2001; ENR 2000)

Nationality	1991	1993	1995	1999
American	45.7	39.3	16.6	24.1
European	38.3	40.6	50.0	53.6
French	8.1	9.1	15.5	13.2
British	9.4	12.4	4.9	11.7
Italian	7.9	6.8	9.4	2.7
German	7.0	6.5	11.2	10.5
Dutch	1.0	2.4	3.0	3.8
Japanese	7.5	13.0	21.3	9.7
Canadian	0.8	0.3	0.7	0.0
Yugoslav	*0.4*	*0.1*	*0.0*	*0.0*
Turkish	*0.5*	*0.9*	*0.0*	*0.0*
Chinese	*0.0*	*0.0*	*2.8*	*5.1*
Korean	*0.0*	*0.0*	*4.4*	*2.3*
Other	11.8	9.2	10.1	16.7
Total	**100.0**	**100.0**	**100.0**	**100.0**

He also provided the data contained in Table 4.2 to provide a more complete picture of the global industry and considers the international consultants' market share. Table 4.2 contains data on the top international designing firms' *market share of billings* for the period 1990-1995 by country of residence. Regarding with the data Langford

[48] Please compare the dates of Eagan report (1998), and Construction Best Practice Programs and provided data to understand the impacts of the report.

(2001) noted that, in direct contrast to the pattern of market share for the top 225 international contractors, generally the market share of billings for international designers appears to remain relatively constant over the period 1990-1995.

A possible reason for this apparent inconsistency is suggested by Seymour (1987) that the move away from contractors from industrialized countries to those from less industrialized countries is largely due to the use of unskilled local labor by contractors to create a lower cost base resulting in lower tender costs. (Langford, 2001)

Table 4.2 Top international designers' market share of billings (%) by country of residence

Nationality	1990	1991	1992	1993	1994	1995
American	42.2	41.1	51.0	42.5	31.5	40.2
Canadian	5.8	6.1	4.4	5.4	6.0	7.4
European	44.9	46.1	38.8	45.7	54.3	42.1
British	17.4	19.3	13.0	13.9	18.9	13.5
German	4.8	5.3	5.5	5.4	6.3	4.8
French	4.8	2.7	4.7	5.0	4.8	3.6
Italian	1.9	1.4	0.6	5.4	1.9	1.7
Dutch	6.7	7.3	7.7	9.0	14.0	11.8
Former Yugoslavia	0.3	0.1	0.0	0.0	0.0	0.0
Japanese	3.2	3.1	2.5	2.6	3.8	4.2
Other	12.9	13.6	10.4	10.7	12.8	12.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Langford (2001) explained a relatively constant market share of designers over the 90-95 periods by the fact that the design expertise remains in the possession of the top international designers whereas designers from less industrialized nations have yet to develop such design knowledge. The share of work which each market sector generates is also important when considering the market for international construction.

Table 4.3 Market analysis of top 225 global contractors by type of work (Source: Langford, 2001)

Type of Work	1995 Revenue (US$ million)	%
General building	166200	37.1
Transportation	78600	17.6
Industrial process and petrochemical	65300	14.6
Power	32300	7.2
Manufacturing	31900	7.1
Water supply	18000	4.0
Sewerage	13800	3.1
Hazardous waste	6200	1.4
Other	35500	7.9
Total	**447800**	**100**

Here, Table 4.3 contains a market analysis of the top 225 global contractors by the type of work undertaken in 1995. According to Table 4.3, by far with a 37% share, *general building* is the largest sector for international contractors. Transportation and petrochemical are the next largest ones. While it is acknowledged that general building work forms the largest single market segment, Bauml (1997) highlighted some examples of niche markets including, hydrocarbon processing and power generation as examples of high rated engineering and construction firms activities. (Langford, 2001)

4.3.3 Reasons for Internationalizations

Langford (2001) defined the reasons for a firm to internationalize based on the outcomes of a *portfolio analysis*. Accordingly, if a firm cannot improve its competitive position within its traditional market, could diversify into other domestic markets, or internationalize. He also stated four basic strategic reasons for a firm's intention to internationalize. These are;

- Current portfolio no longer meets the firm's objectives due to; (1) market diffusion in the domestic market and unreasonable return on assets, (2) general turn down in demand in the domestic market, (3) competitive stress from other firms in the domestic market.

- The firm may have sufficient resources to internationalize and wants to expand its operations.
- Greater profitability is expected from internationalization than diversification due to; (1)internationalization opportunities are sufficiently attractive, (2) the firm's products or services which are highly sought in the international arena,
- *'Grass is greener syndrome'* encourages the firms. Consequently, though they have insufficient information for a complete analysis of internationalization opportunities, they rather *dive* into the overseas environment since there are other similar contractors doing the same thing.

Crossthwaite (1998) carried out research into the reasons why British construction companies internationalized. In his study he identified some reasons which include, *increasing long-term profitability*, *maintaining shareholders' return*, *balancing growth* and *the avoidance of saturation in domestic markets*. In addition, Crossthwaite also sought to establish what the firm's overall objectives and found that these were, *to hit new and booming markets*, *to protect the company against business cycles*, and *to maintain an edge over competitors*[49].Langford (2001) also stated that individual firms may have their own and subjective reasons for seeking to internationalize and listed the main reasons why construction firms internationalize, these are namely; *the desire to increase their profitability*, *spread their political economic commercial risk*, *avoid saturation in their own domestic market* and *to improve their competitive position*.

4.3.4 Competitive Advantage in International Construction

Hillebrandt (2000) defined the construction industry as '*local*' by nature due to the location specificity of constructed items and in terms of the *climatic, regulatory, political and social conditions* that affect it, as well as the necessary approaches to the procurement of resources, and logistics. This gives competitive advantages to home-country firms over foreign contractors and Flanagan, (1994) lists these advantages as *language*, *knowledge of appropriate methods and procedures* considering cultures, *practices and climate*, *knowledge of laws*, *regulations*, *policies* and *administrative system*, *established client base and track record*, *political and economic policy* which may offer preferences; and *existing networks of strategic allies*, suppliers and subcontractors (Ofori, 2003). Sugimoto (1990)

[49] It is understood that '*entrepreneurship*' plays an important role while maintaining competitiveness.

also refers three types of advantages which are *efficient operation, home country advantages,* and *exceptional knowledge of local conditions* for international contractors.

Moavenzadeh (1985) argues that *the importance of R&D* which may sustain the technological competitiveness of U.S. construction firms. He suggests promising areas in which construction firms can potentially gain technological leadership, such as computer technology (most notably the application of expert systems) *robotics*, and *advanced materials*. (Sugimoto, 1990)

Tatum (1987) also argues that *advanced technology*; particularly an application of *computer technology and robotics* is a key to the international competitiveness of construction firms because of the demand associated with the increasing technical complexity of constructed facilities. (Sugimoto, 1990)

Demacopoulos and Moavenzadeh (1989) suggest that *innovative financing schemes* will be an increasing challenge to international construction firms. Demacopoulos (1989) emphasizes foreign exchange management capability may shape an increasingly important part of the main thrust of international competitiveness for construction firms. (Sugimoto, 1990)

Sugimoto (1990) draws a quick framework for international competitiveness of construction firms and summarized three sources of competitiveness for construction firms. These are; (1) *technological or engineering capability in executing processes of design and construction* (2) *Government policies and support*, and (3) *Financial packaging capability*.

Flanagan (1994) presents *design, procurement and construction* as core construction industry functions while reviewing the competitiveness of European contractors. He also identified the contractor's prime function as 'mobilizing the specific resources required for construction of a unique product in a given time' in a globalizing construction market. However, Male and Mitrovic (1999) viewed the international contractor's core competencies as widening and defined the emerging international contractor with the following definition (Langford, 2001)

> '…a project centered organization able to provide flexible logistic skills, manage human resources, provide construction technical skills, organize a network of specialist, have the ability to organize and control financial packages, manage a

> complex multi-layered and multi-skilled organization, which in combination can deliver an integrated global offer' (Male &Mitrovic 1999, Langford 2001)

They defined the key sources of competitive advantage for international contractors as follows (Langford, 2001);

- 'The ability to provide attractive *financial packages'*. It is verified to be the most efficient entry barrier for construction, accordingly; build, operate and transfer (BOT) and build, operate and own (BOO) projects are rapidly increasing.
- 'The ability to build winning *alliances with partners'*. It is supposed that proven expertise, common experience, and objectives provide a competitive advantage. These can be founded as global or local and may go beyond the industry boundaries to include clients and financial institutions.
- 'The ability to *accept and manage risk'*. It helps sharing of risk in BOT projects. It is also required to manage those arising from innovation.
- 'The ability to *invest in sales* and *R&D'*.
- 'The *identification of client* and *user needs* through market research'.
- 'The ability to *procure on a global basis'*. It is obvious that lump-sum and BOT contracts necessitate searching out cheaper sources of material and equipment.
- 'The use of right technology and *technical expertise'* in that many international contractors use these *as sources of differentiation* from their competitors and they work hard to increase their capabilities in this area.
- 'The integration of *local* and *global knowledge'*. Accordingly, global knowledge is needed to formulate business and multi-project strategies, to follow *market trend*s and *identify potential clients*, establish links with *potential partners* and *key suppliers*. Good local knowledge provides a contractor with an understanding of the socio-economic business environment within which it has to operate.
- Lastly, '*political backing* with which *political authorities* at home and host country' has been defined as providing a competitive edge.

4.3.5 Applying Diamond Framework to International Construction

In the context of understanding the sources of competitive advantage it is useful to understand how these potential sources of advantage could be converted into

international success. Here it is useful to see the application of *diamond model* developed by Porter (1990) in which he identified four broad attributes of a nation that affect and shape the environment in which domestic firms compete and thus this environment either promoted or restricted the creation of competitive advantage. As stated before, these are namely; f*actor conditions, domestic demand conditions, related and supported industries* and *firm strategy, structure and rivalry*. These determinants determine the available resources, skills, goals, pressures, and cultural and behavioral aspects which affect individuals and firms operating in that nation.

Here it is important to bear in mind that though researchers have sought frameworks to apply in analyzing the factors for success in international business, including construction. Ofori (2003) quotes that 'Whereas models to analyze factors shaping industry competitiveness exist (Porter, 1980, 1985, 1986, 1990), there is no comprehensive model to evaluate the competitiveness of an industry such as construction' (Momaya and Selby's, 1998) and concludes a reminding that 'Attempts to examine specific problems in isolation without an integrated approach cannot solve strategic problems' (Momaya and Selby's, 1998).

Within this conceptual framework Oz (2001) applied Porter's diamond framework to analyze the international operations of Turkish contractors. She analyzed the international operations of Turkish contractors using Porter's diamond framework and Ofori (2003) summarized her analysis (see, Table 4.4). Accordingly, previous authors attributed the competitiveness of Turkish contractors to lower labor costs and geographical and cultural proximity to their markets However, Oz found that these firms' success abroad was also due to the fierce domestic rivalry that forced firms to upgrade their operations and the favourable entrepreneurial climate. She found *financial and administrative difficulties, lack of a coherent government construction policy*, and *excessive bureaucracy* as the problems of Turkish international contractors and concluded as follows;

> Turkish contractors achieved their success despite economic and political instability and without notable government support. This has become possible, thanks to the self-reinforcing systemic advantage Turkish contractors created and sustained over the years. . . . This rationale . . . helps us understand why it is Turkish contractors that have succeeded in international markets rather than contractors from many other

developing countries, which can also make use of the cheap labour and geographic and cultural proximity to some promising markets. (Oz, 2001, p. 142)

Table 4.4 Porter's diamond framework and Turkish international construction firms (Source Ofori 2002; Oz, 2000)

Framework component	Strengths	Weaknesses
Factor conditions	▪ Low wages of Turkish workers and ease of communication among them; high quality of education. ▪ Internationally competitive construction materials cluster.	▪ Lack of on-the-job training for middle-level personnel; bureaucratic problems in transferring Turkish workers abroad. ▪ Financial problems leading to inability to offer financial packages.
Demand conditions	▪ Good track record in housing, hotels and infrastructure, which are in demand in overseas markets of Turkish firms. ▪ Rising quality of work.	▪ Stagnant domestic market recently.
Related and supporting industries	▪ Strong supplementary industries to construction firms.	▪ Weak competitive position of Turkish design consultancy firms. ▪ Lack of design capacity among Turkish contractors.
Context for firm strategy and rivalry	▪ Highly competitive domestic industry. Turkish firms compete among themselves overseas. ▪ Extensive diversification among construction firms. ▪ Entrepreneurial, risk-taking skills of contractors; good managerial and communication skills; ability to deal with bureaucracy. ▪ Accumulated past record of good performance and good relationships.	▪ Family owned companies lacking formal organization. Extensive multi-level subcontracting of work contributes to this.
Chance events	▪ 1970s construction boom in Middle East and Africa. ▪ Opportunities in former Soviet countries in 1990s. ▪ Geographical proximity and cultural and religious ties to 'promising' markets.	▪ Iran–Iraq war; Iraq's invasion of Kuwait; payment problems in Libya after US embargo. ▪ Stagnation in Russian Federation. ▪ Massive destruction of 1999 earthquake dented image of industry.
Role of governments	▪ Occasional government support, such as tax incentives and rebates in early 1980s encouraged firms to go abroad. ▪ Trade agreement with Russian Federation.	▪ Bureaucratic obstacles to aspects of construction including payment for work done. ▪ Government's economic and financial policies including high interest rates, non-availability of export credit. ▪ Lack of government support for overseas market development. ▪ Lack of coherent government policy for the industry. ▪ Inadequate building regulations and ineffective implementation.

According to Ofori (2003) Oz's paper covers the Turkish situation well and its findings are mostly in line with conclusions in the literature on international construction; however, he offers to see the Turkish situation in context by discussing international construction and to compares the performance of Turkish contractors with those of countries at similar levels of development.

Ofori (2003) criticized the application of diamond framework without considering the applicability of the model to construction. Accordingly he states some lacking points for the model and emphasize these points with other authors' approaches. Some of these points are as follows;

First issue is that *government action* appears to be more influential in competitiveness in international construction than Porter (1990) allows. Accordingly, he exemplifies such procedures as, *tied or targeted aid, soft loans for contractors, market information and bidding data assistance; market development grants and tax concessions,* and *suppliers' credits and insurance support* highly important matters in international construction.

Another missing area is depicted as *culture matters*; that the diamond framework does not incorporate. Bosch and Van Prooijen (1992) noted and Flanagan (1994) also states that *culture* has a direct influence on international construction projects that usually involve a number of firms and people from different countries.

Finally, for *factor conditions*, privileged access to national key resources is a success factor however, for a project overseas, a source of good quality inputs closer to the location of the project may be more advantageous than a source at home.

Moreover, *linked* and *multiple diamonds* concepts are highlighted as important issues regarding the Porter's national diamond. Accordingly, Rugman and D'Cruz (1993) offer, using the US and Canadian diamonds as linked ones. For the construction issue in his paper Cartwright (1993) suggests that the formation of regional economic blocks (such as the European Union and Southern African Development Community) is effectively transforming national construction markets into regional ones with increasingly harmonized technical and procurement regulations and offers multiple diamonds concept. (Ellis, 1994; Langford, 2001; Ofori, 1994, 2003)

Ofori (2003) suggests that the diamond concept should be extended to include international business as parallel with the proposals by Rugman (1991), Cartwright (1993) and Dunning (1993). According to him, the 'multiple linked diamond'

framework proposed by Cartwright (1993) appears to be a more suitable analytical concept for international construction than Porter's single diamond when considering the local nature of construction.

4.3.6 Application of Other Analytical Models to International Construction

In this section theoretical frameworks used by various authors to analyze international construction and factors which contribute towards competitive advantage for firms in this market are considered. Accordingly, apart from Oz (2000), several authors have applied Porter's diamond framework to aspects of construction and some of whom analyzing competitiveness in international construction have considered other concepts in addition to/ instead of, Porter's diamond framework. To illustrate, Betts and Ofori (1992) use it to provide a framework for strategic planning by construction enterprises. Furthermore, they (1994) examine how professional institutions can use the framework to formulate strategic plans for competitive advantage. (Ofori, 2003)

Yates *et al.* (1991) compare the US national construction industry by using Porter's (1980) five forces model to analyze in the context of future international competition[50]. They highlighted the strengths and weaknesses of US firms with respect to the global market, and proposed appropriate courses of action. (Ofori, 2003)

Huovinen and Kiiras (1994) develop their 'spearhead strategy' for a European construction firm to break into a new market in a neighboring country by analyzing several frameworks such as the classic product-market matrix for strategy formation proposed by Ansoff[51] (1965); the competitive forces framework of Porter (1980) and differentiating strategy of Porter (1985); the core competences concept of Prahalad and Hamel (1990); and the reengineering idea of Hammer and Champy (1993). (Ofori, 2003)

Seymour (1987) reviews multi-national enterprise (MNE) theory in his work on international construction, including, *behavioral models*, *industrial organization theory*, *the internalization theory*, and *general theories* such as Dunning's (1977) eclectic approach.

[50] Note that in this study Five Competitive Forces model analyzed under Industrial level competitiveness understanding, but Yates (1991) used it for international comparison. The point is outlined in *Ch.6 Conclusions*

[51] Also known as Ansoff Matrix

Accordingly, the eclectic paradigm suggests that the extent and composition of a company's foreign production is based on three sets of interdependent variables;

(1)*Ownership*: competitive advantages of the company which are specific to its ownership

(2)*Location*: the locational attractions of alternative countries or regions for undertaking the value-adding activities of multi-national enterprises, and;

(3)*Internalization*: The alternative ways, in which firms may organize the creation and exploitation of their core competencies, given the locational attractions of different countries or regions.

By applying Dunning's (1977) eclectic paradigm to international construction, Seymour (1987) concluded that although it had been developed for the study of multinational manufacturing, 'the eclectic framework provides a comprehensive and flexible method for analyzing the international construction industry despite industry specific characteristics'. After applying the paradigm to international construction, he also noted that the eclectic approach would be more adequate if dynamic considerations were included. (Ofori, 2003)

Some authors have modeled international construction without particular reference to existing theoretical frameworks. Accordingly, Hasegawa (1988) considered the international strategies of Japanese construction firms and identified the following competitive forces, *the level of domestic and international competition*, and *the threat of new entrants to the industry through diversification*. He categorized the strategies adopted by Japanese contractors exporting their services as, *a transnational approach*, *new business development*, *being an integrated engineering constructor*, *exploiting opportunities for total project development*, *technology development*, and *exploiting financial strategies*. (Ofori, 2003)

Momaya and Selby (1998) quantified the international competitiveness of the Canadian construction industry and compared it with those of its Japanese and US counterparts. Their model had three components; (1)*competitive assets:* factor costs, human resources, industry infrastructure, technology, demand conditions and government, (2)*competitive processes:* strategic management, formal planning, implementation, human resources development, R&D and synergies, and (3)*competitive performance:* productivity, human resources, quality/effectiveness, cost, financial, international and technological. (Ofori, 2003)

In conclusion, Ofori (2003) states that 'there is no perfect framework for analyzing competitiveness for construction' and 'not any one in itself is sufficient for all sectors'. Similarly, Segev and Gray (1994) found out that there is no single appropriate model exists for construction firms and advised to evaluate individual business units in terms of two or three typologies, after presenting eight typologies of organizational strategies relevant to construction companies.

4.3.7 Comparative Analysis of Success in the International Market

After having reviewed basic approaches to competitiveness in construction with applications of competitive models, a comparative analysis of success in international construction is presented in this section. Accordingly, Ofori (2003) made a comparative analysis of success in international construction on the work of Oz (2001) where she applies the diamond framework for Turkish construction industry. Here, a simple model of his analysis and outcomes are overviewed.

Table 4.5 Contractors from different countries listed in the top *ENR* 30 list 1990–99 (Adapted from, Ofori 2003; Sources: ENR, 1991–2000; World Bank, 2000)

Relative Ranking	Country	GNP per capita (1999) US$	Number of contractors	Percentage
1	USA	30 600	14	24.1
2	Japan	32 230	9	15.5
3	France	23 480	8	13.8
4	UK	22 640	6	10.3
5	Germany	25 350	5	8.6
6	Italy	19 710	4	6.9
7	*Korea*	8490	3	5.2
8	Sweden	25 040	2	3.4
9	Netherlands	24 320	2	3.4
10	*China*	780	2	3.4
	Others	–	3	5.2
	Total	**–**	**58**	**100.0**

According to Ofori (2003) contractors from a few developed countries dominate the international construction market. He made an analysis of the top 30 ENR international contractors during 1990–99 and showed the results of this analysis (Table 4.5). Accordingly, fifty-eight contractors were listed at least once in this group during the period, the highest number (14) were American, followed by Japanese,

French, British and German. However, as shown by the GDP per capita figures, some firms from outside developed countries have been strong participants in the market; five firms from middle-income Korea and low-income China (showed with italics) were among the 30 top international construction firms in 1990–99.

According to his analysis, he concludes that the number of international firms from middle-income and developing countries (such as Brazil, China, Cyprus, Korea and Turkey) has been increasing. He listed these countries' *firm-specific* advantages with (1) *access to inexpensive, highly skilled labor* (2) *proficiency in available technology*, (3) *close geographical, cultural and language proximity to their markets*, and (4) *the support from governments including credits, export guarantees, preferential taxes and other export development incentives* in parallel with the outcomes of Kim (1988), Quak (1990), Strassman & Wells (1988) and Rashid (1990).

As comparing the performance of contractors from *middle* and *low income* countries, Ofori predicted these countries to have an increasing share of the global market in future and made a comparison between favourable companies of these developing countries with Turkish international contractors (Table 4.6). The analysis based on the GNP per capita data and top 225 contractors between 1990-99 data of ENR (*ENR measured firms' performance by contracts awarded in 1990–93 and turnover in 1994–99*).

Accordingly, he found that 42 Chinese contractors were listed at least once in the *ENR* top 225 during 1990–99, compared with 20 from Korea, 16 from Turkey, five from Brazil and four each from Mexico, Hong Kong and Taiwan. Also, *three* Chinese contractors were on the list throughout the 10 years, compared with *two* each from Brazil, Korea and Turkey. His analysis showed that the highest ranked firm was Hyundai Engineering and Construction of Korea, at 12th position in 1997. China State Construction & Engineering Corporation was 20th in 1999; and Oderbrecht of Brazil, 21st in 1997. The highest ranking attained by a Turkish firm was ENKA Construction & Ind. Co.'s 64th (in 1994).

Ofori (2003) concludes his analysis with comparison of the outcomes of the Oz's (2001) findings on Turkish construction companies in international markets. In her study, Oz applied Porter's diamond framework in Turkish construction industry for international markets and after the analysis she concluded with 'a uniquely competitive Turkish international construction' outcome.

Table 4.6 Firms from middle-income and developing countries among top 225 *ENR* contractors, 1990–99 (Source: Ofori, 2003; based on ENR, 1991-2000; World Bank, 2000)

Country	GNP per capita, 1999 (US$)	No. of firms	Contracts awarded 1990-93 (US$m)	Revenue 1994-99 (US$m)	Highest ranking firm rank (and year)	No. of firms on list throughout 1990-99	Period of which a firm was on list (years)
Argentina	7600	2	18	118	Benito Roggio e Hijos SA 174 (1999)	0	4
Bahrain	n.a.	1	1	0	Mannai Engineering Co. 220 (1992)	0	1
Brazil	4420	5	4260	8488	Construtura Norberto Oderbrecht SA 21 (1997)	2	10
China	780	42	5437	25203	China State Construction & Engineering Corporation, 20 (1999)	3	10
Cyprus	'Middle income'	3	2790	3634	Joannu & Paraskevaides Ltd. 36 (1998)	1	10
Ecuador	1310	1	16		Santos CMI Construction Inc 187 (1999)	0	1
Egypt	1400	1	0	258	The Arab Contractors – Osman Ahmed Osman 99 (1999)	0	2
Greece	11770	1	4211	7778	Consolidated Contractors International Co. SAL 21 (1995&1999)	1	10
Hong Kong	23520	1	0	1509	Paul Y.ITC Construction Holdings, 54 (1999)	0	6
India	450	7	89	284	Indian Railway Construction Co. Ltd, 147 (1999)	0	7
Israel	'High income'	1	535	840	Soleh Boneh International Ltd 89 (1992)	0	9
Korea	8490	20	8820	26874	Hyundai Engineering & Construction Co., 12 (1997)	2	10
Lebanon	3700	2	80	384	Arabian Construction Co. 129 (1999)	0	5
Malaysia	3400	1	34	37	Pilecon Engineering Berhad, 180 (1993)	0	3
Mexico	4400	4	236	1078	Empresas ICA SA de CV 58 (1998)	0	5
Philippines	1020	2	176	46	Engineering Equipment Inc., 139 (1993)	0	7
Saudi Arabia	'Middle income'	1	0	707	Joannu & Paraskevaides (Overseas) Ltd 45 (1999)	0	1
Singapore	29610	4	564	394	IPCO Corporation, 112 (1996)	0	4
South Africa	3160	2	0	2270	Murray & Roberts Contractors 45 (1998)	0	6
Taiwan	n.a.	4	734	1086	Retired-Services Engineering. Agency, 89 (1998)	1	10
Turkey	2900	16	4089	6119	ENKA Construction and Ind. Co. Inc. 64 (1994)	2	10
United Arab Emirates	n.a.	2	276	697	National Petroleum Construction Co. 107 (1998)	0	6
Venezuela	3670	2	48	0	Technoconsult Ingenieros Consultores SA 182(1990)	0	2

However, with his analysis on ENR records, Ofori (2003) puts an opposite opinion on the claims of Oz (2001) about *a competitive Turkish construction industry*. He explained this as follows;

> '…Korean firms realized the highest volume, followed by the Chinese, Brazilians, Greeks and Turkish. On this evidence, Oz's claim of a uniquely competitive Turkish international construction industry does not hold; instead, these companies have been outperformed by those from countries at similar or lower levels of economic development.' (Ofori, 2003, p.382)

4.3.8 Strategies for success in International Construction

Ofori (2003) states that in order to succeed in the international markets, foreign firms have to break down local companies' advantages and overcome problems of international construction with reference to literature. Kindleberger (1969) stated that to succeed in international markets there must be some imperfection in *markets for goods* or *factors of production*, or *interference in competition by governments or firms*, which separates markets. According to The United Nations Centre for Transnational Corporations (UNCTC, 1989) *technical knowledge* rather than *capital investment* is the most important barrier for entry and competitiveness in international construction. Linder (1994) suggests that access to the most efficient means of production, cheapest and best building materials and engineering knowledge were influential in the early international success of European and US contractors but currently that may not be enough for success.

Seymour (1987) noted that like other business enterprises, construction companies choose overseas markets where they have competitive advantage and he defined these items as *firm* and *national* advantages[52]. Firm-specific advantages include the firm's name, which embodies its reputation, experience, and firm size, which relates to its resources. National advantages embrace national currency; geographical proximity to markets, historical, political, language, cultural and economic relationships between the home and host countries, foreign direct investment (FDI) by home-country enterprises; and strengths of inter-sectoral linkages within the home country's economy. (Ofori, 2003)

[52] Note that this classification will also used in conclusion part.

Ofori (2003) defines some prerequisites for the internationalizing contractor that have to possess. These contain the firm's *track-record, corporate knowledge, communication structures, resources and risk management capability*. Flanagan (1994) categorizes the key factors contributing to competitiveness in international construction into, *human resources and their management*, *technology*, and *government's incentives and disincentives* which describes flatter organizations implying less bureaucracy and enabling the firm to move quickly into new markets.

Within this context international construction in the future is defined to be increasingly complex owing to advancing technology that will influence the nature and internal environment of productive facilities such as industrial and other commercial facilities (Hassan *et al.*, 1998) and at the same time many predictions indicate that more construction will be required around the world to meet the basic needs of the world's growing population and enhance the quality of life in the future (Flanagan, 1994; Drewer, 2001). (Ofori, 2003)

Hassan *et al.* (1998) predict that the share of demand for large projects will increasingly move away from Europe towards the Asia-Pacific, Africa and South America, leading to increases in the political, commercial and logistical risks for European firms in future whereas Drewer (2001) estimated that construction in developed countries accounts for about 80% of total global output mainly on the advanced construction materials on the evidence of his previous works. However, it can be concluded that the future market for construction will be more competitive, involving firms from China, South America, South-East Asia and Africa (Ofori, 2003). Also, Bon and Crosthwaite (2000, 2001) found that China, Germany, Vietnam, Malaysia, India and Russia would have the fastest growing construction markets in the medium-term and concludes that in the next 25 years, Western Europe and North America would become substantial importers of construction services, and Asia a substantial exporter. However, construction firms from Western Europe and North America would continue to have competitive advantage in highly specialized construction services (Ofori, 2003). Here, the author is suspicious with the predictions of Bon (2000) and Crosthwaite (2001) and coincides with the conclusions of the Drewer (2001) on the dominance of developed countries over construction markets since it is evidenced that with the domination of government

interventions; new construction markets such as Iraq and Afghanistan are mainly dominated by North American contractors.

Future determinants of success in international construction is highlighted by the International Construction Task Force of the Construction Industry Institute (1993) with the following list; *leadership (vision)*, *social acceptability (environmental consciousness, industry and government co-operation)*, *cost effectiveness (efficient resource allocation)*, *innovation (accelerating rate of invention, shortening product cycles, growing worldwide technical and scientific competence)*, and *organizational effectiveness (flexible structures, teamwork)*. Hassan *et al.* (1998) note that clients will demand a change in cost focus from capital expenditure to total life cycle costs, as well as quality, and reduction of project timescales. Flanagan (1994) suggests that between 1995–2005, the main issues in international construction will be; *speed in innovation and delivery*; *flexibility in delivery mix*, *environmental consciousness*, *human resource development and deployment*; *automation and information*; *joint ventures*, *alliances and partnering*, and *financial engineering*. It is predicted that the trend towards diversification of services by major contractors will continue, and that some of them will offer an integrated, one-stop service, becoming 'worldwide system organizers' which co-ordinate the work of firms from different sectors or countries (Bennett, 1994). (Ofori, 2003)

In literature there are some strategies for competitiveness in international construction have been projected for future. Accordingly, Market Analysis Task Force of the European Construction Institute (1991) interviewed international firms and ranked the sources of future competitive advantage as follows; (1)*project finance*, (2)*reduced project timescales*, (3)*technical expertise*, (4)*experience and reputation*, (5)*willingness to carry risks*; (6)*ability to procure globally*; (7)*management and re-use of information*; (8)*political backing*; (9)*corporate infrastructure*; (10)*ability to provide project funding*; *ability to form partnerships or alliances with firms with skills in construction or other areas such as finance*, (11)*design and operation*; and (12)*ability to adopt company structures to work in multi-firm, multi-cultural and multi-discipline networks*.

Similarly, The International Construction Task Force (1993) recommends companies to, *identify compatible values and philosophy*, s*ustain long-term relationships*, *take equity in projects*, *provide additional services*; *establish global partners and alliances*, *develop environmental responsiveness*; *develop new technologies*, *utilize information technology*; and *educate their personnel to work in a new client–contractor environment*. (Ofori, 2003)

4.4 CONCLUSIONS

International construction forms a significant proportion of the total global volume and has many peculiarities and problems which will probably increase in future. Earlier sections identified the fact that there is a hierarchy of sources of competitive advantage and that contractors compete on both *low* and *high order factors*, some of which are sustainable only in short term whilst others have the potential to be *sustainable* in long term.

It is also stated that *competitive advantage* also requires the analysis of value-adding activities and how these are configured into a value chain. The value chain has also both *internal* and *external* components and is a product of a company's history and most of the value-adding activities in construction circle around *team* and *individual knowledge* (Langford, 2001). It is also noted that the traditional competitive tendering approach was dependent *on price* however with current approaches such as Construction Best Programs etc.; contractors can easily use their *distinctive capabilities* to gain a competitive advantage. Similarly, Latham (1994) and Egan (1998) reports also promote changing the procedure from price-based competition to where; price, reputation and negotiation in combination are considered for selection processes.

In this chapter, a quick framework for sources international competitiveness of construction firms also depicted which are; (1) *technological or engineering capability in executing processes of design and construction* (2) *Government policies and support*, and (3) *Financial packaging capability*. Male and Mitrovic (1999) also identified *financial packages, alliances with partners, accepting and managing risk, investing in sales* and *R&D, identification of client, user needs* through market research, *technical expertise* and integration of *local* and *global knowledge* as possible competitive advantages for international construction firms. Market Analysis Task Force of the European Construction Institute (1991) interviewed international firms and ranked eleven sources of future competitive advantages.

Seymour (1987) also identified *firm* and *national* based advantages for international construction which is very useful for classification purposes. Firm-specific advantages include the firm's name, which embodies its reputation, expertise, and firm size, which relates to its resources. National advantages embrace national currency; geographical proximity to markets, historical, political, language, cultural

and economic relationships between the home and host countries, foreign direct investment by home-country enterprises and so on.

In terms of applied competitiveness models for construction Momaya and Selby (1998) concluded that 'there is no comprehensive model to evaluate the competitiveness of the industry' and 'attempts to examine specific problems in isolation without an integrated approach cannot solve strategic problems' and quantified the international competitiveness of the Canadian construction industry by a three component model namely; *competitive assets, processes, performance.* Their model has also, firm level competitiveness extension and will be analyzed in Chapter 5.
It is also highlighted that whereas the efforts to develop an analytical framework for international construction may be based on existing models, the framework should recognize the difference between *international construction* and *multinational manufacturing* by encompassing the peculiar features of international construction (Ofori, 2003). Some of these features can be listed as; (1) the project-based nature of construction means that medium-term alliances among firms are possible; (2) the location specificity of construction projects makes it necessary for firms to have strong abilities in logistics and communications, to shorten the learning curve and to sharpen their risk management abilities; (3) the construction process is fragmented and each project involves several firms with different corporate objectives and experiences, which may be influenced by different cultures.

Also, the lacking points in the application of 'diamond framework' to construction is criticized for *government action, culture matters*, *key national resources* and it is suggested to elaborate the model with *linked* and *multiple diamonds* concept of Dunning (1993) and Cartwright (1993). In partial conclusion, it would be relevant to consider *the four determinants* of *Porter's diamond* with these identified points.

Accordingly, Langford (2001) adapted Porter's national diamond in his book without any explanation. However, when considered with Flanagan's three stage internationalization, it can be concluded that this model involves *national* and *multinational* sides of 'international construction'[53] and have the potential to be elaborated diagrammatically. (Figure 4.1)

[53] The name 'international construction' is used with generic purpose.

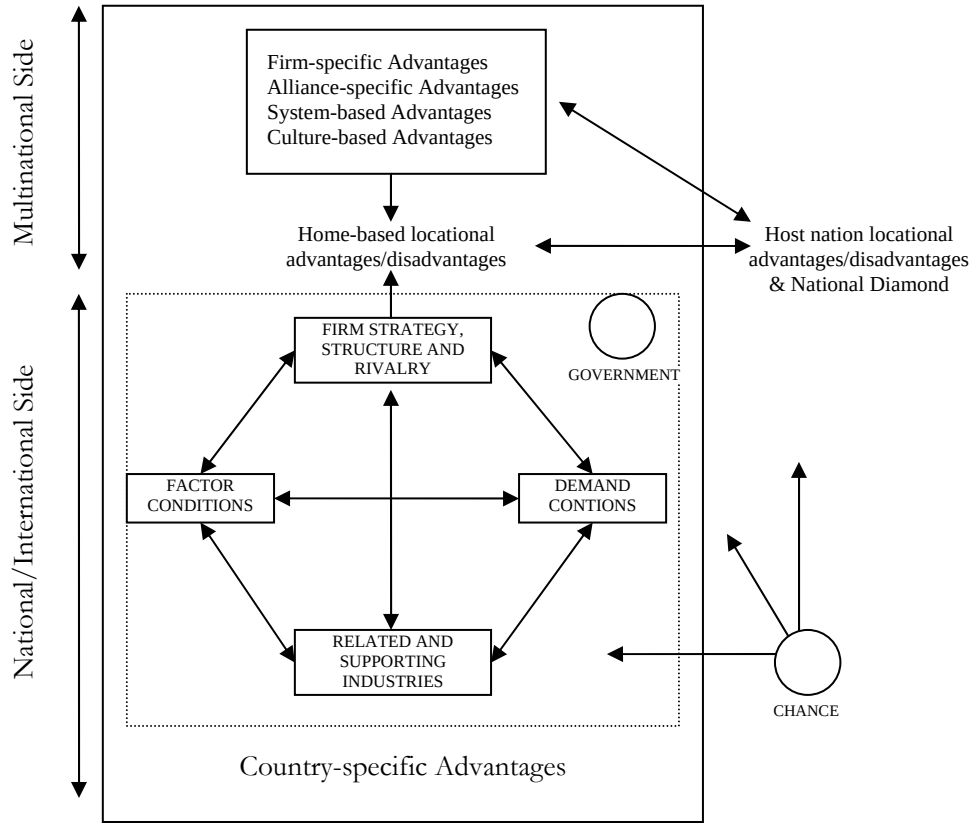


Figure 4.1 Competitive Advantage in international Construction. (Adapted from Langford, 2001)

Having analyzed the outcomes of Ofori (2003), Langford (2001) and Oz (2001), the author believes a competitiveness understanding construction industry could only be achieved by bringing a classification to the application areas of these models. Accordingly, Lansley's (1979) environment classification can be extended by Flanagan's (1994) three stage construction environment, i.e., *international, multinational, global* and in the end, it is obtained a final base to evaluate *competitiveness* issues in construction. To illustrate basic differences, the international firm has *a large domestic market* and *dependent satellites* in several countries. The *global firm* has a home base, but brands *independent companies* around the world (Table 4.6)

Table 4.7 Combined Environment Types and Characteristics, based on Lansley (1979) work and Flanagan (1994)

	Environmental Types Lansley, 1979 & Flanagan, 1994	**Characteristics**
Supra-National Level	Global Environment	▪ Firm level characteristics dominate competitiveness. ▪ Suppliers/Buyers (Global Level) highly important ▪ Financial packages critically important ▪ Importance of Configuration and Coordination (Porter, 1986) ▪ Importance of Value Chain (Porter, 1986) ▪ Impact of global and multi-domestic competition (Porter, 1986)
	Multinational Environment	▪ Importance of firm level characteristics increase in competition ▪ Alliance-specific Advantages ▪ System-based Advantages ▪ Culture-based Advantages ▪ Suppliers/Buyers (Multinational level) ▪ Financial Packages important ▪ Government Support can be seen
Industry and National Level	International Environment	▪ National and firm level characteristics dominates (Seymour, 1987) ▪ International and National level Suppliers are important ▪ Government Supports highly important ▪ Culture, Location is highly important
	Common Industry/ National Environment	▪ Common to all firms in the industry/national environment. ▪ The economic and social background of firms ▪ The industry's existing and potential clients ▪ Suppliers (national level) are important ▪ Labor and respective trade unions ▪ Trade associations ▪ Central and local Government departments ▪ Professional Institutions ▪ Industry Task Forces and initiatives.
Firm Level	Competitive Environment	▪ Localized to the firm. ▪ Structure of demand ▪ Procurement forms used by clients ▪ Suppliers (local) ▪ Competitors ▪ Availability of materials ▪ Labor ▪ Subcontractors
Sub Firm Level	Operational Environment	▪ Unique to each firm ▪ Subcontractors ▪ Technology ▪ Human Resources

Also, considering the suitability of existing competitiveness frameworks for construction industry, and enhancing their applicability the author believes, deterministic models such as Lall's (2001) *triangle of competitiveness* (see Chapter 3) are more suitable for *policy makers* and *government use;* however analysis models such as Porter's (1990) *national diamond* is more appropriate for *researchers* to understand and analyze current status of national industries and have secondary importance for policy planning purposes.

It could be concluded as; 'there is no perfect framework for analyzing competitiveness for construction' and 'not any one in itself is sufficient for all sectors'. Also, as a consequence of the comparative analysis of success in the international market made by Ofori (2003), it is understood that unlike traditional conception, Turkish construction industry is not successful in international markets with reference to other developing countries.

CHAPTER 5 FIRM LEVEL COMPETITIVENESS IN CONSTRUCTION & QUANTIFYING STUDIES

In Chapter 3 basic analytical tools for industry and firm level competitiveness are analyzed along with various specific and generic tools, with a construction industry point of view. Chapter 4 covers core competencies in construction industry; discuss basic analytical models for international competitiveness and presents some strategic implications for being successful in international construction.

In this chapter firm level competitiveness models and quantifying models for construction is evaluated.

5.1 BACKGROUND FOR FIRM LEVEL COMPETITIVENESS

Firm level competitiveness is concerned with the mix of businesses the company should compete in, and the ways in which strategies of individual units should be coordinated and integrated. As it is stated in previous chapters, firm level competitiveness can be seen basically depending on Porter's value chain (1980) definition. The idea of the value chain is based on the process view of organizations, the idea of seeing an organization as a system, made up of subsystems each with inputs, transformation processes and outputs. Inputs, transformation processes, and outputs involve the acquisition and consumption of resources money, labor, materials, equipment, buildings, land, administration and management. How value chain activities are carried out determines costs and affects profits. Construction firms also engage in hundreds of activities in the process of converting inputs to outputs. These activities can also be classified generally as either primary or support activities that all businesses must undertake in some form. Sugimoto (1990) also define value activities of a hypothetical construction firm[54].

It is also suggested by Sugimoto (1990) that competitiveness of construction firms could be determined by looking; 'which activities firms would perform, how firms would concentrate or disperse such activities, how well firms would integrate a chain

[54] See Figure 3.10

of different but sequential internal activities vertically and horizontally, how firms would concentrate or disperse inputs, how complete the value-chain of an entire project, and how firms would coordinate flows of inputs for their geographically vast operations'.

5.2 EXPLORING A BASIS FOR A FIRM-LEVEL COMPETITIVENESS MODEL FOR CONSTRUCTION

While studying analytical competitiveness tools and models, it is perceived that, most of these methodologies aimed for general business organizations and intended to improve general business competitiveness. However, there are also a few studies investigating the competitiveness of construction firms. Most of these studies are concentrated on quantifying studies rather than qualifying studies, however even quantifying studies have basic assumptions on firm level competitiveness and they use indicators accordingly.

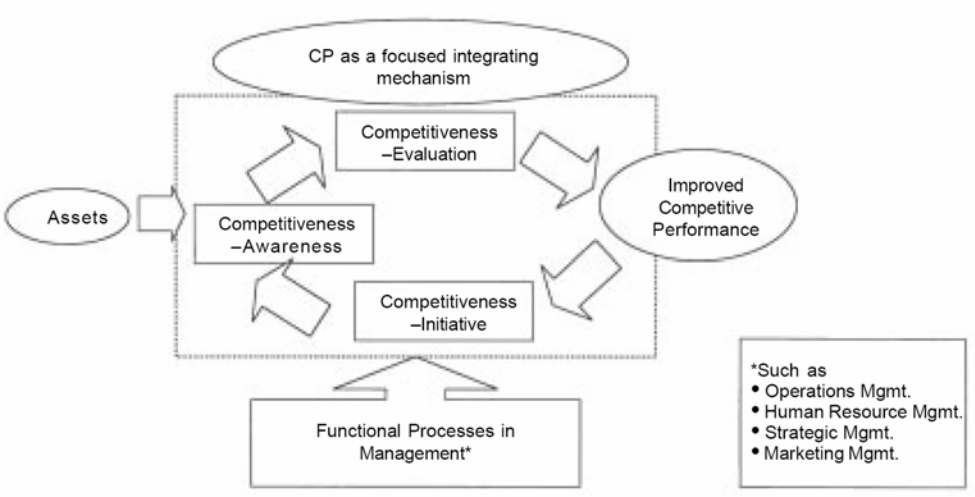


Figure 5.1 Relation between Various Management Processes and Competitiveness Processes (CP) (Momaya, 2004)

Apart from value chain of Porter (1980), Momaya and Selby (1998) proposed a model for evaluating competitiveness of construction by Assets, Processes and Performances (APP) model. As stated, their model is designed to evaluate and quantify the international competitiveness of Canadian construction industry; however for this part, the important thing with their study is their model has a quantification orientation along with qualitative features and also has a firm level competitiveness application extension. Accordingly, Momaya (2004) states that,

sources of competitiveness are those *assets* and *processes* within an organization that provide competitive advantage and these sources can be tangibles or intangibles. According to him, competitiveness processes should help to identify the importance and current performance of *core activities* such as strategic management processes, human resources processes, operations management processes and technology management processes. He defines *key points of competitiveness* and its link with *performance* graphically in Figure 5.1.

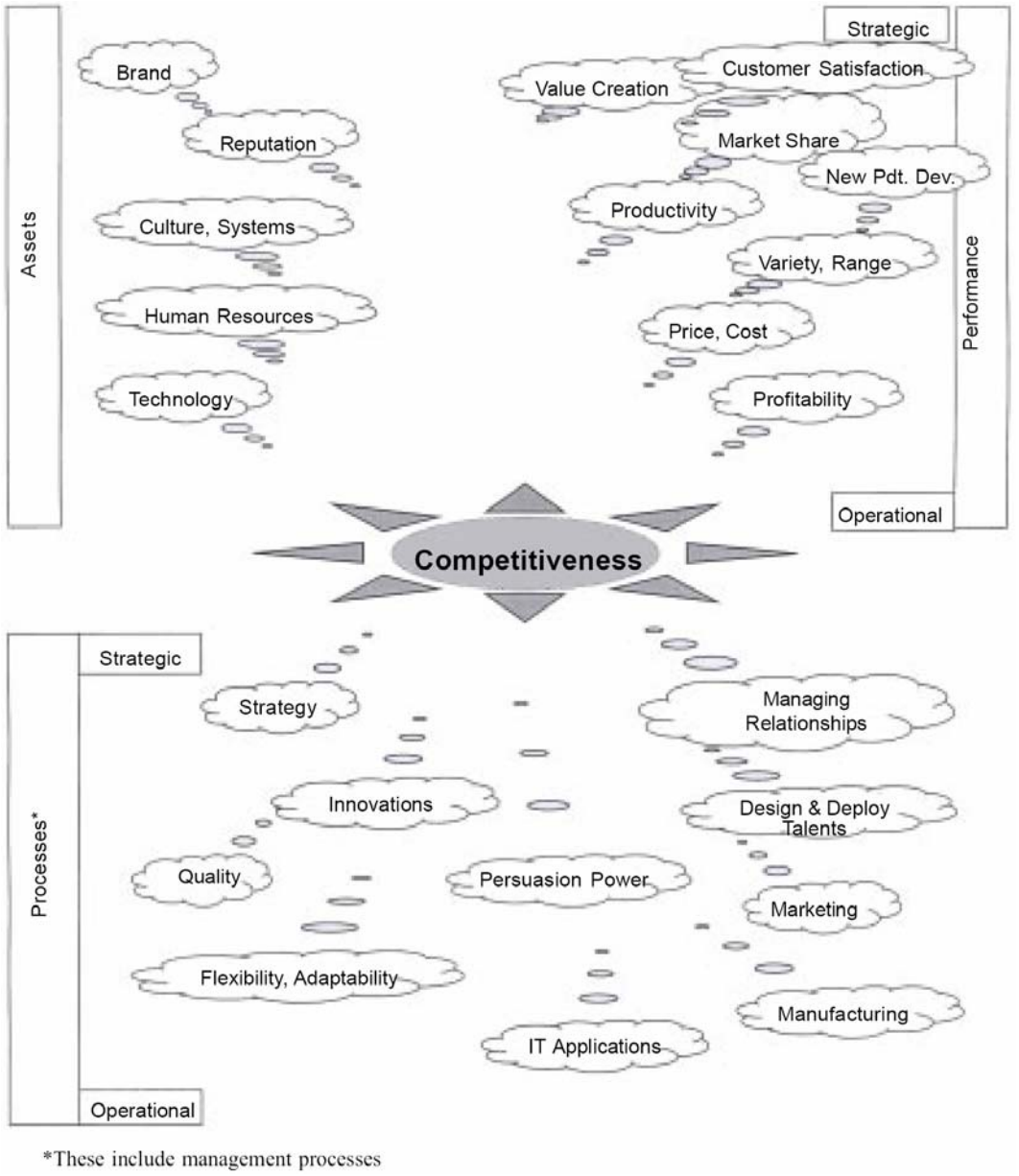


Figure 5.2 Selected connotations of Firm Level Competitiveness (Momaya, 2004)

Momaya (2004) also suggested that the use of the competitiveness processes as key coordinating processes among key management activities such as strategic

management, human resources management, technology management, and operations management may also provide a powerful tool (Figure 5.1). Consequently, he classified popular perspectives on competitiveness to aid in identification of sources of competitiveness and accordingly categorized these sources under Asset, Processes and Performance on the spectrum of *strategic* and *operational* extents (Figure 5.2). He suggests that this will help industry professionals to identify relevant sources of competitiveness.

According to Momaya (2004), competitiveness can be treated as a *dependent* or *independent variable*, conditional on the perspectives from which one approaches the issue. He refers to Berkely et al (1988) having suggested a framework that has three folds, *the competitiveness performance, competitiveness potential,* and *the management processes* and name it as a root source of APP model. He adds that competitiveness involves 'a combination of assets and processes, where assets are inherited (natural resources) or created (infrastructure) and processes transform assets to achieve economic gains from sales to customers' (DC[55], 2001) and outcomes can be achieved through competitive potentials and the processes (Berkely et al, 1988).

Momaya (2004) suggests that the APP framework that integrates resources to performance through processes understood by professionals may provide the better tool to integrate competitiveness with strategy. It can, thus, help to understand the roles of processes and complete competitiveness dynamics at the firm level.

Finally, analyzing Momaya's APP model, it could be stated that though the model has generic qualities, and being simple the author believes that the model is lacking in the *product* and *entrepreneurship* side concepts. The author believes, though nothing every single concept of processes, performances and assets, Momaya (2004) missed the *product* part of the concept and the author believes 'product' side of the APP model is highly important since without it the model resembles a 'so what status'. Also, comparing with the relative part of the Lall's model, APP model does not refer to entrepreneurship side of the firms and it is clear that without the critical first step activity, all other competitive assets and processes becomes nonsense. However these gaps of the model can be filled by adding required items under appropriate headings.

[55] DC (2001) Destination Competitiveness: Development of a Model with Application to Australia and the Republic of Korea, An Australian Government Report, October

5.3 QUANTIFYING STUDIES FOR FIRM LEVEL COMPETITIVENESS IN CONSTRUCTION

The important side of quantifying studies is that they form the metrics side of the competitiveness benchmarking studies and mainly depend on indicators. They usually measure evaluate and compare these indicators. Basic characteristics of the indicators used for construction are evaluated within this study also.

5.3.1 Characteristics of Indicators

Several indicators exist or are being formulated for construction to guide government level activities such as *policy implementation*, *monitoring*, and *sustainable development*. In this section, before analyzing currently proposed indicators for construction industry, some prerequisites for indicators are reviewed.

Accordingly, Guy and Kibert (1998) evaluate the nature, purposes and benefits of indicators. They note that indicators are parameters which provide information about a phenomenon and suggested reducing the number of things to be measured in order to provide a useful gauge of the performance of the system, the state of its health and the severity of conditions requiring actions. They advise that indicators should be valid for measuring something related to the system, stable and reliable, understandable to potential users and recipients, representative as a group, covering the important dimensions of the area concerned, flexible, proactive, acting to provide a warning, long-range in focus and policy relevant.(Ofori, 2001)

Though advised for a different topic, the Organization for Economic Co-operation and Development (OECD) (1993) suggests that an indicator should be simple, easy to interpret, responsive to changes in the item being measured, provide a basis for international comparisons, have a threshold reference value to be compared against, be theoretically well founded; be based on international standards and consensus, lend itself to being linked to economic models, forecasting and information systems, be readily available at low cost, be adequately documented and of known quality, and be updated regularly with reliable procedures. (Ofori, 2001)

Here the important point is that the usually derived indicators are mainly formulated to use in the national and sectoral level, and primarily for the use of the policy makers. Though it is a relatively new topic, Ofori (2001) proposes a new set of sector construction indicators for further discussion and request comments from the wider

research community. In his study, Ofori (2001) proposed three sets of indicators. (1) Macro-level Indicators (2) Sectoral-level Indicators (3) Project-level Indicators[56]. First two sets are out of interest of this section and project-level indicators are important by including *level of implementation, productivity, cost, safety* and *sustainability.*[57] Again, it should be kept in mind that these indicators are formulated for policy makers and governments.

Lastly, Ofori (2001) comments that, the macro-level and sectoral indicators would be easier to compile as they mostly require existing data and concludes that these could be extended to the project level ones where resources and expertise allow since the project level performance on each project contributes towards the overall achievements of the construction industry and is more tangible and easier to assess.

5.3.2 Examples of Quantifying Studies in Construction

In this section, up to date examples of firm level quantifying studies of competitiveness for construction are elaborated with some basic features. Here, the main point in analyzing these models is to become familiar with firm level indicators related with competitiveness in construction.

Drew and Skitmore (2001) measured a contractor's competitiveness with bids according to the type and size of construction work and the type of client involved. They focused on the effect of *construction type* and *size* on a contractor's competitiveness by employing a regression analysis (Figure 5.3). They offer a bidding strategy model to be used by contractors as part of a more informed approach in selecting which contracts to bid for, and as a basis for determining the most appropriate mark-up level for various types and sizes of construction work and client types. Their model was tested on a large and reputable Hong Kong contractor and this particular contractor's bidding behavior was found to be largely unaffected by the type of construction work, but significantly affected by the client type and the size of the construction work.

[56] The author believes four level indicators would be more beneficial for indicator handling (1) Macro-level Indicators (2) Sectoral-level Indicators *(3) Firm-level Indicators* (4) Project-level Indicators

[57] Please refer to paper for a short summary of current indicators and proposed indicators in detail.

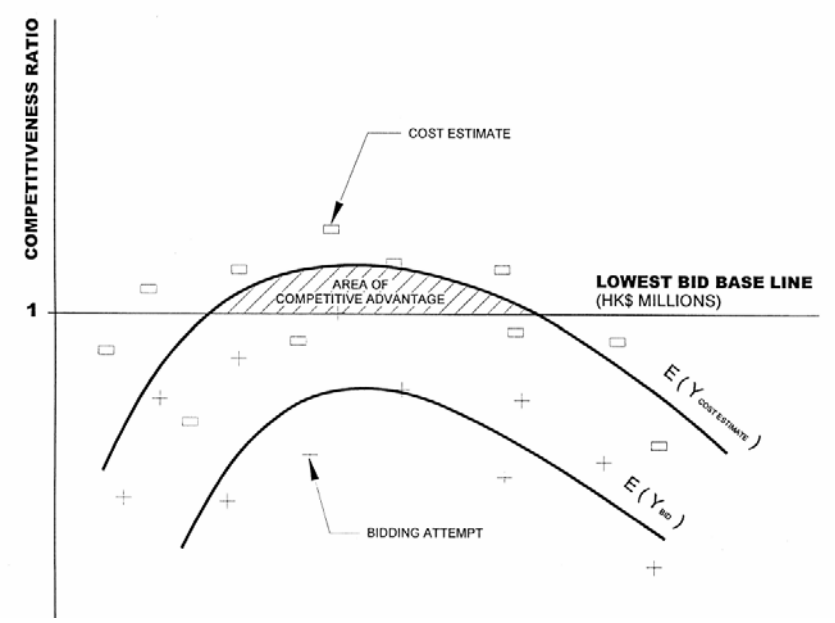


Figure 5.3 Cost estimate and bid competitiveness according to size of construction work (where E(YBID)=lowest bid/bid ratio and E(YCOST ESTIMATE)=lowest bid/cost estimate ratio). (Drew et al., 2001)

Another example is presented by Hatush and Skitmore (1997). They assembled a systematic multi-criteria decision analysis technique for contractor selection and bid evaluation based on utility theory which permits different types of contractor capabilities to be evaluated.

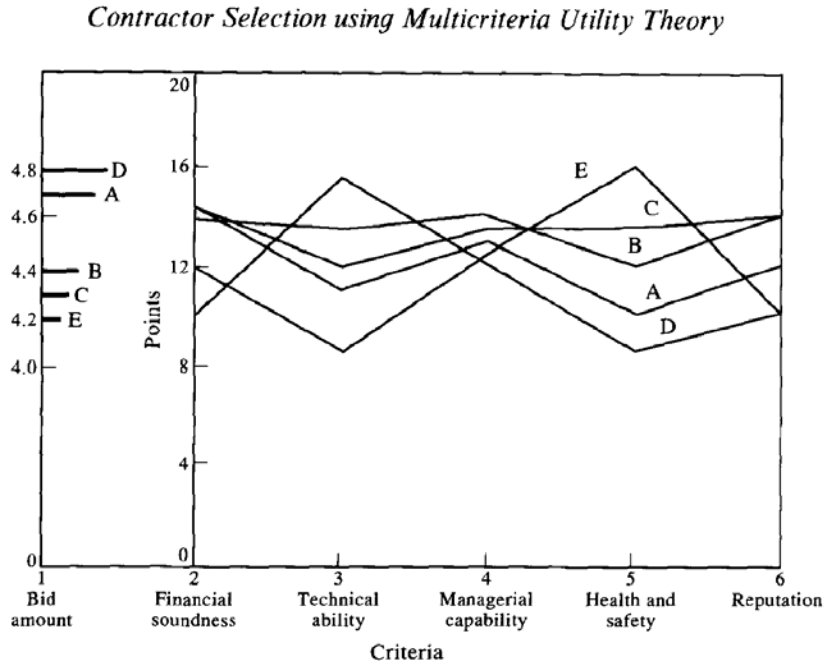


Figure 5.4 Profile of the average scores for the five bidders A, B, C, D and E (Hatush, Skitmore 1997)

They used five major attributes for assessing a contractor's competitiveness during the *pre-qualification* and *bidding process* and include *financial soundness*, *technical ability*, *management capability*, *health and safety* and *reputation* as indicators of competitiveness. Finally, a U.K. case study is used to illustrate the technique and the theoretical basis and the advantages of the technique are also presented within their study.(Figure 5.4)

Lai and Guan [58] (2001) developed a model to assess a large contractor's competitiveness by using the parameters of *organizational ability*, *marketing ability*, *technical ability*, *financial ability* and *image ability*. They proposed to calculate an index value for measuring a particular contractor's competitiveness, but according to Li and Shen, they failed to prove the calculation procedure.

Li and Shen [59] (2002) constructed a model to award construction contractors on multi-criteria basis in China by taking into account both the contractor's competence and its planned contribution to the defined project objectives. This model presented a composition of competitiveness parameters which is also used by Shen et al. (2003).

The last example of a similar study is conducted by Shen et al. (2003). Their study covers an assessment of contractor's competitiveness by an examination of multiple parameters. They named the procedure with the measurement Total Competitiveness Value (TCV) and they offered to use a computer-aided decision support system (DSS) for this process.

Within a parallel routine to quantifying studies, starting from 1998, Construction Best Practice initiative (CBP) in UK has developed some benchmark tools as a comparative tool for construction industry. Accordingly they have developed Key Performance Indicators[60] (KPI) for UK construction industry, which basically serves as a competitive benchmark tool for the UK construction firms.

In the forthcoming sections, as being the ideal examples of their kinds and based on other studies, last two examples, namely; the Key Performance Indicators (KPI) and Total Competitiveness Value (TCV) studies will be covered in detail.

[58] Chinese document.
[59] Chinese document.
[60] See http://www.constructionexcellence.org.uk, and http://www.cbpp.org.uk for more information.02/2004

5.3.3 Key Performance Indicators as a Benchmark Tool in Construction

Benchmarking is defined as 'a method of improving performance in a systematic and logical way by measuring and comparing one's performance against others' in BRE's web page. Though, it has been used rarely in the construction industry; there is a recent surge of interest has been grown by the publication of sets of national Key Performance Indicators that allow companies to measure their performance simply and to set targets based on UK national performance data.

In BRE's web page a benchmark is emphasized as 'the best in class' performance achieved for a specific business process or activity and accordingly a Key Performance Indicator (KPI) is defined as the measure of performance of an activity that is critical to the success of an organization.

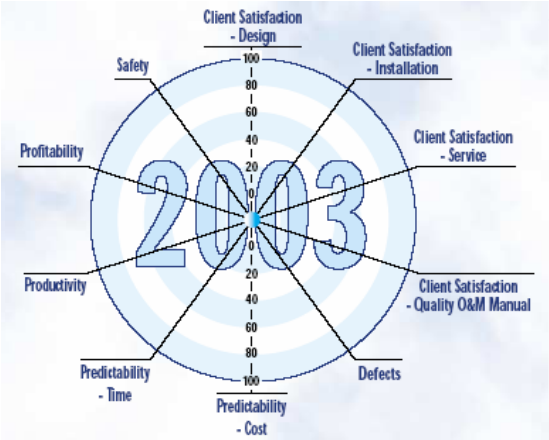


Figure 5.5 Radar Chart for 'All Construction' KPI's. (http://www.cbpp.org.uk)

Each year CBP (Construction Best Practice) publishes KPI Wall charts under the headings of; (1)All Construction, (2) Respect for People, (3) Environment, (4) Construction Consultants, (5) M&E Contractors and (6) Construction Products Industry.

Each wall chart contains KPI graphs which can be used by organizations to benchmark their performance against the rest of the industry or sector. It is defined that the KPI's can form the basis of a more comprehensive set of performance measures and also regular measurement using appropriate KPI's enables an organization to set and communicate its performance targets. Here, 'all construction' KPI's are seen directly related with the subject matter of this thesis and elaborated below

Table 5.1 'All Construction' KPI's measures (http://www.cbpp.org.uk)

	Headline KPI	KPI Measure
1	**Client satisfaction - product**	How satisfied the client was with the finished product/facility. 1 to 10 scale
2	**Client satisfaction - service**	How satisfied the client was with the service of the consultants and main contactor. 1 to 10 scale
3	**Defects**	The condition of the facility with respect to defects at the time of handover. 1 = totally defective 5/6 = some defects with some impact on client, 10 = Defect-free
4	**Predictability of cost (design and construction)**	Design - Actual cost at available for use and estimated cost at commit to invest Construction – actual cost at available for use and estimated cost at commit to construct. % change between estimated and actual cost
5	**Predictability of time (design and construction)**	Design - Actual duration at commit to construct and estimated duration at commit to invest Construction – actual duration at available for use and estimated cost at commit to construct. % change between estimated and actual cost
6	**Profitability**	Profit before tax and interest as percentage of sales
7	**Productivity**	Company value added (ie turnover, less costs subcontracted to, or supplied by, other parties) per employee. Expressed in £000s.
8	**Safety**	Reportable accidents (fatalities, major injuries and over 3 day injuries to employees, self employed and members of the public) per 100,000 employed per year
9	**Construction cost**	Normalisation of construction cost of a project to establish year on year changes
10	**Construction time**	Normalisation of construction time to construct a project to establish year on year changes

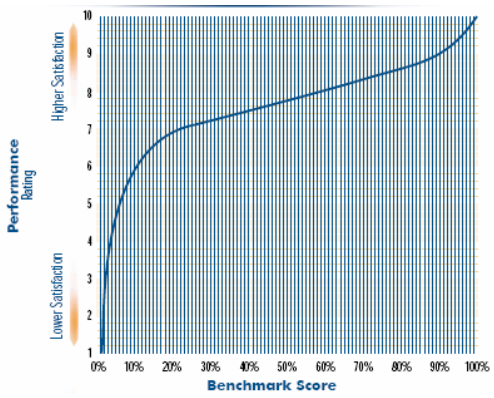
In detail, there are ten factors are considered as *all construction* key performance indicators for UK construction sector. Their graphs are presented as a 'wall chart' accompanying with a *radar chart*[61] in BRE's publications. (Figure 5.5)

The indicators existing in KPI-all construction wall chart are under the headings of; (1) *Client Satisfaction-Product* (2) *Client Satisfaction-Service* (3) *Defects* (4) *Safety* (5) *Predictability-Cost* (6) *Predictability-Time* (7) *Productivity* (8) *Profitability* (9) *Construction Cost* and (10) *Construction Time*. Below, the definitions and graphs of these indicators are presented.

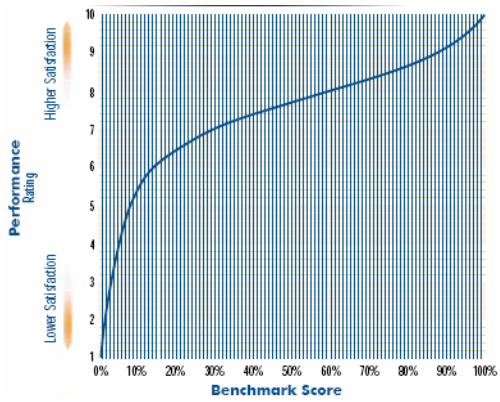
'All Construction' KPI graphs of 2003 for UK (based on the 2002 data) are presented below.

[61] The author believes that *spider chart* would be a better choice for a more accurate representation of the data

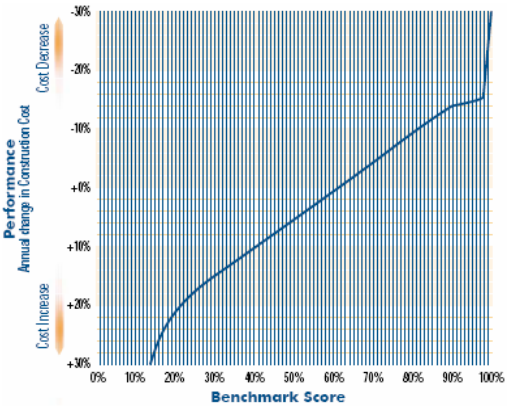
Table 5.2 Examples of 'All Construction' KPI Graphs for UK Construction (http://www.cbpp.org.uk)



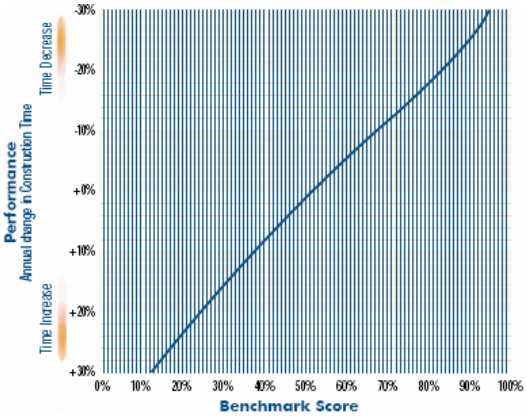
Client Satisfaction-*Product* KPI Graph



Client Satisfaction-*Service* KPI Graph



Construction Cost KPI Graph



Construction Time KPI Graph

It is defined that there is great synergy between the All Construction KPIs and the other five suites. It is also important for KPIs that there is also compatibility between all six suites of it in terms of the form of measurement. For example, in all subjective measures using a 1 to 10 scale, 1 always denotes the worst possible score (i.e. the customer is totally dissatisfied) through to 10, the best possible score.

All six suites of KPIs adopt the same reading rules; for client satisfaction with service the last place where 3 appears is at 6% on the benchmark score and the last place where 4 appears is at 12%. This means that 6% of the industry scored 4 out of 10 on their projects.

When the performance score of 4 is converted to the benchmark score this becomes 12%. This means that 12% of industry is achieving a lower or equal performance, and 88% is achieving higher performance.

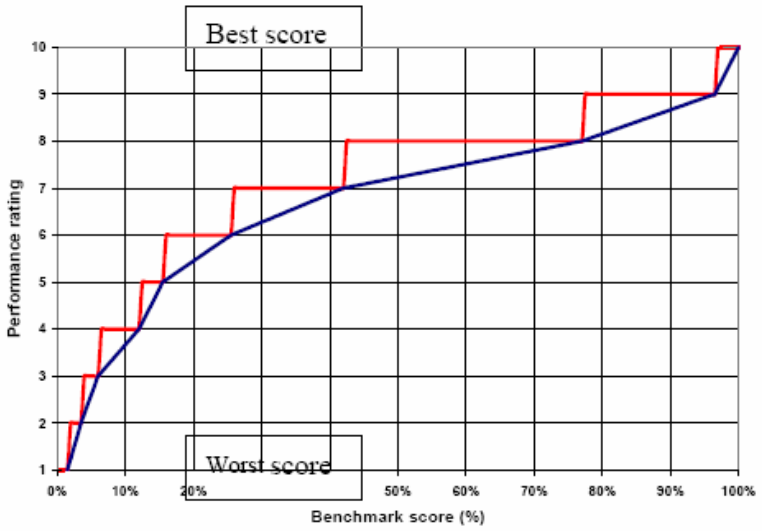


Figure 5.6 Reading of Client Satisfaction KPI (http://www.cbpp.org.uk)

It can be concluded that, KPIs present a basic benchmark tool for construction firms for evaluation purposes based on ten head indicators and several sub indicators. These indicators are also have the potential to be used by other countries' firms and there are also studies presented to use the potential of these indicators to apply for international construction[62].

5.3.4 Total Competitiveness Value (TCV)

Shen et al (2003) introduces a computer-aided decision support system for assessing a contractor's competitiveness to 'help a contractor identify its *strengths* and *weaknesses*', which allows the contractor to make more competitive bids. It is also defined that their project would be useful for construction clients in that they could select more suitable contractors through this kind of more objective and transparent approach. Though not identified to be used just in China, the developed system uses a *benchmark book* which is relevant for China Construction Industry and is demonstrated with references to construction practices in China. Within their study they used six competitiveness parameters namely, *social influence, technical ability, financing ability & accounting status, marketing ability, management skills, organization structure & operation* with sub-parameters.

[62] See BSRIA report on Worldwide KPIs and Benchmarking.

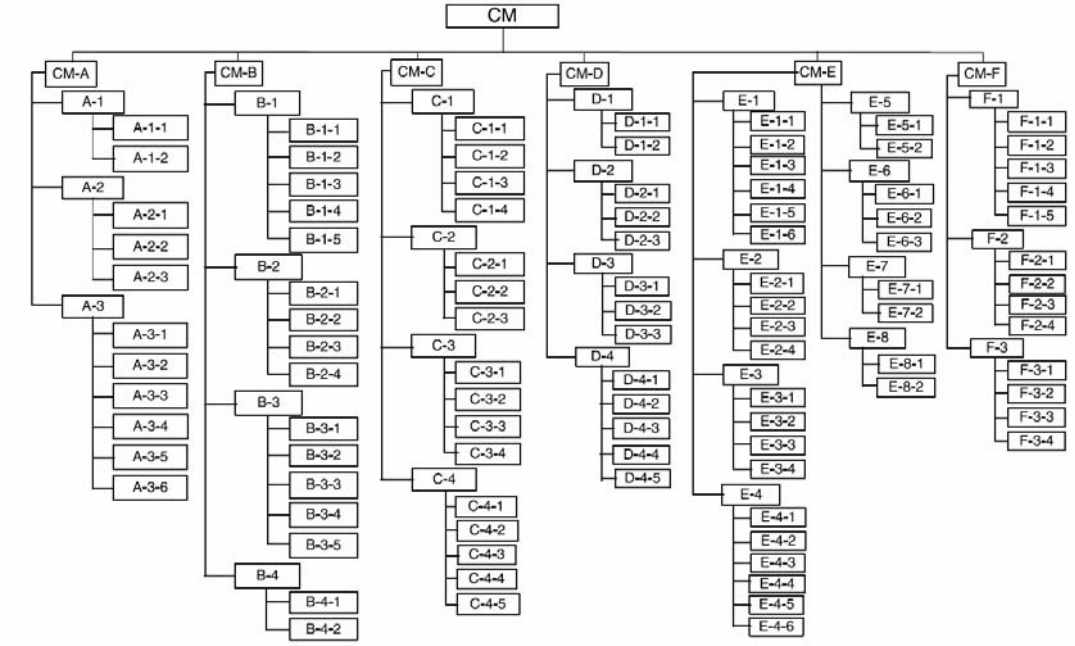


Figure 5.7 The three-level competitiveness parameter system. (Shen et al., 2003)

Shen (2003) structured the parameters used for assessing a contractor's competitiveness in the Chinese construction industry in a 'three-level tree-like hierarchical system' (Figure 5.7).

Table 5.3Two levels of Competitiveness Parameters Notations, (Source: Li & Shen, 2002; Shen, 2003)

CM-A_ Social Influence A1-Qualification grade A2- Business coverage & market share A3- Image & reputation	**CM-D_ Marketing ability** D1- Market coverage for business D2- Marketing information D3- Bidding & pricing ability D4- Public relationship
CM-B_ Technical Ability B1- Built technology capacity B2- Technology and R&D ability B3- Technology Innovation Ability B4-Information Technology	**CM-E_ Management skills** E1- Quality management E2- Time management E3- Cost management E4- Contract management E5- External co-ordination E6- Safety management E7- Environmental management E8- Risk management
CM-C_ Financing ability & accounting status C1-Financing Ability C2- Financial status C3- Capital added ability C4- Procuring ability	**CM-F_ Organization structure & operation** F1- Use of human resources F2- Development of human resources F3- Organization operation mechanism

Table 5.3 provides two levels of the definitions of these parameters[63] and Table 5.4 provides all three levels partially. In the three-level structure shown, the first-level competitiveness parameters represent the six attributes for determining a contractor's competitiveness that is, *social influence (CM-A), technical ability (CM-B), financing ability and accounting status (CM-C), marketing ability (CM-D), management skills (CM-E)* and *organizational structure and operations (CM-F).*

Table 5.4 Three levels of competitiveness parameters (Shen et al., 2003)

A- Social Influence
A1-Qualification grade
A1.1-Qualification grade for company
A1.2- Qualification grade for project manager
A2- Business coverage & market share
A2.1- Business coverage & market share (by region)
A2.2- Business coverage & market share (by industrial sectors)
A2.3-Business specialization (design, or construction, etc)
A3- Image & reputation
A3.1- Contract credibility, rate of successful contract
A3.2- Bank credibility grade
A3.3- Project quality records (quality grade of final products)
A3.4- Project safety performance records
A3.5- Project environment & hygiene performance records
A3.6- Corporate identification
B- Technical Ability
B1- Built technology capacity
B1.1- Construction plant capacity
B1.2- Construction plant capacity per staff
B1.3- Proportion of advanced construction plant
B1.4- Utilization efficiency (ratio) of construction plant
B1.5- Equipment depreciation rate
B2- Technology and R&D ability
B2.1- Established research unit and capacity of research staff
B2.2- Level of investment on R&D
B2.3- Adoption rate of the new technology developed internally
B2.4- Level of external dissemination of the new technology
B3- Technology Innovation Ability
B3.1- Quantity of the patents owned by the organization
B3.2- Number of integrated construction methods applied
B3.3- Number of technical patent transfers
B3.4- Status of technology advancement within the industry
B3.5- Rate of contribution to technology development
B4-Information Technology
B4.1-Level of information technology application
B4.2-Software development and application

In their model, Shen adapted a previous study by Li and Shen (2002) to develop a benchmark book and it is the center part of the model and used to assess the

[63] See Appendix for the whole list of Competitiveness Parameters (acquired from Shen via mail and used with permission)

significance values of third-level parameters. Some samples of the benchmark dictionary are provided in Table 5.5.

Table 5.5 Partial Benchmark Dictionary developed for China Construction Industry (see Appendix A for whole list) (Shen et al., 2003)

Coding parameter	Benchmark scores	Conditions	Facts and evidence
A-1-1	100 75 50 25 0	Organizational business grade is Grade I Organizational business grade is Grade II Organizational business grade is Grade III Organizational business grade is Grade IV Organization has no business grade	Certificate of organizational business grade, business license, issued by Commerce & Administration Bureau and construction commissions
A-1-2	100 75 50 25 0	Number of Grade I project manager is over 16 Number of Grade I project manager is between 11 and 15 Number of Grade I project manager is between 6 and 10 Number of Grade I project manager is between 1 and 5 Organization has no Grade I project manager	Project manager certificates issued by the Ministry of Construction, or provincial construction commission
A-2-1	100 75 50 25 0	>1.5% business is from overseas market; 3% from national market; >6% from provincial market 1-1.5% business is from overseas market; 2-3% from national market; 4-6% from provincial market 0.5-1% business is from overseas market; 1-2% from national market; 2-4% from provincial market >0-0.5% business is from overseas market; >0-1% from national market; >0-2% from provincial market There is no business from overseas market, or national market, or provincial	Organization statistics and annual business reports issued by the company
A-2-2	100 80 60 40 20	Organization covers all the five areas: general building, road, water system, electric engineering and telecommunication Organization covers four of the five areas mentioned above Organization covers three of the five areas mentioned above Organization covers two of the five areas mentioned above Organization covers one of the five areas mentioned above	**Organization statistics and annual business reports issued by the company**
A-2-3	100 80 60 40 20	Organization operates on land surveying, design, construction, decoration and maintenance Organization covers four of the five areas mentioned above Organization covers three of the five areas mentioned above Organization covers two of the five areas mentioned above Organization covers one of the five areas mentioned above	**Organization business license issued by** Commerce & Administration Bureau and organization business grade issued by construction commissions

Total competitiveness value (TCV) includes the importance of parameters in the calculation process which is named the *significance values* of all competitiveness parameters. The procedure for calculating TCV is designed as a three-level

calculation system (Figure 5.8) and the value of TCV is defined with the following formulas;

TCV=S.W= [SA; SB; SC; SD; SE; SF] . [WA; WB; WC; WD; WE; WF] (5.1)

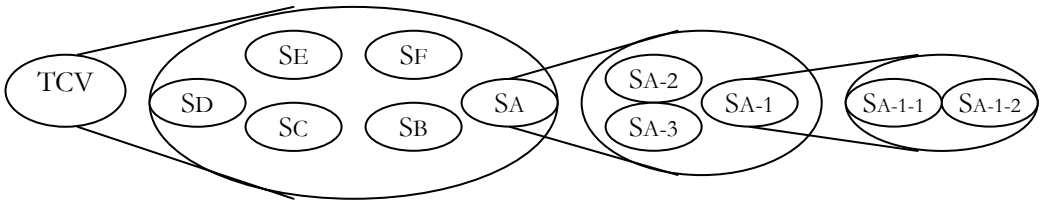


Figure 5.8 Three-level calculation system for computing contractor's overall competitiveness value (Shen et al., 2003)

Here, TCV is the contractor's total competitiveness value; **S** indicates the *assessment matrix* which is composed of the assessment element SA, SB, SC, SD, SE and SF, their values are the assessment scores of the six first-level competitiveness parameters. Similarly, **W** is the *weight matrix* composed of the weight elements WA, WB, WC, WD, WE and WF, their values represent the weighting values of the six first-level competitiveness parameters (CM-A, CM-B, CM-C, CM-D, CM-E and CM-F).

SA is defined as the competitiveness value of the attribute CM-A and is derived by using an analogy similar to the one implemented above, and WA is defined as the weight matrix of the three weight elements (WA-1; WA-2; WA-3) and they are used to weight the three second-level parameters. To illustrate;

SA= [SA-1; SA-2; SA-3] . [WA-1; WA-2; WA-3] (5.1a)

Third level assessment values (SA-1, SA-2, SA-3) are also obtained in a similar way and in fact, from a second-level parameters to a single *total competitiveness value* (TCV), whole assessment is derived and triggered from this stage.

SA-1= [SA-1-1; SA-1-2] . [WA-1-1; WA-1-2] (5.1b)

Here, once more WA-1 is the weight matrix composed of the elements WA-1-1 and WA-1-2 and these indicates the weighting values of the two bottom-level parameters A-1-1 and A-1-2, which belong to A-1.SA-1 is the assessment matrix composed of the elements SA-1-1 and SA-1-2, their values are obtained by referring to the established benchmarks (Table 5.5). To illustrate, SA-1-1 is assigned 100 if the

organization's business grade is Grade I, as specified in Table 5.5. Parallel calculation procedures are applied to all of the other parameters defined in the system.

In Figure 5.9 to 5.10 the interface of the developed computer program can be seen.

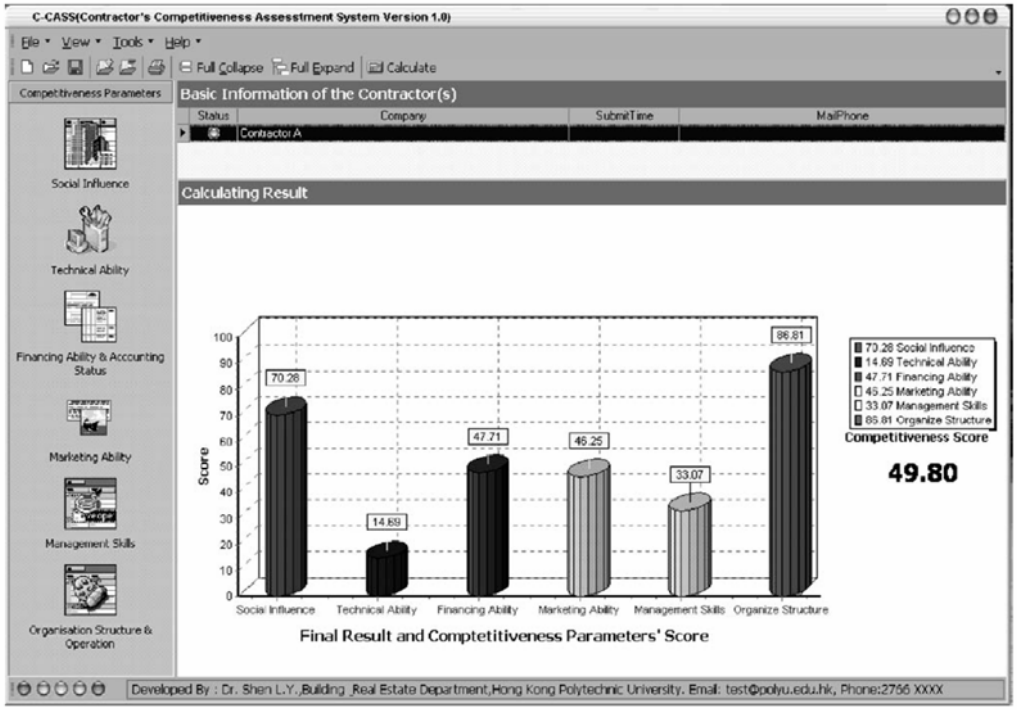


Figure 5.9 The competitiveness score and its distribution of Contractor A (Shen et al., 2003)

Here it is important that as can be seen from the evaluation list, the scheme of competitiveness parameters mainly arranged to overcome pre-bidding qualification processes and the system was primarily designed for two purposes, that is, for a contractor's *self-evaluation* and to assist clients in making a *pre-qualification assessment*.

With their model Shen et. al. (2003) present a decision support system which is really simple and basic for assessing a contractor's competitiveness with reference to the Chinese construction industry. Competitiveness parameters are structured in a way that enables the assessment of competitiveness at different levels, and gives valuable clues for further development. Though the developed model is mainly for the Chinese construction industry, the system provides a valuable and practical methodology to examine a contractor's total competitiveness for other countries also.

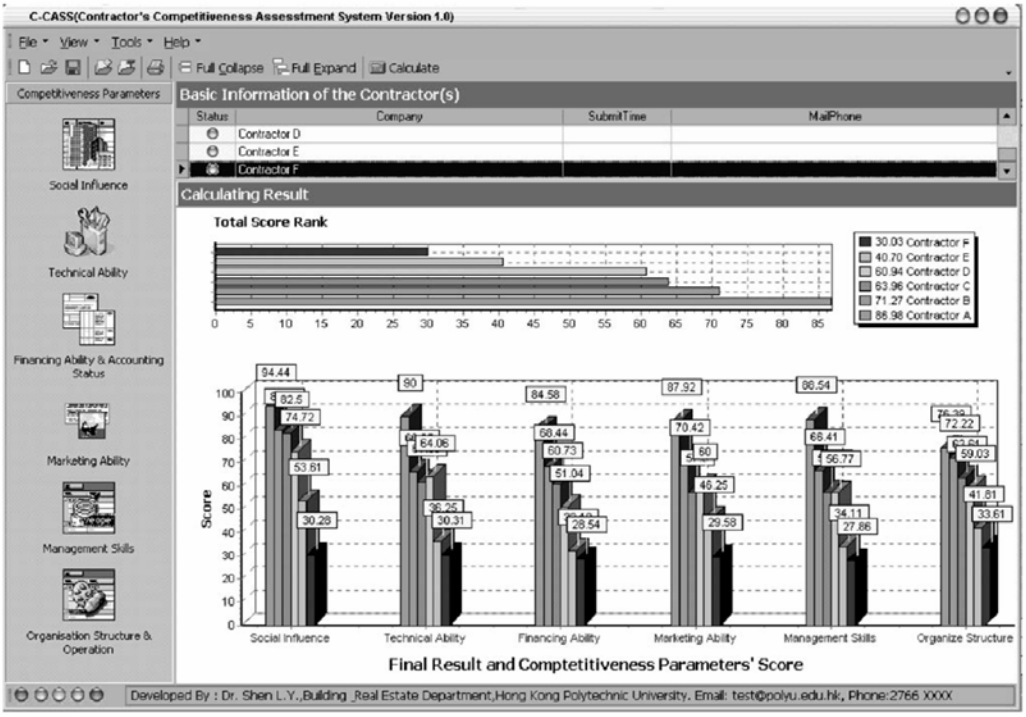


Figure 5.10 The output report of pre-qualification procedure. (Shen et al., 2003)

5.4 CONCLUSION

Chapter 4 covers core competencies in construction industry; discuss basic analytical models for international competitiveness and presents some firm-level strategic implications for being successful in international construction. As a continuum of previous chapter, this chapter evaluates firm level competitiveness and quantifying models for construction.

Accordingly, it is defined that firm level competitiveness is concerned with 'the mix of businesses the company should compete in, and the ways in which strategies of individual units should be coordinated and integrated'. It is also stated that, firm level competitiveness can be seen basically depending on Porter's value chain (1980) definition.

Apart from the use value chain for firm level competitiveness understanding, Momaya and Selby (1998) proposed a model for evaluating competitiveness of construction by Assets, Processes and Performances (APP) model. Their model is designed to evaluate and quantify the international competitiveness of Canadian construction industry mainly; however their study has also a quantification

orientation along with qualitative features and has a firm level competitiveness application extension. Momaya (2004) also identified that competitiveness can be treated as a *dependent* or *independent variable* which also defines another classification to competitiveness models.

Momaya (2004) suggests that a model which integrates *resources* to *performance* through *processes* may provide a better tool to integrate competitiveness with strategy and also understood by working professionals (which in turn defines APP model). Also, analyzing Momaya's APP model, it is stated that though the model has *generic qualities*, and *being simple* the author believes that the model is lacking in the *product* and *entrepreneurship* side concepts. However it is highlighted that these gaps can be filled by adding required items under appropriate headings.

It is also perceived that studying the analytical competitiveness tools and models, there are a few studies investigating the competitiveness of construction firms and most of these studies are concentrated on quantifying studies rather than qualifying studies. The important side of quantifying studies is presented as they form the *metrics* side of the competitiveness benchmarking studies and mainly depend on *indicators*. Basic characteristics of the indicators are also pointed out within this study and apart from Ofori's (2001) classification, it is stated that four level indicators would be more beneficial for indicator handling namely; (1) Macro-level Indicators (2) Sectoral-level Indicators *(3) Firm-level Indicators* (4) Project-level Indicators.

Also within this section, up to date examples of firm level quantifying studies of competitiveness for construction are elaborated. Accordingly, the studies of Drew and Skitmore (1997) and Hatush and Skitmore (1997) are reviewed and being the ideal examples of their kinds and based on other studies; the Key Performance Indicators (KPI) and Total Competitiveness Value (TCV) studies are covered in detail.

The indicators used in construction KPIs are defined under ten headings namely; c*lient satisfaction-product*, c*lient satisfaction-service*, *defects*, *safety*, p*redictability-cost*, p*redictability-time*, *productivity*, *profitability*, c*onstruction cost* and c*onstruction time* and TCV model used six competitiveness parameters namely, *social influence, technical ability, financing ability & accounting status, marketing ability, management skills, organization structure & operation* with sub-parameters and used a *benchmark book* for evaluation which are all together characterize the basic items for evaluating firm level competitiveness in construction.

CHAPTER 6 CONCLUSIONS & SUGGESTIONS FOR FUTURE RESEARCH

In this chapter, conclusions and general outcomes of the study and possible future research possibilities are depicted.

6.1 EVALUATION OF THE STUDY AND CONCLUSIONS

As stated, this study bears two important points to be recognized (1) construction industry is one of the major businesses for international trade and can only be sustained by obtaining sustainable competitive advantage, (2) maintaining competitive advantage in construction industry is an important topic for developing countries and this could only be ameliorated with an analytical thinking about competitiveness. Accordingly, the competitiveness issue is highlighted in three levels (international level, industry level and firm level) within this study and the goal of this dissertation is founded to investigate and understand the competitiveness concerns in construction industry and analyze the issue in all levels.

Finally through the subject matter the study aims to provide an insight for future executives of construction industry about competitiveness and serve as an initial step for further studies on the topic. Accordingly, the study overviews the specific characteristics, trends, markets and business cycles of the construction industry; explains the central concepts of competitiveness and basic analytical tools of evaluating competitiveness; overviews the core competencies and competitive advantages in construction and highlight competitiveness in international construction by national level competitiveness tools; outline benchmark and related firm level competitiveness studies for construction industry; and identify characteristics of competitiveness tools and areas for further research.

Accordingly, in Chapter 2 it is stated that the construction industry must operate in constantly changing environments and conditions. Uncertainty and imprecision are critical elements in the nature of the construction industry. All these characteristics make competitive understanding and strategic planning critical issues in terms of staying competitive and alive in the future markets. It is also seen that typical

characteristics of construction firms' final output makes it divergent according to manufacturing industries and the difference should be understood first while a theoretical framework developed for manufacturing industry is applied to construction industry. Moreover, various characteristics both for the *processes* and *production* of the construction industry are elaborated along with analytical issues such as *demand conditions*, *business cycles* and *trend analysis*. These characteristics also provide a basis for understanding current *competitiveness models* which are analyzed in the forthcoming chapters and help to improve their imperfect parts and present tips for individual competitiveness models for construction industry. Also, by presenting a perspective to understand the *environment types* of a construction firm, this section provided a basis for further classification of competitiveness issues.

In Chapter 3, basic concepts and tools of competitiveness are analyzed with three levels, namely; *national*[64]*, industry and firm level*. Within these three levels, Porter's (1990) 'diamond framework' and 'National Competitiveness Indices' are analyzed along with Lall's (2001) 'Competitiveness Triangle' to have an understanding of the link between the *firm level* and *national level* competitiveness issues. The strengths and weaknesses of these national levels models are also covered in this section according to, *business school, and power school approaches*; *static* and *dynamic characteristics of models*; plus *analysis* and *deterministic* point of view of models.

Within Porter's diamond framework, two basic divisions are also defined under *factor conditions*, and this division is important for *competitive advantage* understanding. In the first one, there is a classification of, *basic* and *advanced* factors and in the second one the distinction made with *generalized* and *specialized* factors. It is also concluded that*, advanced* and *specialized* factors are viewed as crucial and having *sustainable* basis for competitive advantage whereas *basic* and *generalized* factors are replicable and *not sustainable*.

Continuing with *industry* and *firm level* competitiveness concepts, *five competitive forces model, value chain, segmentation matrix, SWOT* and *benchmark analysis* and *three generic strategies* are reviewed with a construction industry point of view. It is mentioned that, depending on microeconomics *five competitive forces model* and *value chain* provides a

[64] There is confusion between the terms *national* and *international*. Here, *national level* defines international competitiveness issues/models of a national industry. *International level* also encompasses firm level involvement, and this point should be noted for final part of the thesis.

backbone for all level of competitiveness studies and issues covered in this study. It is also highlighted that *SWOT* and *benchmark analysis* have a very broad and generic application areas and SWOT has tool characteristics; however benchmarking is relatively a *technique*. *Segmentation matrix* and *three generic competitive strategies* are also useful tools for *market understanding* and *competitive strategy formulation*. It is also stated that since the analysis of any tool directly or indirectly influence the results of other analytical tools of competitive planning, during the process of planning; firms have to consider all analyses together.

In Chapter 4, it is stated that *competitive advantage* requires the analysis of value-adding activities and noted that the traditional competitive tendering approach was dependent *on price* however with current approaches (Latham, 1994 and Egan, 1998) this is changing. Also, a quick framework for sources international competitiveness of construction firms also depicted and possible competitive advantages for international construction firms issued. In this chapter also Seymour's (1987) definition of *firm* and *national* based advantages of international construction is found useful for classification purposes and it is used in Figure 6.1 to define Multinational and Global side of international construction.

In terms of competitiveness models for construction it is concluded that 'there is no comprehensive model to evaluate the competitiveness of the industry'. Also, the lacking points in the application of 'diamond framework' to construction is criticized for *government action, culture matters*, *key national resources* and it is suggested to elaborate the model with *linked* and *multiple diamonds* concept of Dunning (1993) and Cartwright (1993). In partial conclusion, it would be relevant to consider *the four determinants* of *Porter's diamond* with these identified points. (Figure 6.1)

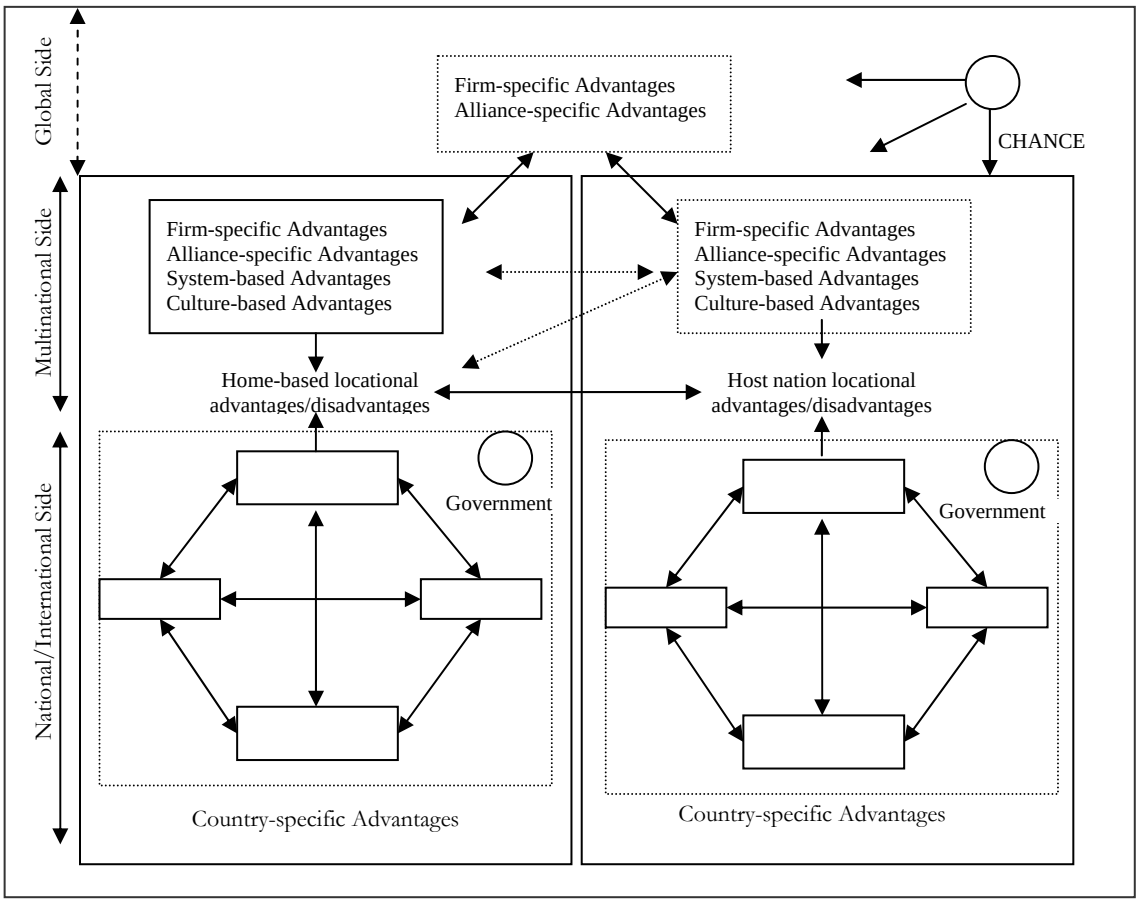


Figure 6.1 Competitive Advantage in International Construction (Multinational and Global sides)

After analyzing the outcomes of several authors, it is stated that competitiveness understanding in construction industry could only be achieved by bringing a classification to the application areas of these models. Accordingly, Lansley's (1979) environment classification is extended by Flanagan's (1994) three stage construction environment and a final base is obtained to evaluate *competitiveness* issues in construction (see Table 4.7). In this part, as a final outcome of the thesis Table 4.7 elaborated with applicability of the models between these environment types and Table 6.1 is obtained.

Considering the suitability of existing competitiveness frameworks for construction industry, it is also concluded that deterministic models such as Lall's (2001) *triangle of competitiveness* are more suitable for *policy makers* and *government use;* however analysis models such as Porter's (1990) *national diamond* is more appropriate for *researchers* to understand and analyze current status of national industries and have secondary importance for policy planning purposes.

Table 6.1 Combined Environment Types, Characteristics and Useful Models and Tools for Competitiveness

	Environmental Types Lansley, 1979 & Flanagan, 1994	**Characteristics**	**Useful Models and Tools for Competitiveness**
Supra-National Level	Global Environment	▪ Firm level characteristics dominate competitiveness. ▪ Suppliers/Buyers (Global Level) highly important ▪ Financial packages critically important ▪ Importance of Configuration and Coordination (Porter, 1986) ▪ Importance of Value Chain (Porter, 1986) ▪ Impact of global and multi-domestic competition (Porter, 1986)	▪ Firm Level Competitiveness Models can be applied
	Multinational Environment	▪ Importance of firm level characteristics increase in competition ▪ Alliance-specific Advantages ▪ System-based Advantages ▪ Culture-based Advantages ▪ Suppliers/Buyers (Multinational level) ▪ Financial Packages important ▪ Government Support can be seen	▪ National level competitiveness models can be *partly* applied. ▪ Firm Level Competitiveness Models can be applied
Industry and National Level	International Environment	▪ National and firm level characteristics dominates (Seymour, 1987) ▪ International and National level Suppliers are important ▪ Government Supports highly important ▪ Culture, Location is highly important	▪ Diamond Framework (Porter, 1990)
	Common Industry/ National Environment	▪ Common to all firms in the industry/national environment. ▪ Affects firms both directly and indirectly. ▪ Affected by demographics, technological and societal changes. ▪ The economic and social background of firms ▪ The industry's existing and potential clients ▪ Suppliers (national level) are important ▪ Labor and respective trade unions ▪ Trade associations ▪ Central and local Government departments ▪ Professional Institutions ▪ Industry Task Forces and initiatives.	▪ Diamond Framework (Porter, 1990) ▪ Competitiveness Triangle (Lall, 2001) ▪ Five Competitive Forces Model ▪ Segmentation Matrix
Firm Level	Competitive Environment	▪ Localized to the firm. ▪ Dealing with industries and markets. ▪ Structure of demand ▪ Procurement forms used by clients ▪ Suppliers (local) ▪ Competitors ▪ Availability of materials ▪ Labor ▪ Subcontractors	▪ Value Chain (Porter, 1980) ▪ Five Competitive Forces Model (Porter 1985) ▪ Segmentation Matrix
Sub Firm Level	Operational Environment	▪ Unique to each firm ▪ Subcontractors ▪ Technology ▪ Human Resources	▪ Value Chain

Finally in Chapter 5, firm level competitiveness and quantifying models for construction are evaluated. Accordingly, it is defined that firm level competitiveness is concerned with 'the mix of businesses the company should compete in, and the ways in which strategies of individual units should be coordinated and integrated' and firm level competitiveness can be seen basically depending on Porter's value chain (1980) definition.

Apart from the use value chain for firm level competitiveness understanding, it is also perceived that studying the analytical competitiveness tools and models, there are a few studies investigating the competitiveness of construction firms and most of these studies are concentrated on quantifying studies rather than qualifying studies. Accordingly, Momaya and Selby's (1998) assets, processes and performances (APP) model is evaluated with its qualitative features. Their model is designed mainly to evaluate and quantify the international competitiveness construction industry; however their study has also a quantification orientation along with qualitative features and has a firm level competitiveness application extension. Also, the important side of quantifying studies is presented as forming the *metrics* side of the competitiveness benchmarking studies and mainly depends on *indicators*. Basic characteristics of the indicators are also pointed out within this study and apart from Ofori's (2001) classification, it is stated that four level indicators would be more beneficial for indicator handling namely; (1) Macro-level Indicators (2) Sectoral-level Indicators *(3) Firm-level Indicators* (4) Project-level Indicators.

Also within this section, up to date examples of firm level quantifying studies of competitiveness for construction are elaborated and being the ideal examples of their kinds and based on other studies; Key Performance Indicators (KPI) and Total Competitiveness Value (TCV) studies are covered in detail which is believed all together characterize the basic feature of firm level competitiveness models in construction.

Here, to identify generally the strengths and weaknesses of competitiveness models and concepts Table 6.2 is formed. Within this table application scope of the model, strengths and weaknesses of analyzed concepts are depicted with general points.

Table 6.2 Strengths and Weaknesses of Competitiveness Models and Concepts

Strengths and Weaknesses of Competitiveness Models; (Construction Industry Point of View)			
	Scope of Application	**Strengths**	**Weaknesses**
DIAMOND FRAMEWORK (Porter, 1990)	▪ National Industries	▪ Provides an analytical point of view. ▪ Supposed to be dynamic	▪ Business School approach ▪ Culture and Government impacts are lacking for construction. ▪ Multiple diamonds can provide a more realistic framework
NATIONAL LEVEL COMPETITIVENESS INDICES (IMD, 2003)	▪ Countries	▪ Provides continuous data base and ranking ▪ Systematic questionnaire and presentation	▪ Business School Approach. ▪ Weak and Suspect analytical frameworks. ▪ Connections between the variables unclear.
COMPETITIVENESS TRIANGLE (Lall, 2001)	▪ Enterprise to National Level	▪ Deterministic Model ▪ Provides a Market point of view and Considers Market Failures ▪ Considers Government Effect on Market Failures.	▪ Presents a Static Understanding ▪ Application Procedure is not identified.
FIVE COMPETITIVE FORCES MODEL (Porter, 1985)	▪ Industry and firm level [65]	▪ Provides an analytical point of view ▪ Depends mainly on microeconomics. ▪ Can be used in all levels	▪ Presents a Static Understanding. ▪ Provides more an analytical point of view rather than a deterministic one.
VALUE CHAIN	▪ Industry, Firm and National Level	▪ Provides an analytical point of view ▪ Have a generic quality and applicable to all levels	▪ Usually there is a complex procedure to apply
SEGMENTATION MATRIX	▪ Industry Level	▪ Provides a Market point of view ▪ Can be used in all levels	▪ Used to identify competitive market segment, rather to increase competitiveness
THREE GENERIC COMPETITIVE STRATEGIES	▪ Generic Application	▪ Can be used in Firm Level ▪ Meaningful to practitioners	▪ Overlapping areas present. Differentiation can be seen as a single strategy ▪ Provides a static understanding
SWOT	▪ Generic Application	▪ Can be used in all levels ▪ Meaningful to practitioners	▪ Covers everything due to being so generic. ▪ Lacks a strategic point of view.
BENCHMARKING	▪ Generic Application	▪ Can be used in all levels ▪ Its definition is linked with competitiveness issues.	▪ It is rather a technique than a tool
APP model (Momaya, 2004)	▪ Generic Application	▪ Can be used in all levels ▪ Meaningful to Practitioners ▪ Have qualitative features	▪ Presents a Static Understanding. ▪ *Entrepreneurship* and *Product* issues are not identified.
KPI Model (BRE)	▪ Firm Level	▪ Meaningful to Practitioners ▪ Can also be used among industries and nations	▪ Presents a Static Understanding. ▪ Based on indicators rather than theory.
TCV Model (Shen et al. 2003)	▪ Firm Level	▪ Dynamic methodology through changing weights	▪ Lacks theoretical link. ▪ Depends solely on indicators ▪ No qualitative side is identified

[65] It is also applied to International level construction by Yates et al. (1991)

To identify some final points, it can be concluded that survival and success in turbulent times increasingly depend on competitiveness and it is described by many researchers as a multidimensional and relative concept. However, there is need for harmonizing competitiveness and related terms, so that confusion can be minimized (Momaya, 2004). Accordingly, it is concluded that 'while the Five Forces and Diamond Model by Porter and their variants provide useful insights, their limited use in competitiveness evaluations in construction hints at the need for better frameworks' (Momaya, 2004). Instead of trying to construct comprehensive indexes, as Lall (2001) advised; to aggregate and settle less ambitious but more manageable indicators will be better for the purposes of assessing competitiveness.

In conclusion, most of the frameworks or models are useful to evaluate some specific dimension of competitiveness; however their utility in other context becomes limited due to low flexibility and vagueness. As Momaya (2004) stated many such frameworks need to be upgraded through research and validation, to evolve flexible frameworks that can be used widely by practitioners for making key decisions concerning the competitiveness of construction firms. On the other hand by using supposed classification in Table 6.1 competitiveness concept can be analyzed in a more descriptive way while analyzing construction firms. Another critical approach to competitiveness can be seen by the lacking point within different research outcomes in that; the term usually expressed as achieving high marks on a set of qualifications performances for a single firm or an industry. However it is obvious that preserving most of these qualifications defined in some competitiveness models (such as TCV by Shen et.al) bring out bulky organizations rather than agile and truly competitive ones[66]. Also it is obvious that keeping the defined situation in the long term costs high. It should also be noted that the term competitiveness usually remains weak without defining a target area. For this part Porter's (1985) 'Market Segmentation Matrix' can be used successfully. For rising this issue; as Momaya (2004) stated it can be defined as a *dependent* or an *independent* variable for area of application.

[66] This point is highly relevant for construction industry while we think the relative subcontractor system.

6.2 SUGGESTIONS FOR FUTURE RESEARCH

Competitiveness implies elements of productivity, efficiency, and profitability; but these changes over time and the sustainability of these elements is important in maintaining competitiveness. There needs to be sustained improvement in management, products and processes in component, and materials manufacturing, design management and processes, site production and assembly. In the following part some other suggestions for future research is presented.

(1) Applicability of competitiveness models by practitioners: Competitiveness is a multi-dimensional concept with dynamic weightings of different factors and it is necessary for a firm to define competitiveness as part of its strategy. While there are many theories about competitiveness and related inter-disciplinary fields of strategy, operations, resource-based view, and economics, they are not used widely by practitioners in their decisions for enhancing or sustaining competitiveness (Momaya, 2004). A systematic evaluation of competitiveness will be of great help to practitioners. Accordingly, Momaya (2004) states that g*eneric frameworks* (such as APP) may provide a better platform for managers to develop their own models for simulation and there is need for a research network that can develop better tools to improve competitiveness processes.

(2) A game theoretic approach to competitiveness: As stated in Chapter 3, current studies on competitiveness of firms usually depend on a static understanding or rather bear a static definition with its environment. From this perspective, a game theoretic approach for competitiveness and competitiveness strategy formulation can also be investigated with a Ph.D. level study.

(3) Quantitative Measurement of International Construction Competitiveness: As stated before metrics are needed to properly measure competitiveness of firms and an industry to provide a baseline for improvement and a way of comparing construction sectors. There is a current research conducted in the University of Reading about measuring competitiveness of national construction industries started by June 2004. It is reported that countries to be measured through the study are: the UK, USA, Sweden, Finland, Germany, France, Japan and Australia and the study is reported to develop a methodology to measure competitiveness through the analysis of the factors that directly influence the performance of the sector.

(4) Measuring Firm Level Competitiveness: In terms of Measuring Competitiveness; Total Competitiveness Value (TCV) and Key Performance Indicators (KPI) models are analyzed. Accordingly, it is concluded that appropriate *metrics* are needed to properly measure competitiveness of construction firms. As a future research, TCV model can also be adapted to the Turkish construction industry and while analyzing KPI model, it is understood that large data collection and metrics are compulsory to make a benchmark study on competitiveness.

(5) Management Study with Competitiveness Orientation: Most companies are organized on functional lines such as marketing, finance, operations, and have narrow views about their contribution to the competitiveness of the whole organization. So, a competitiveness approach having close linkage with strategy process to integrate different functions will be useful both for construction firms and other firms. Also, the implication of different measures of competitiveness changes with time and context so, theories and frameworks must be flexible enough to integrate the change with key strategic management processes if their utility is required to be sustained in practice (Momaya, 2004).

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APPENDIX

Notations of Competitiveness Parameters, defined by Shen et al. (2003)

A- Social Influence

A1-Qualification grade
- A1.1-Qualification grade for company
- A1.2- Qualification grade for project manager

A2- Business coverage & market share
- A2.1- Business coverage & market share (by region)
- A2.2- Business coverage & market share (by industrial sectors)
- A2.3-Business specialization (design, or construction, etc)

A3- Image & reputation
- A3.1- Contract credibility, rate of successful contract
- A3.2- Bank credibility grade
- A3.3- Project quality records (quality grade of final products)
- A3.4- Project safety performance records
- A3.5- Project environment & hygiene performance records
- A3.6- Corporate identification

B- Technical Ability

B1- Built technology capacity
- B1.1- Construction plant capacity
- B1.2- Construction plant capacity per staff
- B1.3- Proportion of advanced construction plant
- B1.4- Utilization efficiency (ratio) of construction plant
- B1.5- Equipment depreciation rate

B2- Technology and R&D ability
- B2.1- Established research unit and capacity of research staff
- B2.2- Level of investment on R&D
- B2.3- Adoption rate of the new technology developed internally
- B2.4- Level of external dissemination of the new technology

B3- Technology Innovation Ability
- B3.1- Quantity of the patents owned by the organization
- B3.2- Number of integrated construction methods applied
- B3.3- Number of technical patent transfers
- B3.4- Status of technology advancement within the industry
- B3.5- Rate of contribution to technology development

B4-Information Technology
- B4.1-Level of information technology application
- B4.2-Software development and application

C-Financing ability & accounting status

C1-Financing Ability
- C1.1- Creditability grade certified by relevant bodies
- C1.2- Annual value of loans obtained
- C1.3- Satisfactory level of communication with banker
- C1.4- Level of knowledge about financial policy

C2- Financial status
- C2.1- Assets status
- C2.2- Profit status
- C2.3- Debt status

C3- Capital added ability
- C3.1- Growth rate of total assets
- C3.2- Growth rate of total profit
- C3.3- Growth rate of gross output
- C3.4- Growth rate of capital

C4- Procuring ability
- C4.1- Annual value of the materials/equipment self-procured
- C4.2- Annual profit from applying self-procured resources
- C4.3- Market coverage for conducting resources procurement
- C4.4- Methods of procurement (agent, self-doing, e-commerce)
- C4.5- Ability of transporting goods and tax-clearance skills

D- Marketing ability

D1- Market coverage for business
- D1.1- Business market by locations/regions

D1.2- Business market by industrial sectors
D2- Marketing information
D2.1- System availability for managing market information
D2.2- Ability of information processing
D2.3- Degree of IT application in managing the information
D3- Bidding & pricing ability
D3.1- Previous success rate in pre-qualification
D3.2- Previous success rate of bidding
D3.3- Quantity of annual contract works
D4- Public relationship
D4.1- Relationship with governmental departments
D4.2- Relationship with project clients
D4.3- Relationship with news medium (for business promotion)
D4.4- Relationship with subcontractors and suppliers
D4.5- Relationship with public

E- Management skills
E1- Quality management
E1.1- Availability of quality management system
E1.2- Effectiveness of quality management methods
E1.3- Number of quality awards and punishments
E1.4- Number of major quality accidents over previous 3-years
E1.5- Satisfactory level of maintenance service
E1.6- Return rate of retention deposits for committing contract
E2- Time management
E2.1- Effectiveness of time controlling methods
E2.2- Previous records about construction delays
E2.3- Proportion of liquidated damage to annual works
E2.4- Number of time extension claims and the rate of success
E3- Cost management
E3.1- Effectiveness of cost control methods
E3.2- Previous average rate of cost reduction to contract sum
E3.3- Number of cost claims over previous 3-years
E3.4- Proportion of cost compensation to contract sum
E4- Contract management
E4.1- Establishment of contract administration system
E4.2- Availability of contract managerial staff
E4.3- Success rate of contract claims over previous 3-years
E4.4- Rate of successfully committed contracts
E4.5- Number of contract disputes and the quantity concerned
E4.6- Rate of dispute settlement cost to contract sum
E5- External co-ordination
E5.1- Effectiveness of co-ordination with subcontractors
E5.2- Ability of site management
E6- Safety management
E6.1- Availability & effectiveness of safety management
E6.2- Availability & effectiveness of safety measures on site
E6.3- Effectiveness of accident settlement process
E7- Environmental management
E7.1- Existence & effectiveness of environmental management
E7.2- Effectiveness of environmental protection measures
E8- Risk management
E8.1- Availability & effectiveness of risk management system
E8.2- Effectiveness of risk management methods

F- Organization structure & operation
F1- Use of human resources
F1.1- Organizational gross output per capita
F1.2- Organizational profit per capita
F1.3- Rate of technical staff to the total organizational staff
F1.4- Annual average wage within the organization
F1.5- Annual wage scales for different grades of staff
F2- Development of human resources
F2.1- Availability of resources and programs for training
F2.2- Adequacy of personnel structure within the organization
F2.3- Existence of strategies for human resources development
F3- Organization operation mechanism
F3.1- Establishment of modern enterprise management system
F3.2- Adequacy of competition strategy
F3.3- Personnel recruitment mechanism
F3.4- Benefit distribution and reward mechanism

CURRICULUM VITAE

A. Yağmur TOPRAKLI was born in ISPARTA in 07 August 1978. After primary school, he continued his secondary education in 'Isparta Anatolian High School', and 'Isparta Suleyman Demirel Scientific High School'. For Architecture education, he attended Middle East Technical University (METU) ANKARA, and graduated (B.Arch) in June 2001 with a first rank. He also studied a minor degree (m.B.A.) simultaneous with B.Arch degree, in Department of Business Administration of METU and completed in January 2001. He worked in construction sector for 2 years actively after graduation and got more familiar with contracting business. In September 2002, he started 'Project and Construction Management' Master Program in ITU and studied 'Competitiveness in Construction Industry' for partial fulfillment of M.Sc. Degree.