EXPLORING CRITICAL SUCCESS FACTORS FOR PARTNERING IN ARCHITECTURAL DESIGN PROCESS

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ABSTRACT

EXPLORING CRITICAL SUCCESS FACTORS FOR PARTNERING IN ARCHITECTURAL DESIGN PROCESS

Partnering is common to construction companies and success increases by effective partnering. Objective of this thesis is to analyze the critical success factors of partnering and to determine the most important critical success factors of partnering particular to architectural design offices in İzmir. For this purpose, a questionnaire survey is conducted for 104 practicing architects in İzmir. The collected data are analyzed with factor analysis and multiple regression methods. By factor analysis, 7 critical success factors of partnering are determined for the architectural design process. These are; (1) establishment of efficient communication towards mutual goals, (2) willingness to effective coordination, (3) commitment to mutual objectives by clear definition of responsibilities, (4) willingness to eliminate non-value added activities, (5) commitment to win-win attitude by focusing on long-term relationship, (6) mutual trust and (7) support from top management. Multiple regression analysis is conducted to identify the most important critical success factors for partnering success of the architectural design process. The results of the regression analyses suggest that architects state the most important critical success factors leading to partnering success to be respectively as follows: (1) willingness to effective coordination, (2) willingness to eliminate non-value added activities and (3) commitment to win-to-win attitude.

ÖZET

MİMARİ TASARIM SÜRECİNDE ORTAKLIK İÇİN KRİTİK BAŞARI FAKTÖRLERİNİN ARAŞTIRILMASI

Ortaklık kavramı inşaat firmalarında yaygındır ve başarı, etkili ortaklık yaklaşımı ile artar. Bu tezin amacı, ortaklık kavramının kritik başarı faktörlerini analiz ederek, mimari ofislerin proje tasarım sürecindeki başarısının en etkili faktörlerini belirlemektir. Bu amaçla, İzmir'de serbest çalışan 104 mimara bir anket çalışması uygulanmış, toplanan veriler faktör analizi ve çoklu regresyon analizi yöntemleriyle incelenmiştir. Faktör analizi aracılığıyla ortaklığın 7 kritik başarı faktörü ortaya çıkartılmıştır. Bunlar; (1) ortak amaçlara doğru etkili iletişimin kurulması, (2) etkili koordinasyona isteklilik, (3) sorumlulukların açıkça tanımlanması ile ortak hedeflere katılım, (4) değer katmayan faaliyetleri azaltmaya isteklilik, (5) uzun vadeli ilişkilere odaklanarak kazan-kazan tavrına adanmışlık, (6) ortak güven ve (7) üst yönetimin desteğidir. Ortaklığın başarısında en etkili faktörleri ortaya çıkarmak için çoklu regresyon analizi yöntem olarak uygulanmıştır. Regresyon analizinin sonuçları, mimarların, ortaklık başarısına öncülük eden en etkili faktörleri sırasıyla; (1) etkili koordinasyona isteklilik (2) değer katmayan faaliyetleri azaltmaya isteklilik ve (3) uzun vadeli ilişkilere odaklanarak kazan-kazan tavrına adanmışlık olarak sıraladığını göstermiştir.

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LIST OF ABBREVIATIONS

ACEC: The American Consulting Engineers Council

AIA: American Institute of Architects

APQC: American Productivity and Quality Center

BQF: British Quality Foundation

CFA: Common Factor Analysis

CII: Construction Industry Institute

CSF: Critical Success Factor

FA: Factor Analysis

KMO: Kaiser-Meyer-Olkin's measure of sampling

MRA: Multiple Regression Analysis

PCA: Principal Component Analysis

SCM: Supply Chain Management

SPSS: Statistical Package for the Social Sciences

TQM: Total Quality Management

UK: United Kingdom

USA: United States of America

VIF: Variance Inflation Factor

CHAPTER 1

INTRODUCTION

1.1. Problem Definition

For design process partnering means to become a team for meeting complex design needs (Weingardt, 1996). Partnering approach with its success factors is a strategy that all parties in the design project create cooperation and teamwork in a win-win approach in order to improve design process and achieve mutual goals (Harback, Basham, & Buhts, 1994; Koraltan & Dikbaş, 2002; Anvuur & Kumaraswamy, 2007). Partnering approach in construction sector is increasingly gaining importance as an object of scientific investigation. In Turkey, researchers in the field are as well working on partnering for the improvement of the construction process (Bayramoğlu, 2001; Koraltan & Dikbaş , 2002; Eren, 2007). According to Koraltan and Dikbaş (2002), in order to reach international standards in the construction industry in Turkey, firstly it is important to improve construction sector by using partnering approach which can improve construction process, quality and other requirements. When the literature on partnering is reviewed it is seen that, research studies generally focus on partnering in construction companies (Black, Akintoye, & Fitzgerald, 2000; Chan et al., 2004; Tang, Duffield, & Young, 2006). However, as another vital part of the construction industry architectural design offices commonly use partnering for their design projects. Partnering is a must for successful and feasible designs (Weingardt, 1996).

Architectural design is an intricate process that involves many stakeholders from different disciplines. Newton (2006) states that in architectural design there can be so complex problems that architects need to be well informed before making a decision. In order to have solutions for these complex problems judgments of variety of stakeholders are required (Newton, 2006). According to Holdaway (2005), for the success of the design project additional team members such as civil, mechanical and electrical engineers are required to work together to facilitate the complex issues of architectural design process. For instance, buildings currently are required to be engineered in order to support sustainability, energy and cost efficiency (Weingardt, 1996). Therefore in the

architectural design phase, architects more insistently require partnering from related disciplines of civil, mechanical, electrical engineers. In architectural design, engineers and architects are major players and their interaction is vital for the success of design process and the design project (Weingardt, 1996). In the architectural design process not just the architects' efforts but also the efforts of other professionals from different disciplines are required. In the same manner, Heintz (2002) states that many architects and engineers must acquire the collaborative nature of the architectural design process and support the efficient management of the design tasks carried out by different professionals. For the success of the architectural design process, architects and engineers must accommodate not only all of the goals related to the design product, but also goals related to carrying out the design process (Heintz, 2002).

Literature review of partnering in the construction sector reveals that any research on partnering particular to architectural design process is lacking. Therefore, considering the multidisciplinary and collaborative character of the design process in the discipline of architecture, this thesis focuses on exploring the critical success factors of partnering for the architectural design process in the architectural design offices in İzmir.

1.2. Objective of the Research

The primary objective of this thesis is:

- Analyzing the critical success factors of partnering and determining the most effective factors for the success of the architectural design process particular to architectural design offices in İzmir.

The secondary objectives of this thesis are:

- Defining the concept, objectives, key components and benefits of partnering in the construction sector
- Identifying partnering in the architectural design process
- Reviewing the critical success factors of partnering that extracted from previous research studies in literature
- Making comparisons with the findings of recent research studies on critical success factors of partnering derived from construction industry.

1.3. Limitations of the Research

The limitations of this research are mainly based on the collected data. Firstly, the empirical aspect of the limitations is that the questionnaire survey was conducted in only the city of İzmir in Turkey, with practicing architects owning architectural design offices which approximately have up to 20.000 m² construction amount. The geographical distribution of subjects to be targeted to the city of İzmir was the first limitation for data collection. Thus, empirical research of this thesis has not been implemented in every city in Turkey. Secondly, the construction firms and engineers collaborating in the architectural design process could not be included in the questionnaire survey. Therefore, this thesis only reflects the architects' point of view for partnering in the architectural design process.

1.4. Outline

In the 1st chapter, problem definition, objectives, limitations and the organization of this thesis are explained respectively.

In the 2nd chapter, firstly the definition of partnering concept is reviewed. Then the emergence, objectives, key components and benefits of partnering are explained by reviewing literature. The interrelationship among partnering and other management approaches is mentioned. Partnering in the architectural design process is explained. Finally, the previous research studies on critical success factors of partnering are reviewed and defined.

In the 3rd chapter, the research methodology of this thesis, the design and administration procedure of the questionnaire survey are explained. Statistical methods used for data analysis of the questionnaire survey are briefly summarized.

In the 4th chapter, findings of the questionnaire survey are presented. Results of the statistical analyses and the strongest predictors of partnering success are listed. Then comparisons are made with recent research findings in literature.

Finally in the 5th chapter, concluding remarks are made. Further research areas are recommended.

CHAPTER 2

LITERATURE REVIEW

The literature review covers six main issues: (1) Reviewing the various definitions of partnering in literature that are related to construction industry, (2) Describing the goals, key concepts, and benefits of partnering, (3) Reviewing the relationship between partnering and other management approaches, (4) Describing partnering in architectural design process, (5) Reviewing the previous studies on partnering, (6) Identifying and describing the critical success factors of partnering in the construction industry.

2.1. Definitions of Partnering

Partnering is a difficult term to define with a formal definition that is universally accepted (Larson, 1995; Bresnen & Marshall, 2000; Cheng, Li, & Love, 2000; McGeorge & Palmer, 2002; Naoum, 2003; Beach, Webster, & Campbell, 2005; Nyström, 2005; Manley, Shaw, & Manley, 2007). McGeorge and Palmer (2002) justify this difficulty by indicating that the term partnering recalls many different meanings to different professionals from different disciplines. In the same way, Thompson and Sanders (1998) state that, partnering is a catchall term. In literature numerous terms are used in lieu of partnering. While, Mohr and Spekman (1994) use *partnership*, Cheng et al. (2000), Manley et al. (2007) and Love, Irani, Cheng, and Li (2002) call it *alliancing*, Andersin et al. (1993) refer to it as *integration*, Cravens, Piercy, and Shipp (1996) call it *network* and Weingardt (1996) names it *teaming*. Regarding the literature related to construction industry, the term *partnering* is more preferably used rather than its abovementioned equivalents.

By reviewing the various definitions of partnering in literature related to construction industry, it can be said that the mostly cited definition of partnering comes from the Construction Industry Institute (CII) in USA. The partnering definition of CII is presented as follows:

> Partnering is a long-term commitment between two or more organizations for the purpose of achieving specific business objectives by maximizing the effectiveness of each participant's resources. This requires changing traditional relationships to a shared culture without regard to organizational boundaries. The relationship is based upon trust, dedication to common goals, and an understanding of each other's individual expectations and values. Expected benefits include improved efficiency and cost effectiveness, increased opportunity for innovation, and the continuous improvement of quality products and services (CII, 1987, para. 3).

In 1993, The American Consulting Engineers Council (ACEC) and the American Institute of Architects (AIA) agreed on a definition and defined partnering as "a way of doing business that helps the providers and recipients of services work together to achieve both their mutual goals and objectives" (Weingardt, 1996, p. 49).

Below are given the definitions of partnering cited from recent publications in construction industry. Partnering:

- "is a teamwork approach to achieving success. Partnering is a way of doing business that embodies the principles of total quality management and seeks to change traditional project relationships to a shared culture where all can win. Partnering is based on trust, dedication to common goals and understanding of each other's expectations and values" (Harback et al., 1994, p. 23).
- "is the special relationship which encourages the parties in design or construction industry to change their traditional relationship to a more cooperative, team based approach" (Larson, 1995, p. 30).
- "is more than behavioral change, it is also cultural change that places common goals, trust and teamwork at the center of all contractual agreements in construction" (Wilson, Songer, & Diekmann 1995, p. 44).
- "is an organized effort to improve communications and build a culture of teamwork and cooperation among the people and organizations working on a design and construction project" (Ronco & Ronco, 1996, p. 1).
- "means to meet complex design needs" (Weingardt, 1996, p. 49).
- "is an approach used to enable the different parties involved in a project to work cooperatively" (Kanji & Wong, 1998, p. 134).
- "is a relationship that centers on trust, commitment and equity among owners, design professionals and contractors in a project" (Slater, 1998, p. 48).
- "is a technique that has become the construction industry's application of total quality management and enjoys widespread use throughout the industry" (Gransberg, Dillon, Reynolds, & Boyd, 1999, p. 161).

- "is an arrangement between parties such as the client and the contractor or the contractor and the sub-contractor with either short term or long term objectives" (Black et al., 2000, p. 423).
- "is an array of collaborative approaches" (Bresnen & Marshall, 2000, p. 229).
- "is a scientific process of two or more individuals, groups or organizations coming together to pursue a collaborative venture" (DeVilbiss & Leonard, 2000, p. 51).
- "is a concept which provides a framework for the establishment of mutual objectives among the building team with an attempt to reach an agreed dispute resolution procedure as well as encouraging the principle of continuous improvement" (Naoum, 2003, p. 71).
- "is a technique that tries to create an effective project management process between two or more organizations and also it is an effective approach for team working" (Chan et al., 2004, p. 188).
- "is a change mechanism for transforming a cross-functional project workgroup into a team" (Anvuur & Kumaraswamy, 2007, p. 227).
- "is a management philosophy which is based on trust, mutual respect and cooperation for common goals (Fong & Lung, 2007, p. 157).

As seen from the various definitions cited above, the term partnering is a comprehensive and difficult concept to define in one standard way. Based on the extensive definitions of the partnering, Nyström (2005) developed a model by adopting philosopher Wittgenstein's idea of family resemblance for the concept of partnering. The model of Nyström (2005) reflects Wittgenstein's idea that the completed concepts cannot be defined with a single or small number of features and completed concept can be understood by looking for a network of overlapping similarities. The completed features of the concept resemble the type of similarity in a family. Nyström (2005) defined partnering by a partnering flower to be base for the whole family of all partnering variants. According to Nyström (2005), partnering approach first and foremost covers the two centre components of partnering flower, trust and mutual understanding as seen Figure 2.1. Moreover, Nyström (2005) claims that some of the petals should be contained without mentioning a specific petal. The illustration of the variants of partnering flower to indicate the different definitions that could be derived from the partnering term is given in Figure 2.2.

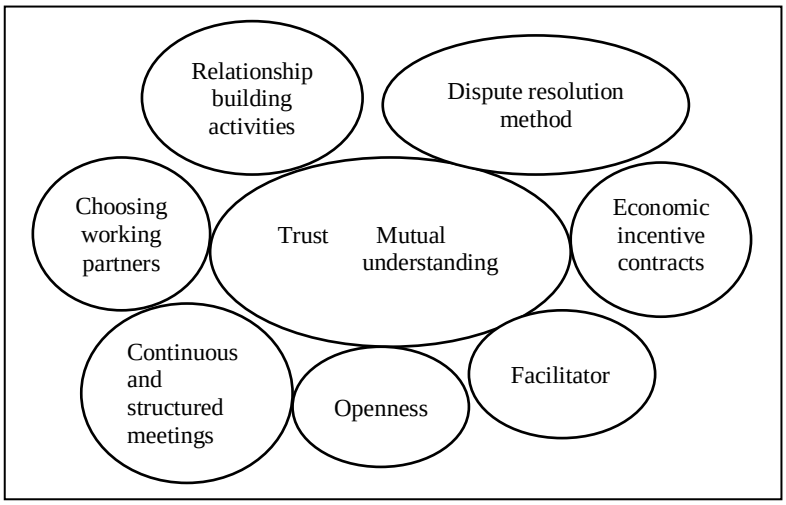

Figure 2.1. The partnering flower
(Source: Nyström, 2005)

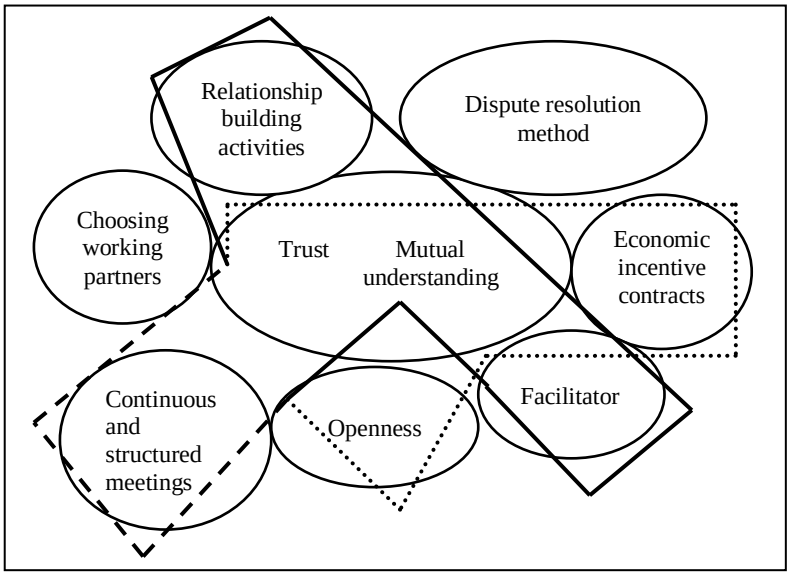

Figure 2.2. The variant of partnering flower
(Source: Nyström, 2005)

Most of the studies in literature state that partnering is a form of teamwork and refers to collaborative approaches where all its members although may have various perspectives agree to give their bests to complete the project successfully for the users' benefits (Weingardt, 1996; Bresnen & Marshall, 2000; Oakland & Marosszeky, 2006; Anvuur & Kumaraswamy, 2007; Fong & Lung, 2007). According to McGeorge and Palmer (2002), partnering could be in a single project based relationship or can broaden

to a long-term cooperation. By the same way, Koraltan and Dikbaş (2002) mention that there are different forms of partnering in literature such as formal or informal, project based or strategic. For instance, some organizations adopt partnering informally through collaborative approaches in a short-term and if it succeeds they develop it into more structured project partnering in a long-term (Koraltan & Dikbaş, 2002).

In the light of the above reviewed definitions of partnering, the term partnering in this thesis refers to collaborative approaches among social actors of the building project organizations.

2.2. Defining the Objective, Key Concepts and Benefits of Partnering

The partnering concept was first originated in Japan, USA and Australia (Naoum, 2003). Partnering origins can be found in Japanese management strategy Kaizen that emerged after the end of World War II (Naoum, 2003; Imai, 1986). Like Kaizen, partnering focuses on the importance of process where all parties have commitment rather than a top down approach (Imai, 1986). In the late 1980's the use of partnering has spread in construction industry (Lazar, 1997; Kwan & Ofori, 2001; Li, Cheng, & Love, 2000; McGeorge & Palmer, 2002; Tang et al., 2006). In his report Constructing the Team, Latham (1994) mentioned that partnering can be a way of improvement for construction industry. It is also indicated in the Latham report (1994) that public sector in the construction industry in UK should incorporate the concept of partnering already used in USA, Australia and Japan for vital competitive advantages. The construction management literature emphasizes that construction is a competitive business (Abudayyeh, 1994; Chan et al., 2004; Anvuur & Kumaraswamy, 2007). Regarding this competitive nature of construction industry, Black et al. (2000) defines the main reason for the introduction of the concept of partnering to the construction industry to be willing to survive in this competitive market with the support of suppliers. According to Black et al. (2000), working with suppliers could only improve the organizations' attempts for meeting the clients' programme, quality, flexibility and cost requirements. According to Fong and Lung (2007), partnering has been introduced to resolve the problems and conflicts in the construction industry. For resolving problems in the construction industry, individuals are increasingly concerned with enhancing the quality of relations among project participants in the design and

construction processes. Adverse relationships in construction such as lack of communication and cooperation among parties results in negative impacts. Partnering aims to reverse the negative impacts of adversarial relationships in construction industry (Wilson et al., 1995). In the same way, Abudayyeh (1994) mentions that the main objective of partnering is to encourage all parties to change confrontational relationships to cooperative in order to act as a member of a team. Cheng et al. (2000) states that the aim of partnering in construction industry is stimulating construction parties to cooperate. Nyström (2005) states that the main objective of partnering is to establish a continuous development. Wilson et al. (1995) lists the objectives of partnering as being on time and within budget delivery, increasing quality of the product, reducing rework, increasing communication, customer satisfaction and better working environment. It is obvious by reviewing literature that there are several definitions of partnering based on its objectives. Most partnering definitions emphasize that the achievement of trust and cooperation is the essential goal of partnering (CII, 1987; Larson, 1995; Ronco & Ronco, 1996; McGeorge & Palmer, 2002; Fong & Lung, 2007). McGeorge and Palmer (2002) state that since the goals of partnering are commonly shared, defining the goals of partnering is simpler with respect to defining the nature of partnering.

Reviewing the literature on partnering in construction industry, the objectives of partnering can be summarized as follows: (1) Resolving the problems in construction industry, (2) Changing confrontational relationships to cooperative ones with the achievement of trust, (3) Establishing continuous development, (4) Providing on time and within budget delivery, (5) Increasing the quality of the product and communication, (6) Providing better customer satisfaction (Fong & Lung, 2007; Abudayyeh, 1994; Nyström, 2005; Larson, 1995; Wilson et al., 1995).

Reaching the goals of partnering defines a successful partnering relationship. In order to achieve successful partnering results, there are some key concepts which need to be mentioned. DeVilbiss and Leonard (2000) state that trust, responsiveness for meeting needs and resolution of conflicts are required for successful partnering. Abudayyeh (1994) states that behaviors based on win-win attitude, mutual trust, open communication are required for successful partnering. Mohr and Spekman (1994) mention that coordination, commitment, trust, perceiving mutual benefits, more information sharing, more participation in planning and goal setting, high communication quality and using conflict resolution techniques are significant key concepts in the success of partnering. Harback et al. (1994) lists the key concepts of

partnering to be commitment from top management, equality for all parties in a win-win approach, trust, focusing on mutual goals, continuous evaluation and timely responsiveness. Naoum (2003) lists the key concepts of partnering to be mutually agreed objectives and goals, mutual trust, mechanism for problem resolution and continuous improvement. Based on the conceptual model of partnering that Anvuur and Kumaraswamy developed in 2007, they list the key concepts of partnering to be equality, cooperative interaction, common goals and authority support. According to Kwan and Ofori (2001), trust, mutual respect, cooperation toward the achievement of a common goal, continuous evaluation and commitment of top management are the key concepts of partnering. Liu and Fellows (2001) define the key concepts of partnering to be conflict resolution, trust, common goals or shared vision, mutual benefits or equity, commitment and respect. Similarly, Miles (1995) indicates that commitment, equity, effective communication, trust, timely responsiveness, continuous improvement and conflict resolution system are essential for the success of partnering. Larson (1995) mentions the key concepts of partnering to be teamwork, collaboration, trust, openness and mutual respect. Nyström (2005) states that mutual objectives, mutual trust, problem resolution strategy and commitment are mostly repeated key concepts of partnering. According to Chen and Chen (2007), key concepts of partnering are trust, commitment, communication, respect, equity and collaborative team culture. Chan et al. (2004) indicates the key concepts of partnering to be adequate resources, support from top management, mutual trust, long term commitment, effective communication, effective coordination and productive conflict resolution. Table 2.1 presents the most commonly repeated key concepts of partnering derived from the review of articles in literature about construction partnering dating from 1994 to 2009 (Abudayyeh, 1994; Mohr & Spekman, 1994; Larson, 1995; Miles, 1995; DeVilbiss & Leonard, 2000; Kwan & Ofori, 2001; Liu & Fellows, 2001; Naoum, 2003; Chan et al., 2004; Nyström, 2005; Anvuur & Kumaraswamy, 2007; Chen & Chen, 2007).

Table 2.1. The key concepts of partnering derived from literature review

No	Key Concepts of Partnering	Abudayyeh (1994)	Mohr & Spekman (1994)	Larson (1995)	Miles (1995)	DeVilbiss & Leonard (2000)	Kwan & Ofori (2001)	Liu & Fellows (2001)	Naoum (2003)	Chan et al. (2004)	Nyström (2005)	Anvuur & Kumaraswamy (2007)	Chen & Chen (2007)	Total No
(1)	Mutual trust	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	11
(2)	Conflict resolution strategy		✓		✓	✓		✓	✓	✓	✓			7
(3)	Long-term commitment		✓		✓			✓		✓	✓		✓	6
(4)	Effective communication	✓	✓		✓					✓			✓	5
(5)	Mutual goals						✓	✓	✓		✓	✓		5
(6)	Equality / perceiving mutual benefits		✓		✓			✓				✓	✓	5
(7)	Mutual respect			✓			✓	✓					✓	4
(8)	Support from top management						✓			✓		✓		3
(9)	Continuous improvement				✓		✓		✓					3
(10)	Effective coordination		✓							✓				2
(11)	Sharing adequate information and resources		✓							✓				2
(12)	Timely responsiveness for meeting needs				✓	✓								2
(13)	Cooperation						✓					✓		2
(14)	Collaborative team culture			✓									✓	2
(15)	Behaviors on win-win attitude	✓												1
(16)	Openness			✓										1

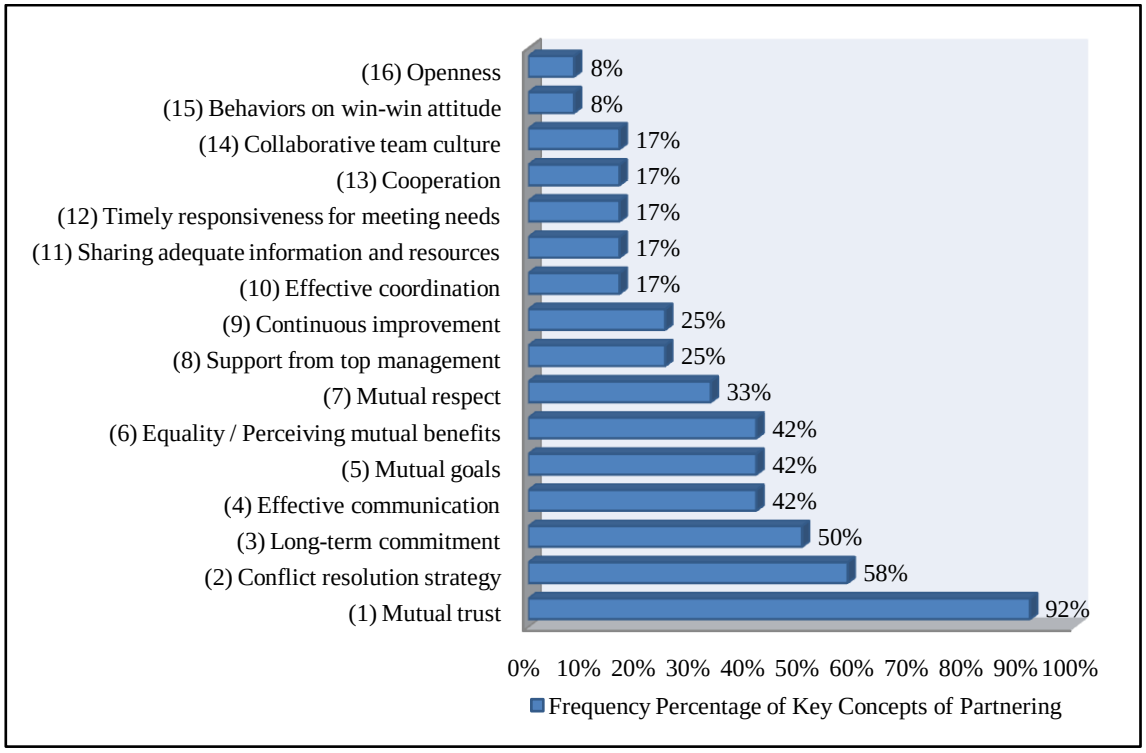

Figure 2.3. The frequency percentages of key concepts of partnering

Figure 2.3 gives the frequency percentages of key concepts of partnering based on Table 2.1. By summarizing the most commonly repeated key concepts of partnering emphasized by researchers in the construction industry, primarily three key concepts come forward;

- Mutual trust
- Conflict resolution strategy
- Long-term commitment

As seen from Figure 2.3, the below mentioned key concepts of partnering come forward as well;

- Effective communication
- Mutual goals
- Equality or perceiving mutual benefits

By utilizing these six key concepts and reaching successful partnering some benefits can be achieved. According to CII (1987), improved efficiency, cost effectiveness, increased opportunity for innovation, continuous improvement of quality products and services are the expected benefits of successful partnering. Harback et al.

(1994) states that changing adversarial relationships to cooperative teamwork, moving from win-lose strategy to win-win, changing a stressful project to a satisfying one are some of the benefits of successful partnering. According to Cheng et al. (2000), the benefits of successful partnering are cost effectiveness, and improvement of project performance. According to Naoum (2003), development of long term relationships based on mutual trust is also one important benefit of partnering. Tang et al. (2006) groups the benefits of successful partnering as, improved ability to respond to changing project environment, improved quality and safety, reduced cost and project time, improved profit and value, effective utilization of resources. Similarly, Anvuur and Kumaraswamy (2007) list the benefits of successful partnering to be productivity and improved performance in cost and quality. Slater (1998) lists the benefits of partnering gained by parties to be heightened productivity, improved decision or reaction time, enhanced quality of construction, reduced overall project cost, quicker resolution of situations aiding project schedules and claims for extension of time. Figure 2.4 presents the illustration by Thompson and Sanders (1998) on the benefits of partnering expected from the four levels of partnering relationship. These stages are competition, cooperation, collaboration and coalescence. Thompson and Sanders (1998) illustrated that the benefits of partnering are increased as the relationship developed and unified from competition to coalescence.

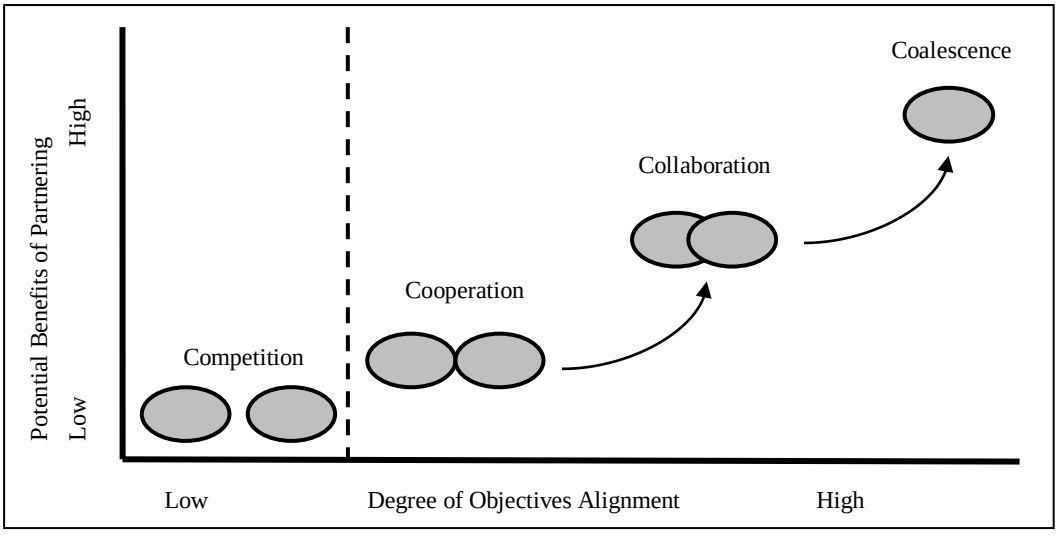

Figure 2.4. Comparison of expected benefits of partnering from the four levels of partnering relationship (Source: Thompson & Sanders, 1998)

On the contrary to researchers that lists the benefits of partnering, Bresnen (2007) states that partnering involves management of number of contradictions that makes it much more challenging. Bresnen (2007) demonstrates that the seven pillars of partnering are strategy, equity, integration, benchmarks, project processes and feedback. The corresponding problems of these pillars rhetorically named as sins and as to be sloth, lust, avarice, gluttony, envy, wrath and pride. Table 2.2 presents the seven pillars, corresponding problems and sins of partnering. In order to clarify the table it can be said that the problems in reconciling individuals together that connected with the strategy pillar is corresponding with the sin sloth.

Table 2.2. The seven pillars of partnering and their corresponding problems and sins (Source: Bresnen, 2007)

Pillars	Problems	Sins
Strategy	Problems in reconciling individuals together	Sloth
Membership	Problems in commitment of members	Lust
Equity	Unequal powers between parties	Avarice
Integration	Problems in Substation of competition and conflict with integration	Gluttony
Benchmarks	Setting of inappropriate targets as best practice	Envy
Processes	Becoming system standardization as a primary goal rather than project process as a whole.	Wroth
Feedback	Failing to capture knowledge and learning because of the problems in feedback	Pride

Besides challenges of partnering that Bresnen (2007) mentioned, many of the research studies in literature agree on benefits of successful partnering. Reviewing partnering literature in construction industry, the principal benefits of successful partnering can be briefly summarized as follows:

- Improved project performance in productivity and quality (CII, 1987; Slater, 1998; Cheng et al. 2000; McGeorge & Palmer, 2002; Tang et al., 2006; Anvuur & Kumaraswamy, 2007).
- Reduced project cost and time extensions (Slater, 1998; Cheng et al., 2000; Tang et al., 2006; Anvuur & Kumaraswamy, 2007).
- Change of confrontational relationships to cooperative ones (Harback et al., 1994; Tang et al., 2006; Anvuur & Kumaraswamy, 2007).

- Long-term commitment for the continuous improvement of quality products (CII, 1987; Black et al., 2000; Cheng et al., 2000).
- Reduced plan deficiencies and increased opportunity for innovation (CII, 1987; Slater, 1998).

2.3. The Inter-Relationship among Partnering and Other Management Approaches

Reviewing the literature it can be concluded that, researchers have an agreement on construction industry has many problems in issues of performance, quality, time, cost and meeting customer needs. These problems are raised from construction industry's complicated, fragmented and competitive nature (Wilson et al., 1995; Evboumwan & Anumba, 1998; Kanji & Wong, 1998; Black et al., 2000; Bayramoğlu, 2001; Fong & Lung, 2007). Organizations in the construction industry have searched for better management approaches because of the increased competition and dwindling resources in the industry and in order to sustain higher standards for competitive success (Li et al., 2000). These management approaches are total quality management (TQM), benchmarking, partnering, re-engineering, etc. According to McGeorge and Palmer (2002), the adaptation of new approaches are going to be impulsive for making a cultural shift from confrontational to cooperative in construction industry. McGeorge and Palmer (2002) state that the new management approaches in construction industry are like "Russian dolls" which have smaller and smaller versions of the same doll in each of them (p.269). McGeorge and Palmer (2002) make this analogy regarding that the new management approaches do not have a direct hierarchical order however the interrelationships between approaches are more complex. McGeorge and Palmer (2002) derived the conceptual model of Barlow (1995) which presents the interrelationships among current management approaches. Figure 2.5 obtained from McGeorge and Palmer (2002) and it illustrates the management approaches as islands appearing above the sea. In the illustration, while some management approaches are placed in close proximity, some management approaches are detached. For example, while TQM, benchmarking, supply chain management (SCM) and partnering have close proximity in the same land mass, reengineering is detached on another island. Since, below the surface some management islands have connectivity (McGeorge & Palmer, 2002).

However, the management approaches in the same land mass do not have a strict hierarchy, they have a relationship (McGeorge & Palmer, 2002). According to McGeorge and Palmer (2002), below the surface the following emergences of new management islands are yet unknown. Thus, some of the islands in the illustration are depicted as uncharted.

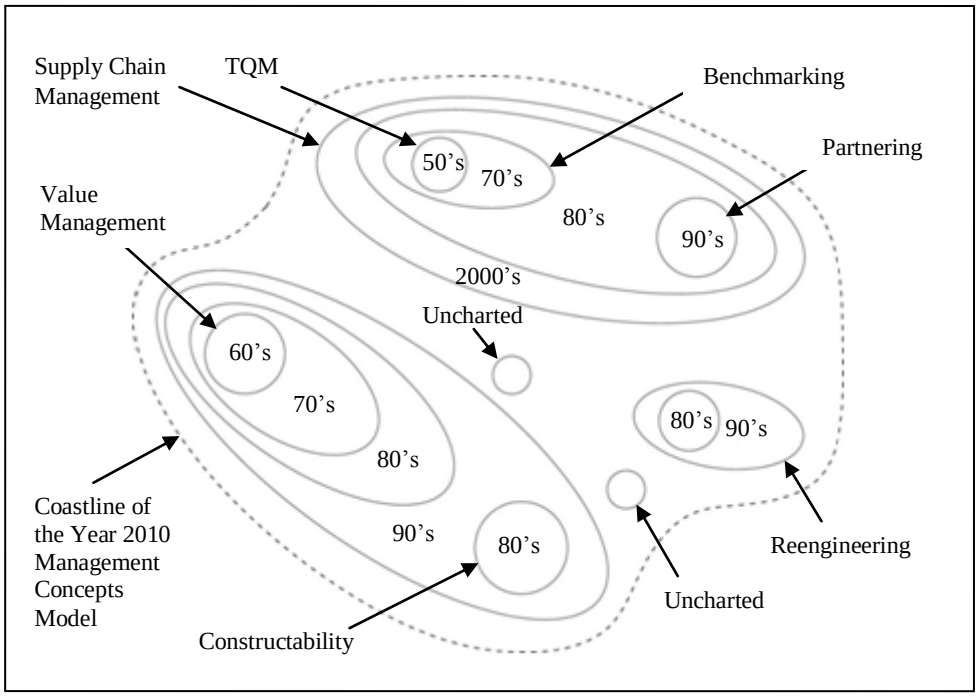

Figure 2.5. Management islands
(Source: McGeorge & Palmer, 2002)

According to Kanji and Wong (1998), various parties in the supply chain of construction industry working together for quality performance. Partnering, SCM and TQM are concepts that can be applied as initiatives for solving problems and meeting customer needs in the construction industry (Kanji &Wong, 1998). Kanji and Wong (1998) illustrates relationships between TQM, SCM and partnering. According to this illustration which is presented by Figure 2.6, partnering which is depicted under SCM is a synergy that involves collaboration among different parties in construction. SCM sees different parties in construction industry as a supply chain which has different roles for ensuring quality in the construction product. TQM extends beyond every party in the supply chain to create a quality culture in the construction industry.

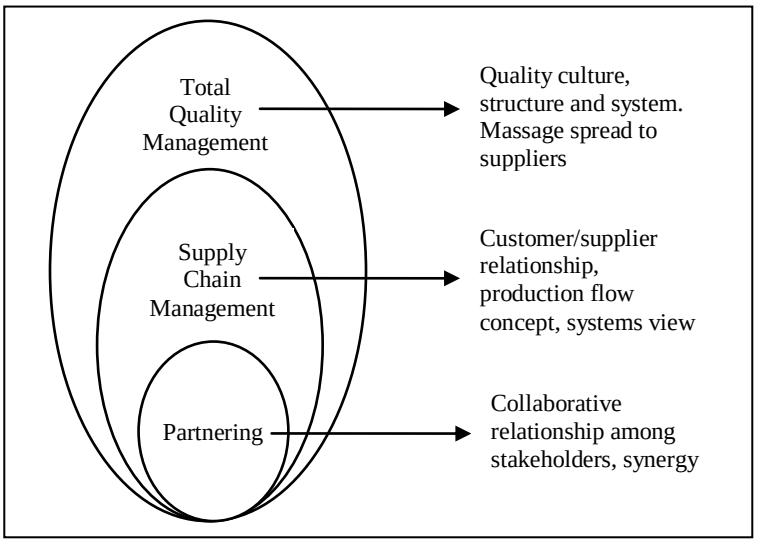

Figure 2.6. Relationships among partnering, SCM and TQM
(Source: Kanji & Wong, 1998)

The interrelationships among partnering and other management approaches which share the same land mass in the illustration of McGeorge and Palmer (2002) are given hereinafter. The brief introductions of the TQM, benchmarking and SCM which emerged 1950s, 1970s and 2000s are given respectively.

2.3.1. Partnering and Total Quality Management

TQM in construction industry has emerged in the 1950s and partnering has emerged in construction industry in the late 1980s (McGeorge & Palmer, 2002). Researchers in construction industry generally agree that TQM and partnering are nested, interactive and share similar elements (Hanley & Valence, 1993; Harback et al., 1994; Hellard, 1995; Ronco & Ronco, 1996; Chini & Valdez, 2003). In order to explain interactions between partnering and TQM, firstly it is important to define TQM. TQM is an approach to quality that all people in an organization are involved in to focus on customer (McGeorge & Palmer, 2002). Within the scope of report for British Quality Foundation (BQF), Hendricks and Shingal (2000) defined TQM as a management paradigm based on customer satisfaction, employee involvement, continuous improvement and long-term partnerships with suppliers and customers. TQM aims to improve customer satisfaction (Ronco & Ronco, 1996; McGeorge & Palmer, 2002).

According to Harback et al. (1994), partnering encloses the principles of TQM and aims to provide a shared culture with a win-win approach. Hellard (1995) states that the philosophy and techniques of TQM are progressed in partnering to provide customer satisfaction. Similarly, Kanji and Wong (1998) mention that partnering is one of the pillars of TQM. Partnering applies TQM to the construction industry by establishing teamwork among various parties (Kanji & Wong, 1998). The interaction of partnering and TQM is well defined in the partnering explanations given by Chini and Valdez (2003) and Hellard (1995). Chini and Valdez (2003) state that partnering is another way of implementing quality management by attempting to improve the communication flow in the project. Hellard (1995) states that partnering is the essential philosophical framework for application of the principles and practices of TQM to the construction projects. According to Arditi and Günaydın (1997), partnering approaches between parties in the construction sector will enhance total quality. The essential ingredients of TQM such as continuous improvement and teamwork are also essential for partnering (Harback et al., 1994).

Therefore it can be concluded that both partnering and TQM offer a change and a cultural shift in organizations from fragmented to integrated (McGeorge & Palmer, 2002). They both aim to improve customer satisfaction (Ronco & Ronco, 1996; McGeorge & Palmer, 2002). They both focus on continuous improvement approach (Harback et al., 1994; Ronco & Ronco, 1996; McGeorge & Palmer, 2002; Jackson, 2004).

2.3.2. Partnering and Benchmarking

American Productivity and Quality Center (APQC) (2008) define benchmarking as "the process of identifying, learning, and adapting outstanding practices and processes from any organization, anywhere in the world, to help an organization improve its performance" (para. 3). Benchmarking is a process of continuous improvement based on the comparison of an organization's processes with others' by establishing achievable goals and act as catalyst to change (McGeorge & Palmer, 2002; Levy, 2006). Benchmarking is a formal and structured management technique that is embedded in TQM (Fisher, Miertschin, & Pollock, 1995; Hamilton & Gibson, 1995; McGeorge & Palmer, 2002). Benchmarking provide an investigation that an

organization seeks how other organizations carry out their processes in order to find performance gaps (McGeorge & Palmer, 2002). According to Akintoye and Chinyio (2003), benchmarking concerns in measuring the organization's performance by making comparison with others in key business activities. Bower and Joyce (2003) state that the existence of making comparison provides benchmarking differ from other management approaches. The aim of benchmarking is to achieve a superior performance and organizational improvement by establishing achievable goals (McGeorge & Palmer, 2002; Bower & Joyce, 2003) Reduce rework and duplication, increase competitive advantage, productivity and profitability, increase the awareness of what and how well it is done, identify what and why to change are the benefits achieved through effective benchmarking (Hamilton & Gibson, 1995; Yasin & Zimmerer, 1995; Akintoye & Chinyio, 2003; Bower & Joyce, 2003).

Benchmarking in construction industry has emerged relatively earlier than partnering in 1970s (McGeorge & Palmer, 2002). It can be concluded from reviewing the literature that benchmarking and partnering share some communities. For example, both benchmarking and partnering encourage information exchange and focus on meeting customer objectives (Li, Cheng, Love & Irani, 2001; McGeorge & Palmer, 2002). In order to improve performance both partnering and benchmarking act as a catalyst for change (Cheng et al., 2000; McGeorge & Palmer, 2002; Anvuur & Kumaraswamy, 2007). Likewise TQM and partnering, continuous improvement is also important for benchmarking (Fisher et al., 1995). Top management support is both crucial for the success of benchmarking and partnering processes (Yasin & Zimmerer, 1995).

In order to solve existing cooperation and adversarial problems in construction industry, partnering and benchmarking approaches can be used cooperatively (Li et al., 2001). According to Li et al. (2001), benchmarking approach can be used in partnering arrangements in construction in order to improve performance of parties. Li et al. (2001) states that if benchmarking used effectively in a partnering process it can bring positive outcomes such as creativity, continuous improvement, shared vision, problem solving ability, equity, cost effectiveness and customer satisfaction.

2.3.3. Partnering and Supply Chain Management

SCM was first originated in manufacturing sector likewise partnering (Vrijhoef, & Koskela, 2000; Tan, 2001; McGeorge & Palmer, 2002; Saad, Jones & James, 2002). Then, it was emerged in the construction sector in late 1990s and it is relatively new concept rather than partnering and benchmarking (McGeorge & Palmer, 2002). Supply chain is the network of organizations through upstream and downstream linkages in the different processes (Kanji & Wong, 1998). According to Kanji and Wong (1998), the supply chain in the construction industry comprises owner, architects and engineers (consultants), main contractor, subcontractors and suppliers. SCM is the way of managing supply chains (Kanji & Wong, 1998). Saad et al. (2002) define SCM as a long, complex and dynamic process which focuses on to increase internal efficiency of organizations, reducing waste and adding value across whole supply chain. SCM is the systematic and strategic coordination of business activities within the supply chain for improving long-term performance of the individual companies and supply chain as a whole (Mentzer et al., 2001). Mentzer et al. (2001) state that SCM is made up of series of partnering among firms working together and successful SCM requires building long term relationships among partners. The aim of SCM is to bridge the gap between production and distribution channels for meeting customer needs (Flynn & Flynn, 2005). SCM aims to build trust and cooperation and improve coordination among parties in supply chain (Kanji & Wong, 1998). McGeorge and Palmer (2002) defines the benefits of successful SCM as to be more effective information flow, lower costs, more profits and construction innovation.

Mentzer et al. (2001) state that SCM extends the concept of partnering into a multiform effort to manage the total flow of goods from supplier to the ultimate customer. According to Kanji and Wong (1998), SCM gives clarity to the meaning of partnering by seeing different parties in the partnering concept as a supply chain. On the other hand, Saad et al. (2002) state that SCM is a developed form of partnering which focuses greater on performance improvement in time, quality and cost. Partnering focuses on developing collaboration in upstream relationships among clients, consultants and contractors. However, SCM focuses on collaboration in both upstream and downstream relationships. Saad et al. (2002) state that in order to reach success in construction partnering, it should be extended through to downstream relationships as

well. Moreover, Saad et al. (2002) state that if difficulties still exists in implementing partnering in construction industry, these can be due to the difficulties in its preparedness to adopt SCM. By the same token, Mentzer, Min and Zacharia (2000) mention that partnering is important in developing successful supply chain relationships.

Researchers in literature generally agree that SCM incorporates some of the key features from both partnering and TQM (Kanji & Wong, 1998; Mentzer et al., 2001; Saad et al., 2002; Vrijhoef, & Koskela, 2000; Flynn & Flynn, 2005). Each of these concepts incorporates continuous improvement, reducing costs, establishing teamwork and enhancing quality (Kanji & Wong, 1998; Saad et al., 2002). Mentzer et al. (2001) state that SCM and partnering commonly focuses on customer satisfaction. Mentzer et al. (2001) mention that various key concepts which are similarly crucial for partnering such as cooperation, equality, mutual goals and top management support are crucial for SCM as well. Therefore, it can be concluded from reviewing the literature that both SCM and partnering focus on customer satisfaction and also aim continuous improvement and to resolve problems in the construction industry (Kanji & Wong, 1998; Mentzer et al., 2001; Saad et al., 2002).

2.4. Partnering in the Architectural Design Process and an Integrated Approach for the Construction Process

In the construction industry the general tendency is working independently in both of the architectural design and the construction phases (Evboumwan & Anumba, 1998; Kanji & Wong, 1998; Bilgin & Utkutuğ, 1999; Bayramoğlu, 2001; Saram & Ahmed, 2001). There is a clear differentiation between the architectural design and the construction phases of a building project and between the different organizations that involved in both of these phases (Ronco & Ronco, 1996; Bayramoğlu, 2001). Based on this differentiation, the decisions taken independently caused a fragmentation structure in construction industry and this resulted in ineffective results. Since both design and construction phases are highly fragmented, the negative results that occurred in construction industry assumed to be increase in design time, cost, rework and lack of communication for effective coordination (Ronco & Ronco, 1996; Bayramoğlu, 2001). Evbuomwan and Anumba (1998) state that in traditional construction industry the

prevailing tendency is “over the wall” syndrome which common to manufacturing sector (p. 588). Various disciplines which have the prevailing over the wall tendency in the construction sector participate in building construction processes by taking the processes over the walls that are arranged consecutively. They construct the building by metaphorically taking their responsibilities over the walls and participate respectively in the process. Figure 2.7 depicts the illustration of over the wall syndrome in construction industry.

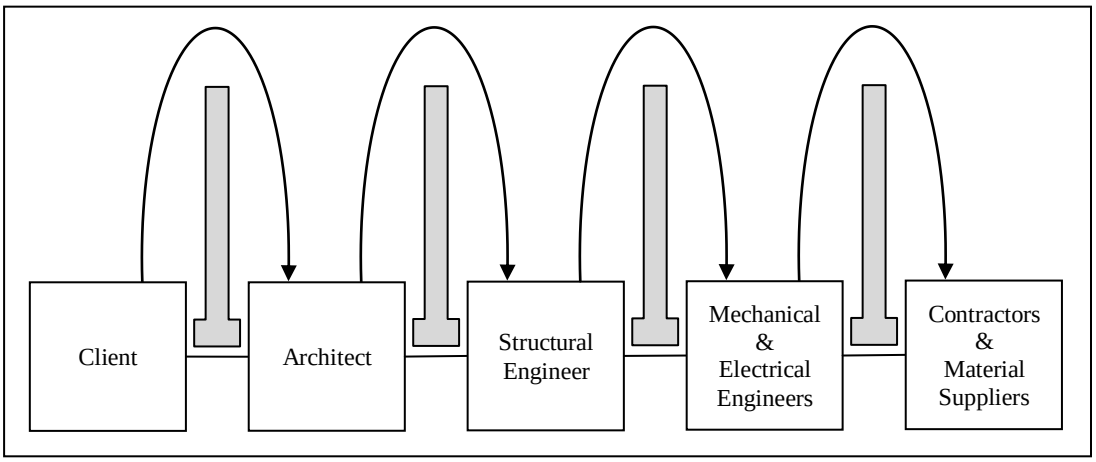

Figure 2.7. Over the wall syndrome in design and construction phases
(Modified from the Source: Evbuomwan & Anumba, 1998)

According to over the wall syndrome, a construction project has four phases. First, based on the architectural program of the clients’ requirements, the architect produces the architectural design. Then, the architectural design is given to the structural engineer for the production of structural design. After that, the project is passed on to the mechanical and electrical engineers. Finally, the process ends with the involvement of contractor for construction. This prevailing tendency in construction industry is regarded as syndrome because it caused many problems based on its fragmented structure. Working independently of one another in the fragmented phases in construction results costly engineering changes and design iterations, time and cost increase, lack of communication between each of disciplines involved in the process, lack of life cycle issues of the project, lack of coordination and integration among different participants of the project (Evbuomwan & Anumba, 1998).

Besides fragmented structure of construction industry, the projects in construction industry are fragmented in different phases such as the creation of the architectural design, engineered the architectural design project, tendering and selecting contractors, the coordination of the subcontractors and suppliers, providing the materials, etc. (Ronco & Ronco, 1996; Love, Gunasekeran & Li, 1998; Cheng et al., 2000; Bayramoğlu, 2001; Cheng & Li, 2001; Chen & Chen 2007). The beginning stage of every building project is architectural design phase. Based on the complex character of design phase different disciplines must be involved to the architectural design process. The lack of efficient coordination among these different disciplines in the architectural design process affects the construction process and the final product to face with problems related to schedule, quality, manpower, materials used and cost (Bayramoğlu, 2001). Partnering provides more integrative, coordinated approach by bringing engineers and architects together in the beginning of the architectural design phase and eliminates the problems caused by fragmentation (Weingardt, 1996). Utkutuğ (1999) states that two major problem to be attributed for the need to change traditional fragmented architectural design phase. First one is the whole system of a building is integrated and interacted as opposed to the independent and fragmented application of the architectural design process. In a building, structure, form and services are the systems of the architectural design process. The decisions that affect one system, directly affect the other systems (Utkutuğ, 1999). Thus, it is important to establish partnering approach from the beginning of the architectural design process for achieving more integration among the structure, form and service systems of a building. This highly integrated interaction will bring more successful results (Evbuomwan & Anumba, 1998; Utkutuğ, 1999). Utkutuğ (1999) states second major problem is the intricate process of the architectural design that comprises so complex problems. In order to solve these complex problems and to meet design needs in the architectural design process, engineers and architects should work together from the beginning of the design process (Weingardt, 1996; Utkutuğ, 1999; Holdaway, 2005). According to Weingardt (1996), besides satisfying the aesthetic statement of architectural design, today's buildings have more complex design needs such as energy efficiency and cost efficiency. As the two major professions in the architectural design process, the architects and the engineers should work together in a harmony for being more beneficial for the complex design needs. Otter and Emmitt (2008) state that architectural design is a collaborative act which is based on effective interaction between project

actors. In the same way, Holdaway (2005) states that architects and engineers are obvious partners who must work together for the functional requirements of the architectural design project. Besides meeting the complex requirements of architectural design process, architects, engineers and clients acquire more benefits through successful partnering in architectural design process. Architects and engineers could improve communications, share ideas better, and grow stronger together technically, professionally and personally (Weingardt, 1996). As well, clients as being the participant of the architectural design process get the benefits of unbiased design. According to Weingardt (1996), partnering in architectural design process enhance the respect between architects and engineers, enhance the leadership of architects and engineers within the construction process and encourage the understanding of each discipline's professional practice.

According to Bayramoğlu (2001), not only bringing architects and engineers, but also bringing clients, architects, engineers and contractors together in the beginning of the architectural design provides a partnering process that differs from the traditional process in terms of project integration. Moreover, Bayramoğlu (2001) states that introducing a process where all parties involved in the beginning of the architectural design improves coordination and communication, provides more integrative approach which is more creative and can reduce the problems caused by fragmented nature of construction process. Establishing a partnering approach in the beginning of the architectural design process is important to construct time, quality, energy and cost efficient buildings (Evbuomwan & Anumba, 1998; Utkutuğ, 1999). In this context, Evbuomwan and Anumba (1998) offers a typical project team with the aim of integrating functional disciplines at the beginning of the architectural design process including architects, structural, mechanical, electrical engineers, main contractors and material suppliers in contrast to the prevailing tendency over the wall syndrome in the construction industry. Figure 2.8 presents the illustration of this typical project team that can establish a partnering approach in the beginning of the architectural design and differs from the traditional building process in terms of integration in the beginning of the architectural design.

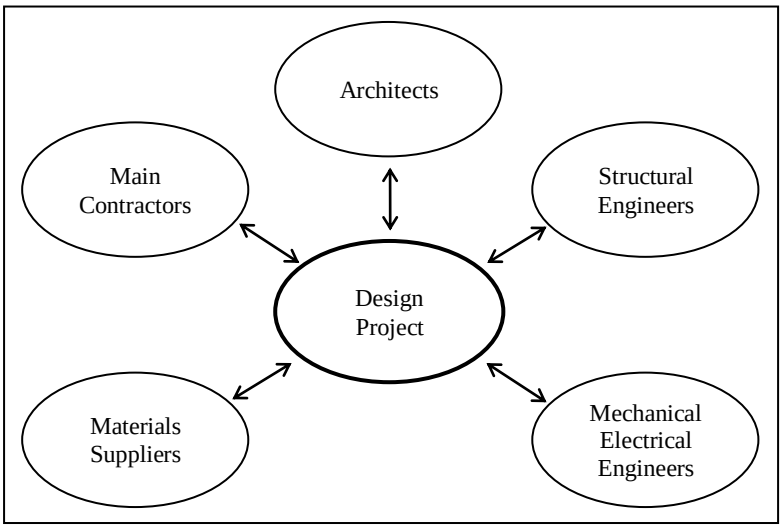

Figure 2.8. A typical project team
(Modified from the Source: Evbuomwan & Anumba, 1998)

Therefore, in order to achieve high quality, reduced rework and duplication, improved performance, lower costs and better satisfied customer, it is important to change over the wall syndrome with an integrated approach for architectural design and construction phases where all parties involved in the beginning of the architectural design process (Evbuomwan & Anumba, 1998; Bayramoğlu, 2001).

2.5. Review of Previous Studies on Partnering in the Construction Industry

There has been a significant increase in interest for partnering in the construction industry with the emergence of partnering concept in the late 1980's (Larson, 1995; Black et al., 2000; Li et al., 2000; McGeorge & Palmer, 2002; Chan et al., 2004; Tang et al., 2006; Manley et al., 2007). Reviewing partnering literature in construction industry it is found that research studies generally focus on partnering to be between construction companies (Black et al., 2000; Chan et al., 2004; Tang et al., 2006). In the literature of construction industry, there are various theoretical and empirical research studies defining partnering essentials, principals, key concepts, benefits, and applicability in the construction sector (Abudayyeh, 1994; Crowley & Karim, 1995; Larson, 1995; Lazar, 2000; Li et al., 2000; Black et al., 2000; Bresnen & Marshall, 2000; Cheng et al., 2000; Drexler & Larson, 2000; Kumaraswamy &

Matthews, 2000; Li et al., 2000; Kwan & Ofori, 2001; Bresnen & Marshall, 2002; Chan, Chan, & Ho, 2003; Naoum, 2003; Packham, Thomas, & Miller, 2003; Bayliss, Cheung, Suen & Wong, 2004; Chan et al., 2004; Hauck, Walker, Hampson, & Peters, 2004; Nyström, 2005; Wong, Cheung, & Ho, 2005; Phua, 2006; Anvuur & Kumaraswamy, 2007; Bresnen, 2007; Manley et al., 2007; Kaluarachchi & Jones, 2007; Yeung, Chan, Chan, & Li, 2007). According to Li et al. (2000), theoretical studies on partnering are mainly about the conception of partnering and operation of types of partnering (Bresnen & Marshall, 2000; Lazar, 2000; Naoum, 2003; Nyström, 2005; Anvuur & Kumaraswamy, 2007; Bresnen, 2007). Table 2.3 gives a brief summary of reviews on the theoretical research studies on partnering in construction industry dating from 2000 to 2009.

Empirical studies on partnering comprise most of the partnering literature. They are limited to certain themes such as project partnering, a particular application of partnering, international usage of partnering, examining dual partnering relationships (Larson, 1997; Li et al., 2000). Review on construction partnering literature shows that many of the research studies on partnering are qualitative research studies based on interviews, case studies, construction projects etc. (Cheng et al., 2000; Kumaraswamy & Matthews, 2000; Li et al., 2000; Bresnen & Marshall, 2002; Packham et al., 2003; Bayliss et al., 2004; Hauck et al., 2004; Manley et al., 2007; Kaluarachchi & Jones, 2007). Quantitative research studies on partnering which commonly use statistical data analyses in order to give numerical evidence have recently been increasing worldwide. (Drexler & Larson, 2000; Kwan & Ofori, 2001; Chan et al., 2003; Wong et al., 2005; Phua, 2006; Yeung et al., 2007).

The brief summaries for both theoretical and empirical studies on partnering dating back to 2000 are presented in Table 2.3, Table 2.4 and Table 2.5. First, in Table 2.3 brief summaries for recent theoretical research studies on partnering concept are presented. Then, in Table 2.4 and Table 2.5 brief summaries of review covering empirical studies on partnering in construction industry as qualitative and quantitative research studies are presented respectively. The relevant information on authors, date, published journal, intention and findings about the research studies reviewed are presented in the related tables.

Table 2.3. The theoretical research studies on partnering in the construction industry dating from 2000-2009

No	Authors	Date	Title	Journal	Focus of Research	Concluding Remarks
(1)	Bresnen & Marshall	2000	Partnering in construction: a critical review of issues, problems and dilemmas	Construction Management and Economics	Reviewed partnering literature for some of the main issues such as nature, culture and merits of partnering in construction management.	Researchers concluded that for implementing partnering effectively fully appreciating the effects of complexities of organizational culture was required. In order to do strong commitment from top management was needed.
(2)	Lazar	2000	Project partnering: improving the likelihood of win/win outcomes	Journal of Management in Engineering	Asserted that how trust based partnering relationships could be developed in order to gain potential benefits for achieving successful outcomes in construction industry.	Strategies of behavior, presence of trust between owner and contractor, preexisting trust were found crucial in the development of successful trust based partnering. Researchers concluded that enhancement of economic benefits was the outcome of trust based partnering.
(3)	Naoum	2003	An overview into the concept of partnering	International Journal of Project Management	Focused on the partnering concept in the construction industry and provided an overview of the principles of partnering.	It was concluded in the research that partnering provided beneficial outcomes in cost, time and productivity. It was also concluded that it was too early yet to conclude direct results of partnering because it had been remaining evolutionary phase.
(4)	Nyström	2005	The definition of partnering as a Wittgenstein family resemblance concept	Construction Management and Economics	Developed a new model by adapting Wittgenstein's idea of family resemblance in order to provide a flexible definition to the partnering concept.	Researcher developed a partnering flower model for the complex concept of partnering. It was concluded that partnering included trust and mutual understanding at the centre. Besides the centre, there were overlapping similarities of other components as petals.
(5)	Anvuur & Kumaraswamy	2007	Conceptual model of partnering and alliancing	Journal of Construction Engineering and Management	In order to present a model of partnering and its consequences on cooperation and project performance outcomes, the research developed a conceptual model for partnering by adopting Gaertner et al.'s (1993) common group identity model.	Based on the model, researchers concluded that the four essential factors (equal status, cooperative interaction, common goals, and authority support) were effective on the consequences (trust, cooperation, productivity, improved performance) of partnering.
(6)	Bresnen	2007	Deconstructing partnering in project based organization: seven pillars, seven paradoxes and seven deadly sins	International Journal of Project Management	In order to present the problems and limitations of partnering in practice the research demonstrated the seven pillars of partnering and their corresponding problems that rhetorically named as sins.	The research demonstrated the seven pillars of partnering as follows: strategy, membership, equity, integration, benchmarks, project processes and feedback. It was also concluded that the problems in the seven pillars of partnering were corresponding seven sins as follows: sloth, lust, avarice, gluttony, wrath, pride.

Table 2.4. The qualitative research studies on partnering in the construction industry dating from 2000-2009

No	Authors	Date	Title	Journal	Focus of Research	Findings of Research
(1)	Cheng & Love	2000	Establishment of critical success factors for construction partnering	Journal of Management in Engineering	Developed a partnering framework in order to identify the critical success factors for partnering arrangements by means of the answers of the executives who are familiar with partnering.	The critical success factors identified in the framework as follows: (1) effective communication, (2) conflict resolution, (3) adequate resources, (4) management support, (5) mutual trust, (6) long-term commitment, (7) coordination, (8) creativity. It is also found in this research that, the degree of the success of partnering could be determined by subjective measures.
(2)	Kumaraswamy & Matthews	2000	Improved subcontractor selection employing partnering principles	Journal of Management In Engineering	In order to develop an alternative approach to partnering, this research examined how partnering may be profitably extended into subcontractor selection by conducting questionnaires and interviews.	Researchers concluded that by using partnering, subcontractor pricing levels are reduced %10.
(3)	Li, Cheng & Love	2000	Partnering research in construction	Engineering, Construction and Architectural Management	In order to offer new directions for partnering research in construction, the research summarized current partnering literature by reviewing high quality rating journals (Construction Management and Economics, ASCE Journal of Construction Engineering and Management, Engineering, Construction and Architectural Management and ASCE Journal of Management in Engineering).	Researchers concluded that empirical studies had four major themes; project partnering, examining a dual relationship, international partnering and a special application of partnering. Theoretical studies were classified as the types of partnering, partnering models, partnering processes and partnering structure. Future studies were recommended to identify performance measures and CSFs, development and test of partnering models, formation and selection of partnering strategy.
(4)	Bresnen & Marshall	2002	The engineering or evolution of cooperation? A tale of two partnering projects	International Journal of Project Management	In order to be aware of not only the strengths but also the limitations of partnering, the research attempted to investigate the strengths and weaknesses of partnering in practice by a case study on two different large scale partnering projects.	Research stated that although partnering tries to solve problems more collaboratively, some of the problems such as lack of responsiveness to user needs, lack of user and contractor input into the design, problems of design-construction coordination were still widespread.

(cont. on next page)

Table 2.4. (cont.)

No	Authors	Date	Title	Journal	Focus of Research	Findings of Research
(5)	Packham, Thomas & Miller	2003	Partnering in the house building sector: A subcontractor's view	International Journal of Project Management	Investigated how partnering impacts construction process in small construction enterprises by conducting a case study and interviews.	Research showed that unequal power relationships between main contractors and small construction enterprises act as a potential barrier to successful implementation of partnering. Thus, small construction enterprises failed to benefit from partnering.
(6)	Bayliss, Cheung, Suen & Wong	2004	Effective partnering tools in construction: a case study on MTRC TKE contract 604 in Hong Kong	International Journal of Project Management	In order to identify effective partnering tools this research reported a case study of a partnering venture implemented by MTR Cooperation Ltd. In Hong Kong construction industry.	Findings stated that monthly partnering review meetings and the use of incentives affected partnering success.
(7)	Hauck, Walker, Hampson & Peters	2004	Project alliancing at national museum of Australia-collaborative process	Journal of Construction Engineering and Management	Analyzed the project of National museum of Australia which is the first example of project partnering in commercial buildings. Research focused to determine whether the project partnering in commercial buildings in construction indicated the major collaborative issues in collaborative process or not.	Researchers concluded that project partnering for commercial buildings offered many advantages over traditional project delivery systems.
(8)	Manley, Shaw & Manley	2007	Project partnering: a medium for private and public sector collaboration	Engineering Management Journal	In order to describe how public-private sector collaboration and better utilization of its benefits could be achieved through partnering, this research focused on partnering in large scale construction projects.	Withal essential elements of partnering identified by literature, researchers also added risk management which was integrated early in the partnering process in order to achieve successful public-private sector collaboration.
(9)	Kaluarachchi & Jones	2007	Monitoring of a strategic partnering process: the Amphion experience	Construction Management and Economics	The research monitored 12 housing development projects which were the results of successful long-term partnering in construction industry in order to obtain key performance indicators.	Mutual trust, effective communication, a changed mindset from all parties, the quality of the services and commitment of all stakeholders were found to be the key factors on strategic partnering process.

Table 2.5. The quantitative research studies on partnering in the construction industry dating from 2000-2009

No	Authors	Date	Title	Journal	Focus of Research	Findings of Research
(1)	Drexler & Larson	2000	Partnering: why project owner-contractor relationships change	Journal of Construction Engineering and Management	Examined the adversarial owner-contractor relationships and identified factors that improve partnering relationships between owner and contractor via questionnaire survey.	Findings suggested that establishing the foundation for teamwork at the beginning of the project, learning collaborative problem solving skills, developing a shared vision were the essential principles behind successful partnering between owner and contractor.
(2)	Kwan & Ofori	2001	Chinese culture and successful implementation of partnering in Singapore's construction industry	Construction Management and Economics	Examined how Chinese culture affected the implementation of partnering in Singapore's construction industry by a postal questionnaire survey.	Findings showed that Singapore's construction industry was influenced by Chinese culture. Chinese cultural values supported and influenced the implementation of partnering in Singapore's construction industry.
(3)	Chan, Chan & Ho	2003	Partnering in construction: critical study of problems for implementation	Journal of Management in Engineering	In order to provide useful insights for partnering success, this research investigated the potential barriers and problems to successful implementation of partnering in Hong Kong by a questionnaire survey.	Findings suggested that the major barrier for the success of partnering was facing commercial pressure to comprise on the partnering attitude.
(4)	Wong, Cheung & Ho	2005	Contractor as trust initiator in construction partnering —prisoner's dilemma perspective	Journal of Construction Engineering and Management	Identified the critical trust factors that affected construction partnering in Hong Kong by a questionnaire survey.	Findings showed that the contractor was in a position to initiate trust with the client. Problem solving ability, competence of work, efficiency of the communication between construction partners were critical factors affected trust as well.
(5)	Phua	2006	When is construction partnering likely to happen? An empirical examination of the role of institutional norms	Construction Management and Economics	Investigated the role of institutional norms in the use of partnering in construction industry in Hong Kong by conducting a questionnaire survey.	Findings showed that firms' use of partnering was selective and that this selectiveness was significantly determined by the industry's level of institutional norms and not by the conventional notion that partnering increases a firm's profitability or efficiency.
(6)	Yeung, Chan, Chan & Li	2007	Establishing quantitative indicators for measuring the partnering performance of construction projects in Hong Kong	Construction Management and Economics	Attempted to find out whether there were existed a set of key performance indicators which could be used practically to measure the partnering performance of construction projects in Hong Kong via questionnaire survey.	The findings showed that the top seven weighted key performance indicators to evaluate the success of partnering projects in Hong Kong were as follows: (1) time performance, (2) cost performance, (3) top management commitment, (4) trust and respect, (5) quality performance, (6) effective communications and (7) innovation and improvement.

2.5.1. Review of Previous Studies on Critical Success Factors of Partnering

In order to achieve goals and benefits of partnering defined in the previous section, there are some indicators named critical success factors (CSFs). In this section, the definitions of CSFs of partnering and review of previous studies related to CSFs of partnering are presented. Munro and Wheeler (1980) define CSF as a factor which must be achieved to ensure success for a company or business unit. Rockart (1982) states that CSFs are those few key areas of activities in which favorable results are absolutely necessary for a particular manager to reach his or her goals. Bynton and Zmud (1984) mention that CSFs are a few vital issues for an organization that must be given special attention to bring about high performance. According to Sanvido et al. (1992), CSFs can be defined as factors that are predicting success. Cheng and Li (2002) define CSFs to be referring to the influences that can affect on a successful result. In literature several researchers focus on the issue of CSFs of construction partnering. This section reviews recently published articles on CSFs of construction partnering. Literature review show that in the last 10 years the articles of Black et al. (2000), Cheng et al. (2000), Chan et al. (2004), Tang et al. (2006), Chen and Chen (2007) and Eren (2007) define and discuss CSFs of construction partnering. Brief summaries of these research studies are presented below.

Cheng et al. (2000) reviews partnering literature related to management discipline in order to identify CSFs of partnering for construction parties. Cheng et al. (2000) suggests that success in partnering can be achieved by using appropriate management skills. They also state that developing some favorable characteristics in partnering context can strengthen the partnering relationships. According to Cheng et al. (2000), the degree of the success of partnering can be determined by objective and subjective measures. Therefore, Cheng et al. (2000) develops some subjective and objective measures. The subjective measures that they have suggested are presented in Table 2.6. The CSFs identified and discussed in the framework are adequate resources, management support, mutual trust, long-term commitment, coordination, creativity, effective communication, conflict resolution, perceived satisfaction of partners' expectations and compatible goals. The objective measures that Cheng et al. (2000) suggests are shown in Table 2.7.

Table 2.6. Examples for subjective measures for determining the degree of partnering success (Source: Cheng et al., 2000)

Variable (CSFs)	Example of Measure
Adequate Resources	Investigating extent to which responding organization has received adequate resources from its partners. Questions are; • Our partners have provided us with sufficient information to execute the project. • When we need relevant information for executing our work, our partners are always helpful. • Our partners always keep us informed about events or changes that may affect us. • In this relationship, it is expected that any information that might help the other parties will be provided.
Management Support	Investigating the extent to which top management has supported formation of partnering. Questions are; • Top management has shown their support for formation of partnering by providing us with sufficient resources, including money, time, manpower, and authority. • Top management has agreed that formation of partnering is strategic affair. • Top management has assigned senior executive who represents our organization in dealing with partnering matters.
Mutual Trust	Investigating the extent to which trust is established between partnering organizations. Questions are; • Our partners are highly trustworthy. • We want to establish a relationship of trust with our partners. • We believe that trust established between organizations is critical to the partnering relationship. • We trust that our partners' decisions will be beneficial to our business. • We feel we do not get a fair deal from our partners. (reverse-scored) • Partnering relationship is marked by high degree of harmony.
Long-term Commitment	Investigating extent to which long-term commitment is established in partnering organizations. Questions are; • We believe that our partners are committed to the partnering relationship on long-term basis. • We are highly committed to what we have promised our partners. • We try to stay away from our commitment to partnering. (reverse-scored)
Coordination	Investigating extent to which partnering parties are effectively coordinated. Questions are; • Our partners have established good contact with us to avoid any misunderstanding. • We would contact our partners when things are not clear. • Our activities with other partners are well coordinated. • We feel we never know what we are supposed to be doing or when we are supposed to be doing it under the partnering agreement. (reverse-scored)
Creativity	Investigating extent to which partnering team is creative. Questions are; • Partnering team always things of novel ideas. • Partnering team always likes to use advanced techniques to initiate their creative thinking, such as the use of value engineering and benchmarking.
Effective Communication	Investigating extent to which partnering organizations communicate effectively. Questions are; • We never encounter communication breakdown with our partners. • Partnering team members have possessed effective communication skills. • Partnering workshops are organized to facilitate communication
Conflict Resolution	• Our organization has used conflict resolution techniques, such as joint problem solving or outside arbitration, to solve conflicts. • Our organization can resolve conflicts quickly. • Our organization is always concerned about our ability to resolve conflicts
Perceived satisfaction of partners' expectations	Investigating extent to which our partners' expectations are satisfied. Questions are; • Our partners praise our successful completion of tasks. • We fulfilled our task commitments, conforming to our partners' expectations.
Compatible goals	Investigating the extent to which our organizational goals are compatible with the partnering goals. Questions are; • Our organizational goals have no conflict with partnering goals. • Our organizational goals are in line with partnering goals.

Table 2.7. Objective measures of partnering outcomes
(Source: Cheng et al., 2000)

Criterion	Measure	Measuring unit	Benefit
Cost-effectiveness	Cost variation	Actual cost/budgeted cost	Improve cost savings for client
Quality	Rejection of work Client satisfaction Quality of work	% sample rejections Number of claims by client Number of claims by contractors	Improve client confidence Increase client satisfaction Increase construction durability
Schedule	Schedule variation	Actual duration/ planned duration	Reduce additional expenses
Scope of Work	Change in scope of work	Change orders/ budgeted cost	Reduce additional expenses
Profit	Profit variation	Actual profit/ projected profit	Increase income
Construction process	Safety Rework	Number of accidents 100/Total number of workers Rework MH/total MH	Develop safety practice to manage risks Reduce wasted work
Others	Litigation Tender Efficiency	Expense of litigation Success rates	Reduce cost Generate income

Note. MH = man-hour.

Black et al. (2000) explores CSFs of partnering in construction industry in United Kingdom (UK) by conducting a postal questionnaire survey. 51 construction companies using construction partnering responded to the survey. The respondents were composed of contractors, clients and design teams. Black et al. (2000) lists the CSFs of partnering depending on the findings of the research as follows: (1) mutual trust, (2) effective communication, (3) commitment from senior management, (4) acting consistently with joint objectives, (5) dedicated team, (6) flexibility to change, (7) commitment to continuous improvement. Black et al. (2000) also tests the level of importance of CSFs of partnering. Findings of the research show that the most important CSFs of partnering in UK are as follows: (1) mutual trust, (2) effective communication and (3) commitment from senior management.

Cheng and Li (2001) suggest that partnering establishment is a process which has three stages. In Figure 2.9 researchers suggest that there is a conceptual model of partnering which has three stages that composed of formation, application and reactivation processes and various CSFs that affect the success of partnering. Based on this assumption Cheng and Li (2002) examined the CSFs of partnering by adopting their previously proposed model of construction partnering. In order to examine the CSFs of

partnering, Cheng and Li (2002) identified the potential success factors with respect to each of the three stages from the literature that deals CSFs of construction partnering. Table 2.8 gives the potential success factors for each of the partnering process that Cheng and Li (2002) identified. In order to determine the important CSFs of partnering at each stage, Cheng and Li (2002) tested their model by conducting a questionnaire survey to 79 respondents from construction professionals around the world. The respondents were asked to rate the proposed success factors in each stages based on a five point Likert-scale. Results of their study are shown in Table 2.9. Cheng and Li (2002) accepted a potential success factor as a CSF if it has a mean value greater than 4,00. As seen from the Table 2.9, (1) top management support, (2) open communication, (3) mutual trust and (4) effective coordination are important to all of the partnering stages. Cheng and Li (2002) labeled these factors as common success factors. The other factors which they accepted as critical to individual process stages were labeled as functional success factors. In other words, researchers divided CSFs as common and functional success factors. While common success factors affected the whole partnering process, functional success factors are crucial for a specific partnering stage.

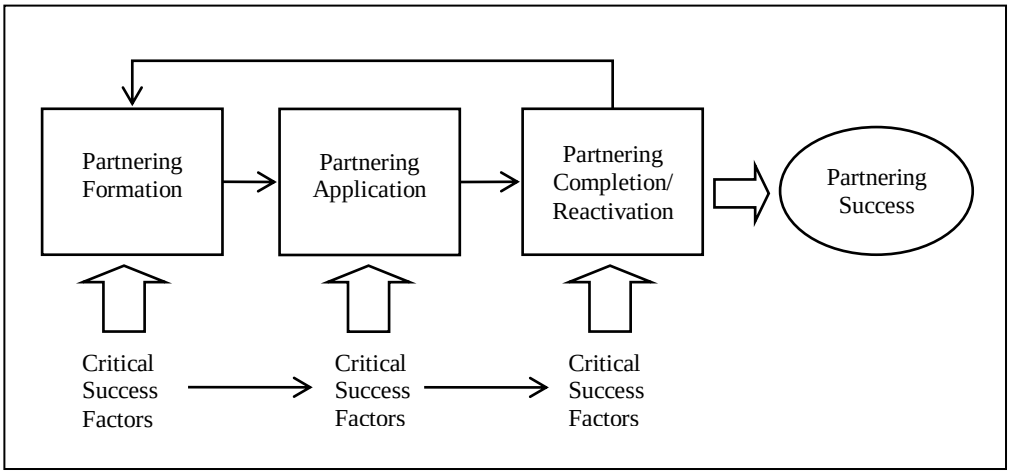

Figure 2.9. Conceptual model of partnering
(Source: Cheng & Li, 2001)

Table 2.8. Potential factors for three partnering process
(Source: Cheng & Li, 2002)

Factors in Partnering Formation	Factors in Partnering Application	Factors in Partnering Completion/ Reactivation
Top Management Support	Top Management Support	Top Management Support
Open Communication	Open Communication	Open Communication
Mutual Trust	Mutual Trust	Mutual Trust
Effective Coordination	Effective Coordination	Effective Coordination
Workshops	Workshops	Workshops
Joint Problem Solving	Joint Problem Solving	Joint Problem Solving
Partnering Agreement	Partnering Goals' Achievement	Learning Climate
Creativity	Creativity	Long-term Commitment
Team Building	Adequate Resources	Adequate Resources
Facilitator	Top Management Support	Partnering Experience
		Continuous Improvement

Table 2.9. Ranks of success factors for three stages of partnering process
(Source: Cheng & Li, 2002)

Factors in Partnering Formation	Mean	Factors in Partnering Application	Mean	Factors in Partnering Completion/ Reactivation	Mean
Top Management Support	4,62	Open Communication	4,41	Mutual Trust	4,59
Open Communication	4,43	Mutual Trust	4,39	Top Management Support	4,47
Mutual Trust	4,41	Effective Coordination	4,37	Long-term Commitment	4,37
Effective Coordination	4,26	Top Management Support	4,29	Continuous Improvement	4,12
Team Building	4,19	Joint Problem Solving	4,14	Learning Climate	4,10
Partnering Agreement	4,17	Partnering Goals' Achievement	4,11	Open Communication	4,05
Facilitator	3,95	Adequate Resources	3,90	Effective Coordination	4,05
Joint Problem Solving	3,80	Creativity	3,15	Partnering Experience	3,99
Creativity	3,16	Workshops	2,81	Joint Problem Solving	3,74
Workshops	2,97			Adequate Resources	3,38
				Workshops	2,81

Chan et al. (2004) identifies the CSFs for partnering projects in construction industry in Hong Kong. A postal questionnaire survey was conducted to explore CSFs of construction partnering. 78 respondents comprised of clients, contractors and designers with partnering experience took the survey. In the data analysis of the research both factor and multiple regression analyses were used. By means of factor analysis, Chan et al. (2004) explored CSFs that come forward on the success formula of partnering. Chan et al. (2004) defined 10 CSFs as the findings of this research as follows: (1) establishment and communication of conflict resolution strategy, (2) commitment to win-win attitude, (3) regular monitoring of partnering process, (4) clear

definition of responsibilities, (5) mutual trust, (6) willingness to eliminate non-value added activities, (7) early implementation of partnering process, (8) willingness to share resources, (9) ability to generate innovative ideas and (10) subcontractors' involvement. In order to get the most important factors of partnering success Chan et al. (2004) further used a stepwise multiple regression in the analysis of the survey. According to Chan et al. (2004), the strongest predictors of partnering success are: (1) establishment and communication of conflict resolution strategy, (2) willingness to share resources, (3) clear definition of responsibilities, (4) commitment to win-win attitude and (5) regular monitoring of partnering process.

Tang et al. (2006) identifies the CSFs of partnering by working on the previous research studies in literature. Tang et al. (2006) developed a conceptual partnering model which presents the relationships of various CSFs of partnering. The model is presented in Figure 2.10. Tang et al. (2006) identified the components numbered from 1 to 10 as CSFs of partnering. These are: (1) mutual goals/objectives, (2) attitude, (3) commitment, (4) equality, (5) trust, (6) openness, (7) team building, (8) effective communication, (9) problem resolution and (10) timely responsiveness. Tang et al. (2006) identified the rest of the components numbered from 11 to 18 as the outcomes of the interactions of CSFs. According to Tang et al. (2006), the outcomes of interactions of CSFs refer to the benefits of partnering. Tang et al. (2006) conducted a questionnaire survey to test and demonstrate the importance of CSFs. 115 respondents in Chinese construction industry responded to the survey. Respondents were asked to score the CSFs by using a five point Likert-scale. According to survey results, (1) mutual goals or objectives, (2) effective communication, (3) team building and (4) commitment had the highest scores respectively by rated above the average level of 3,56. Tang et al. (2006) classified the identified CSFs of partnering into two groups regarding the results of the analyses. The first group is called *attitudinal factors* and included mutual objectives, attitude, commitment, equality and trust. The second group is called *open communication factors* and included openness, team building, effective communication problem resolution, and timely responsiveness. Tang et al. (2006) stated that attitudinal factors reinforce the open communication factors. Tang et al. (2006) found trust as the most important CSF in the attitudinal group.

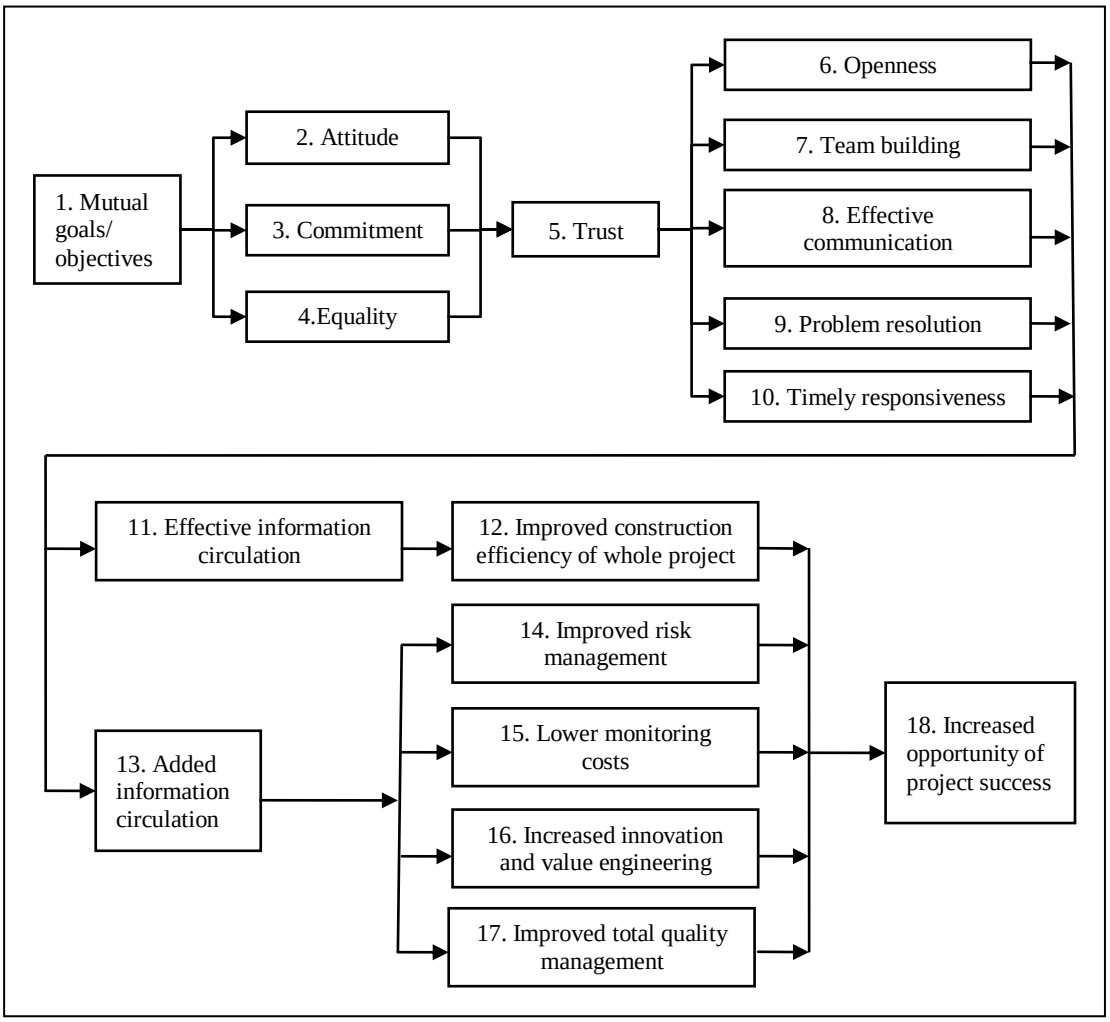

Figure 2.10. Conceptual partnering model
(Source: Tang et al., 2006)

Chen and Chen (2007) conducted a questionnaire survey to construction professionals in Taiwan in order to analyze and rank the nineteen identified CSFs of partnering. The 221 respondents of the questionnaire survey were composed of designers, contractors, government employees and owners with first hand partnering experience in construction industry in Taiwan. The nineteen CSFs were ranked respectively according to their importance level as follows: (1) effective communication, (2) technical expertise, (3) consistency with objectives, (4) questioning attitudes, (5) commitment to quality, (6) mutual trust, (7) financial security, (8) commitment from senior management, (9) clear understanding, (10) total cost perspective, (11) equal power, (12) commitment to continuous improvement, (13) company wide acceptance, (14) flexibility to change, (15) availability of resources, (16)

partnership formation at design stage, (17) dedicated team, (18) long term perspective and (19) good cultural fit. In order to detect underlying relationship among CSFs, Chen and Chen (2007) divided nineteen CSFs into four clusters by using factor analysis. Based on the inherent relationship among CSFs under each cluster, Chen and Chen (2007) labeled and ranked the four clusters according to their importance level as follows: (1) collaborative team culture, (2) long-term quality focus, (3) consistent objectives and (4) resource sharing. The process and result of their study is illustrated in Figure 2.11.

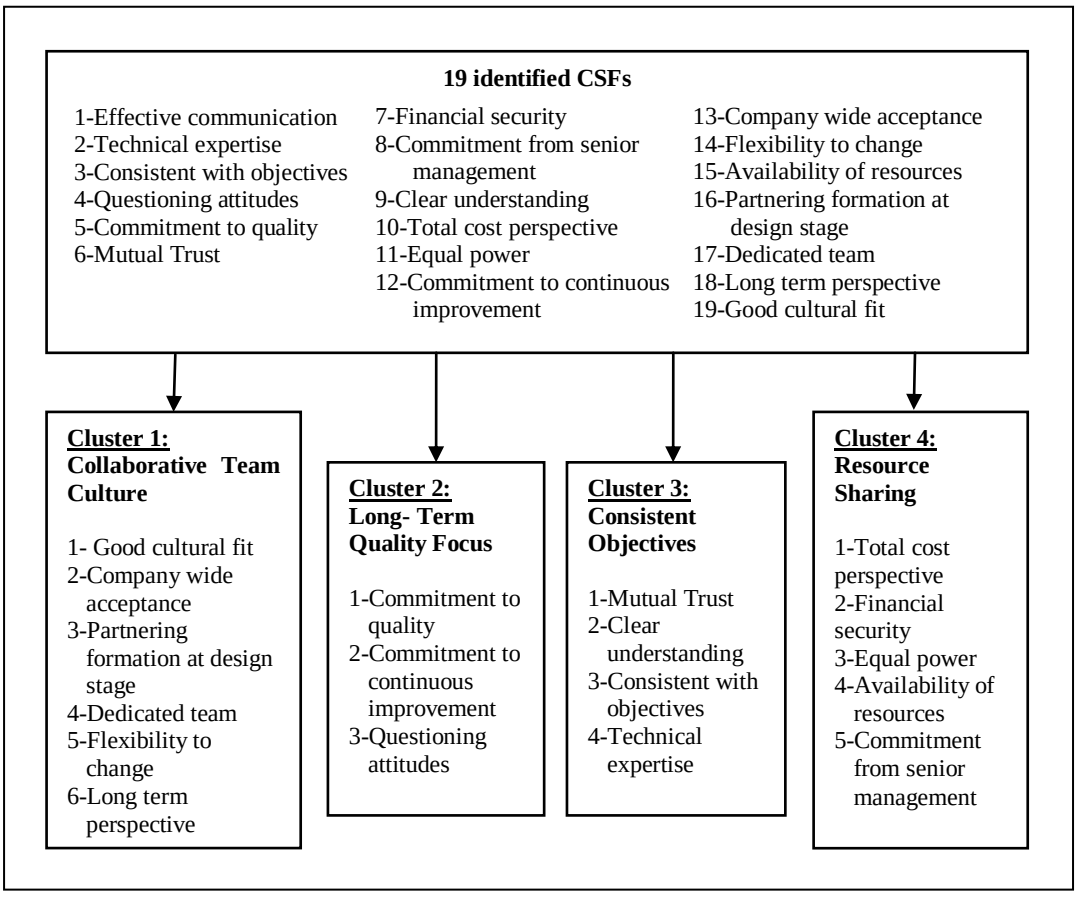

Figure 2.11. The clustering scheme of the CSFs of constructing partnering, an illustration of the research process of Chen and Chen (2007)

In the scope of a master thesis, Eren (2007) conducted a questionnaire survey in order to determine CSFs of partnering selected important by Turkish contractors. A questionnaire survey with 29 questions is conducted to reveal Turkish contractors'

concerns about successful partnering. 49 contractors from the Turkish construction industry answered the survey. Results showed that (1) mutual trust, (2) top management support and (3) commitment to win-win attitude are the most important CSFs for Turkish contractors in construction partnering.

In Table 2.10, the numbers of each CSF emphasized in the articles from literature dating from 2000 to 2009 is presented. Based on the frequencies that presented in Table 2.10, Figure 2.12 presents the frequency percentages of the CSFs that extracted from the articles in literature. It can be concluded that researchers similarly exists an agreement on some of the CSFs of partnering. These commonly repeated CSFs of partnering in construction partnering literature are mutual trust, effective communication, support from top management, clear definition of responsibilities, mutual goals, teambuilding, commitment to continuous improvement and commitment to win-win attitude. Besides commonly repeated CSFs, there are least repeated CSFs that can be concluded Figure 2.12 as well. These are availability of resources, flexibility to change, equality, establishment and communication of conflict resolution strategy and early implementation of partnering process. However, it can also be concluded that researchers show variation on some of the CSFs. As seen in Table 2.10, the CSFs that have variation and repeated by only one researcher are effective coordination, regular monitoring of partnering process, willingness to eliminate non-value added activities, ability to generate innovative ideas, subcontractors' involvement, timely responsiveness, technical expertise, questioning attitudes, commitment to quality, financial security, total cost perspective, company wide acceptance, long term perspective and good cultural fit. The brief introductions for commonly repeated CSFs are summarized respectively hereinafter.

Table 2.10. The comparison of CSFs of partnering from previous research studies in the construction industry

No	CSFs of Partnering	Black et al. (2000)	Cheng & Li (2002)	Chan et al. (2004)	Tang et al. (2006)	Chen & Chen (2007)	Eren (2007)	Total no for each CSF
(1)	Mutual trust / trust	✓	✓	✓	✓	✓	✓	6
(2)	Effective / open communication	✓	✓		✓	✓		4
(3)	Commitment / support from top management	✓	✓			✓	✓	4
(4)	Clear understanding / openness / clear definition of responsibilities			✓	✓	✓		3
(5)	Consistent with objectives / mutual goals	✓			✓	✓		3
(6)	Dedicated team / team building	✓			✓	✓		3
(7)	Commitment to continuous improvement	✓			✓	✓		3
(8)	Commitment to win-win attitude			✓	✓		✓	3
(9)	Willingness to sharing resources / availability of resources			✓		✓		2
(10)	Flexibility to change	✓				✓		2
(11)	Equality / equal power				✓	✓		2
(12)	Establishment and communication of conflict resolution strategy / problem resolution			✓	✓			2
(13)	Early implementation of partnering process / partnership formation at design stage			✓		✓		2
(14)	Effective coordination		✓					1
(15)	Regular monitoring of partnering process			✓				1
(16)	Willingness to eliminate non-value added activities			✓				1
(17)	Ability to generate innovative ideas			✓				1
(18)	Subcontractors' involvement			✓				1
(19)	Timely responsiveness				✓			1
(20)	Technical expertise					✓		1
(21)	Questioning attitudes					✓		1
(22)	Commitment to quality					✓		1
(23)	Financial security					✓		1
(24)	Total cost perspective					✓		1
(25)	Company wide acceptance					✓		1
(26)	Long term perspective					✓		1
(27)	Good cultural fit					✓		1
	Total number of CSFs extracted from publications	7	4	10	10	19	4	

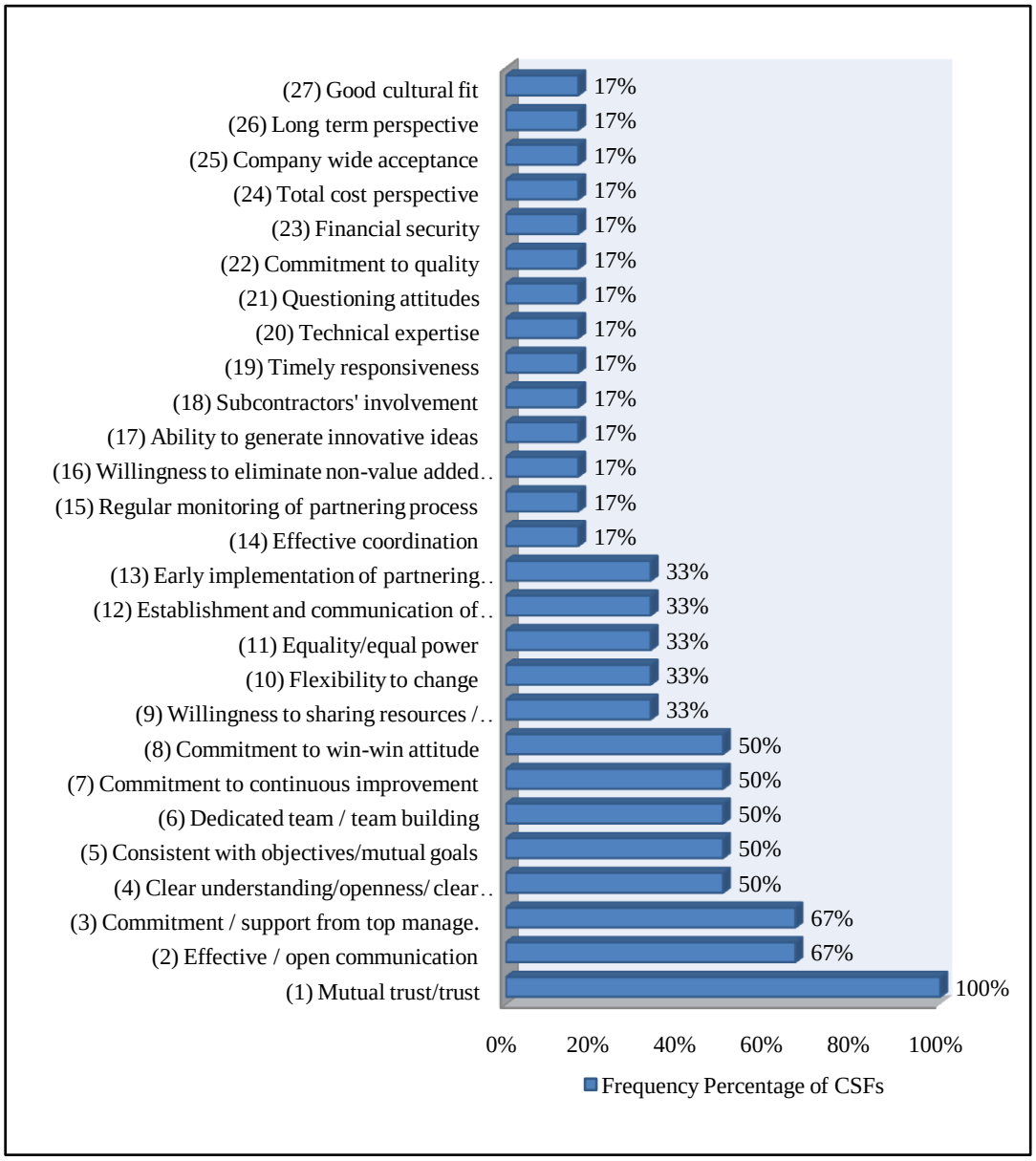

Figure 2.12. The frequency percentages of CSFs of partnering that extracted from previous research studies in construction industry

As seen in Figure 2.12, *mutual trust* is the most cited CSF among the research studies in literature dating from 2000 to 2009 on CSFs of partnering. Wong et al. (2005) state that trust is considered as the most important critical factor among the various factors that affecting on the success of partnering in literature. In order to achieve a better understanding for trust in partnering, firstly brief definitions of trust are needed. Hosmer (1995) define trust as; "the reliance by one person, group, or firm upon a voluntarily accepted duty on the part of another person, group, or firm to recognize and

protect the rights and interests of all others engaged in a joint endeavor or economic exchange" (p. 393). Bhattacharya, Devinney, and Pillutla (1998) define trust as "an expectancy of positive outcomes that one can receive based on the expected action of another party in an interaction characterized by uncertainty" (p. 462). Researchers in literature generally agree that trust is a must for the basis of any working relationship (Butler, 1991; Koraltan & Dikbaş, 2002; Crowley & Karim, 1995). According to the definitions of various researchers in literature partnering is a trust based relationship (CII, 1987; Harback et al., 1994; Wilson et al., 1995; Slater, 1998; Fong & Lung, 2007). For a successful partnering, all parties should have required confidence for other partners. Kanji and Wong (1998) state that partnering requires high levels of trust in order to be effective. According to Crowley and Karim (1995), trust in partnering develops confidence, encourage open communication and sharing of resources. By establishing trust, parties begin to develop confidence in each other and allow active inter-organizational exchange (Crowley & Karim, 1995).

The second most cited CSF is *effective communication*. Researchers generally agree that effective and open communication is required for partnering to succeed (Abudayyeh, 1994; Mohr & Spekman, 1994; Crowley & Karim, 1995; Miles, 1995; Black et al., 2000; Cheng & Li, 2002; Tang et al., 2006; Chen & Chen, 2007). Manley et al. (2007) resemble communication as the life blood of project and state that communication is the core of partnering. According to Ronco and Ronco (1996), partnering improves communication and builds teamwork and cooperation among project participants. According to Cheng et al. (2000) and Chen and Chen (2007), effective communication stimulates mutual trust among participants in the partnering arrangement. On the other hand, according to Tang et al. (2006), trust is the basis of effective communication in the partnering. Similarly Crowley and Karim (1995) stated that trust develops open and effective communication. By regarding these statements it can be said that effective communication and trust are related with each other for partnering to succeed. Since in a partnering arrangement communication brings people together in a win-win environment rather than hierarchical, it provides coordination in a cooperative way (Manley et al., 2007). Effective communication provides the basis for information being shared freely and helps to overcome difficulties that arise during the partnering process. According to Weingardt (1996), architects and engineers meet complex design needs, improve communications, share ideas better and enhance together technically, professionally and personally through effective communication in

partnering. Effective communication has a vital role in the conflict resolution among partners in a partnering arrangement (Crowley & Karim, 1995). Similarly Wong et al. (2005) state that effective communication prevents issues from becoming disputes in the partnering arrangement. According to Cheng and Li (2002), in order to require effective coordination for achieving mutually agreed goals, parties must built effective communication through meetings and workshops. Chen and Chen (2007) state that effective communication is very important for partnering to succeed because partnering requires timely achieved information through maintenance of effective communication. Mohr and Spekman (1994) state that successful partnering exhibits higher level of effective communication and more information being shared between partners based on the quality of communication.

The third most cited CSF is *support from top management*. Generally research studies on CSFs of partnering acknowledge commitment and support from top management as crucial in the success of partnering (Black et al., 2000; Cheng & Li, 2002; Chen & Chen, 2007; Eren, 2007). Design and construction projects have complex relationships based on their hierarchically linked parties that possess differentiated knowledge. If these complex relationships are not managed effectively, they can negatively affect the performance of the project. Thus, the full support and leading of top management is critical for the complex relationships in order to be managed effectively to reach better project outcomes (Cheng et al., 2000). Since top management formulates the strategy and direction of construction activities, the full support and commitment of top managers are critical in a successful partnering (Cheng et al., 2000; Chen & Chen, 2007). Cheng and Li (2002) state that support from top management is important for each of the three proposed (formation, application, reactivation) stages of partnering. Support from top management provides adequate resources in terms of man power, finance, knowledge and arrangement of activities for partnering (Cheng & Li, 2002). Lack of top management support in the partnering process is an obstacle for the success of partnering. In order to achieve success in partnering process commitment and support needs to be from top down because absence of top management support caused partnering to fail from top to down (Harback et al., 1994; Chan et al., 2003). According to Black et al. (2000), design teams in construction sector see support from top management as least important in the success of partnering rather than contractors and clients. Since design teams are more partnership based they are less likely to be involved in the administration of a director in the design process (Black et al., 2000).

However, support from top management is generally accepted as important for a successful partnering relationship by researchers in partnering literature in the construction sector (Harback et al., 1994; Slater, 1998; Black et al., 2000; Cheng & Li, 2002; Chan et al., 2003; Chen & Chen, 2007; Eren, 2007).

The fourth most cited CSF is *clear definition of responsibilities*. The responsibilities of project participants in the partnering project should be clearly defined and each participant assume the responsibility in order to achieve success (Harback et al., 1994; Chan et al., 2004; Tang et al., 2006; Chen & Chen, 2007). Clarifying issues and responsibilities as they arise in the project is important for the partnering process to succeed. Tang et al. (2006) state that in order to clarify responsibilities in the project, open communication is important whether it is oral or written. By means of open communication, free flow of resources such as knowledge, skills, ideas and technology bring out clearly defined issues and responsibilities (Tang et al., 2006). Chan et al. (2004) state that while defining responsibilities of parties in the partnering project, it is important to develop aligned relationships in order to achieve mutual objectives and success. Similarly Chen and Chen (2007) state that in order to achieve success in the partnering clearly understanding of mutual objectives and responsibilities are important.

The fifth most cited CSF is *mutual goals*. Based on the partnering definitions of various researchers in literature, it can be concluded that partnering focuses to share mutual goals and objectives (Weingardt, 1996; Naoum, 2003; Fong & Lung, 2007). Researchers in partnering literature, generally agree that focusing on mutual goals and acting consistently with mutual objectives are significant for partnering to succeed (Harback et al., 1994; Mohr & Spekman, 1994; Black et al., 2000; Kwan & Ofori, 2001; Liu & Fellows, 2001; Naoum, 2003; Tang et al., 2006; Chen & Chen, 2007). According to Tang et al. (2006), the first step of partnering arrangement is to develop mutual goals. Developing mutual goals enable participants to behave in a win-win attitude. Mutual goals that parties commonly shared could be completing the project on schedule, completing the project within budget, increasing cost effectiveness, maximizing the benefits of each party and sharing best work practices, etc. Chen and Chen (2007) state that rather than sharing mutual goals having different goals and expectations caused conflicting issues among parties. As well, conflicting issues are counterproductive for partnering success. Similarly, Black et al. (2000) state that unless parties in a partnering arrangement act consistent with mutual goals the partnering cannot succeed.

The sixth most cited CSF is *teambuilding*. Researchers in literature agree that the most explicit idea behind partnering is being in agreement of all parties from the beginning of the project to create cooperation and teamwork in order to work in a win-win approach where all partners benefit from the results rather than meeting problems and confrontations (Harback et al., 1994; Koraltan and Dikbaş, 2002; Anvuur and Kumaraswamy, 2007). When the partnering definitions in literature are reviewed, it can be seen that researchers generally agree on partnering is a teambuilding approach (Harback et al., 1994; Larson, 1995; Wilson et al., 1995; Ronco & Ronco, 1996; Naoum, 2003; Chan et al., 2004; Anvuur and Kumaraswamy, 2007). Partnering provides a basis for implementing a teamwork and achieving win-win situation. The success of construction projects based on organizing the teams involved in construction which are including architects, engineers, project owners, consultants, contractors, suppliers, etc. (Chen & Chen, 2007). For successfully organizing these teams and integrating the abilities, experience, professional knowledge and skills of teams involved it is important to organize the information and resources for being shared. According to Chen and Chen (2007), the parties in the partnering arrangement which are behaving in a manner that share mutual goals and work as a team they should share resources such as knowledge, information and technology. Resource sharing relies on maintaining trust that those parties not to use the sharing materials for internal competitive purposes (Chen & Chen, 2007).

The seventh most cited CSF is *commitment to continuous improvement*. Continuous improvement entails focusing on processes within a system to ascertain how they could be changed to be made more efficient (Fisher et al., 1995). Partnering embraces the principle of continuous improvement (Harback et al., 1994; Naoum, 2003). Commitment to continuous improvement in partnering refers to willingness of participants in partnering to exert effort for ways of improving. Moreover, the success of the architectural design process depends on the degree of commitment of the individual professionals for the quality and continuous improvement of the architectural design product (Heintz, 2002). Commitment to continuous improvement is an important requirement for partnering to succeed (Black et al., 2000; Tang et al., 2006; Chen & Chen, 2007). Harback et al. (1994) mention that without focus on continuous improvement partnering cannot succeed. According to Chen and Chen (2007), more committed parties for continuous improvement require the long-term objectives by converting those with short-terms.

The eighth and last most cited CSF is *commitment to win-win attitude*. Partnering change the win-lose attitudes in project relationships to win-win ones where all can win (Harback et al., 1994; Tang et al., 2006). Commitment of project participants to win-win attitude is crucial for partnering success (Chan et al, 2004; Tang et al., 2006; Eren, 2007). By means of commitment to win-win attitude, project participants change adversarial situations during a project and make maximum contributions for achieving a successful project to the benefit of all (Tang et al., 2006).

As seen from Table 2.10 the least repeated CSFs are *willingness to sharing resources*, *flexibility to change*, *equality*, *establishment and communication of conflict resolution strategy* and *early implementation of partnering process*. In a successful partnering, all parties should be willing to share their resources such as knowledge, technology, experience and information in a trust based environment. According to Chan et al. (2004), the complementary resources from different parties are major criteria for assessing partnering success. Each member of the design team should be familiar with the issues that affect other team members. All team members should be attentive to the issues of other disciplines and be ready to provide constructive input in the total solution. For instance, in architectural design, input from other design team members on how the electrical, mechanical etc. system will function is vital for each step of the project. Therefore, the architect and engineers are obvious partners who share resources in order to work together for the functional requirements of the architectural design project (Holdaway, 2005). Partnering provides a change in adversarial situations to cooperative ones. Thus, flexibility for change in attitudes, way of thinking, culture and adversarial situations are important for partnering to succeed (Black et al., 2000; Chen & Chen, 2007). Sharing of goals can enable participants to consider the win-win thinking and equality (Tang et al., 2006). Since all parties involved in the project from the beginning and sharing risks and rewards, partnering offers a working arrangement based on equality (Bayramoğlu, 2001). Equality is important for establishing trust among participants by working cooperatively. Thus, for the success of partnering equality is important (Tang et al., 2006; Chen & Chen, 2007). Establishment of a conflict resolution strategy includes the development of a control and resolution mechanism for dealing with problems, the establishment of an effective conflict resolution strategy and the improvement of mutual goals among project participants (Black et al., 2000). Through establishing communication and conflict resolution strategy, the problems in partnering arrangement can be solved in shortest time (Black

et al., 2000). Thus, establishment and communication of conflict resolution strategy is an important factor for the success of partnering (Black et al., 2000; Tang et al., 2006). In order to succeed in the partnering process, partnering should be implemented during the design stage of construction project (Chan et al, 2004). The early implementation of partnering process is an important factor for the success of partnering (Chan et al, 2004; Chen & Chen, 2007).

It can also be concluded from Table 2.10 that some of the CSFs are found as important by only one researcher. These CSFs that show variation are *effective coordination* (Cheng & Li, 2002), *regular monitoring of partnering process, willingness to eliminate non-value added activities, ability to generate innovative ideas, subcontractors' involvement* (Chan et al, 2004), *timely responsiveness* (Tang et al., 2006), *technical expertise, questioning attitudes, commitment to quality, financial security, total cost perspective, company wide acceptance, long term perspective and good cultural fit* (Chen & Chen, 2007).

CHAPTER 3

RESEARCH METHODOLOGY

The methodology of this thesis is adapted from the research model that Chan et al. (2004) and Walker (1997) used in their research studies. The model first began with a detailed review of literature. The literature review provided a base for formulating the problem and determining the success factors of partnering in construction industry. Secondly, a questionnaire survey is prepared in order to explore the CSFs of partnering in the architectural design process. Survey questions are derived from the previous research studies in literature. Later, a pilot study is done to a small group of 10 practicing professional architects in İzmir to refine the survey questions. According to the feedback obtained from the pilot study, the final questionnaire is completed. 104 practicing architects in İzmir district participated in the survey. Factor and multiple regression analyses are used respectively for data analysis. Factor analysis is used to determine the critical success factors of partnering. Multiple regression analysis is used to determine the strongest predictors of successful partnering by identifying the importance levels of critical success factors. Finally, the conclusions are drawn. The methodology used in this thesis is schematized in Figure 3.1.

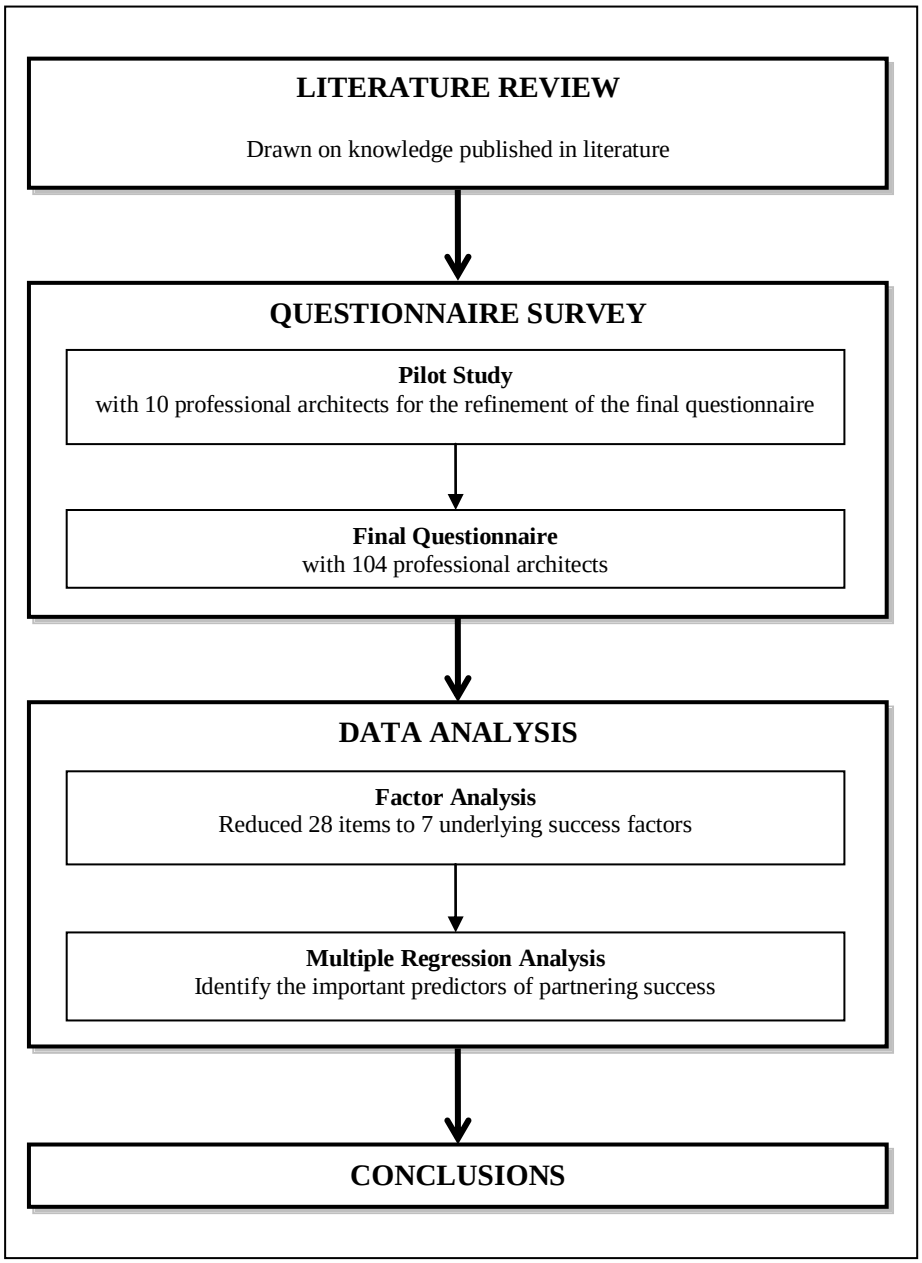

Figure 3.1. The research methodology of this thesis

3.1. Data Collection Method

The empirical part of the methodology of this thesis centers on implementing a quantitative analysis by conducting a questionnaire survey in the light of literature review and drawing of conclusions by statistical methods. The reason behind the choice of using questionnaire survey as the data collection method in this thesis is based on that previous research studies on exploring CSFs of partnering in literature commonly used

this method (Larson, 1997; Black et al., 2000; Kwan & Ofori, 2001; Cheng & Li, 2002; Chan et al., 2004; Phua, 2006; Tang et al., 2006; Lu & Yan, 2007; Mason, 2007).

The questionnaire survey method is a systematical data collection method that determines the information which is required for the objectives of the research. By means of questionnaire survey, the information is gathered to establish quantitative evidence by asking appropriate questions for a particular population that is previously determined (Brace, 2004; Bas, 2006). According to Cheng and Li (2002), a questionnaire survey with its quantitative evidence helps to establish a solid foundation to further research studies. However, questionnaire survey has some weaknesses such as; obtain a sufficiently representative sample, reliability in the data that collected and understandability of the questions in the questionnaire (Brace, 2004). In this thesis, a pilot study is conducted before the final research questionnaire in order to prevent these problems and enhance the reliability of the questionnaire survey. A questionnaire survey can be conducted in various ways such as; telephone administered, face to face, web based and via self completion papers (Brace, 2004). Self completion way of questionnaire is chosen for the questionnaire survey in this thesis.

3.2. Design of the Questionnaire Survey

In the questionnaire survey, the questions of which critical factors can affect the partnering during architectural design process and help to improve design process in more successful, practical and feasible ways are to be explored. The focus of this research on successful partnering in the architectural design process in İzmir had the question below as initiator:

> *Which CSFs of a successful partnering are the more important for the practicing architects in İzmir when establishing partnering with other actors in the architectural design process?*

The statements in the questionnaire survey are basically adopted from the subjective measures of CSFs that Cheng et al. (2000) have suggested and from the questionnaire survey that Chan et al. (2004) used in their own research. The questions in the questionnaire were formulated in such a way as to: 1) reveal the respondents' experiences and their careers, 2) evaluate the condition of partnering implications in

their architectural design projects, 3) determine the critical success factors for a successful partnering in the architectural design process.

3.2.1. Pilot Study

Before implementing the final questionnaire, a pilot study was drafted to test the factors and criteria adopted when assessing the success of partnering during architectural design process. The aim of the pilot study was to provide information for the refinement and the development of the final questionnaire. The pilot study was conducted to 10 architects practicing in İzmir. The final questionnaire was reviewed in the light of the answers of participants of the pilot study. For instance, in the pilot study, it is observed that respondents did not understand the definition of partnering in the architectural design process. Thus, in the final questionnaire two questions were added in order to clear the definition of partnering in the architectural design process and test their frequency level on partnering with other actors of architectural design process like mechanical, civil, electrical engineers, etc.

3.2.2. Final Questionnaire

After the pilot study, the final questionnaire was developed. The questionnaire used to collect data for exploring critical success factors of partnering in the architectural design process for the architects in İzmir consisted of two parts. The first part of the questionnaire was sought for the information about participants' experience, production amount and frequency level of partnering in the architectural design process and with whom they are making partnering in the architectural design process. The first part included ranking and multiple choice questions. In the second part of the questionnaire, the participants were requested to rate all questions according to a five point Likert-scale (1: strongly disagree and 5: strongly agree). In the second part of the questionnaire 29 questions were asked to participants based on their partnering experience in the architectural design process.

3.3. Sample

The final questionnaire was conducted during the Consultation Council of Independent Architects Seminar organized by İzmir Branch of Chamber of Turkish Architects. Practicing architects owning architectural design offices in İzmir were the primary target population for the questionnaire survey. They were requested to define their perceptions on the benefits and problems of partnering, together with the 29 questions in the questionnaire survey depending on the critical success factors and performance measurement criteria for partnering success in literature. A total of 125 practicing architects in İzmir were requested to attend the questionnaire survey. The 104 of them gave valid responses for analysis of the questionnaire survey. 21 of them discarded from the analysis for leaving blank sections.

3.4. Data Analysis Method

Statistical data analysis methods are used in almost all of the current research studies from sciences to social sciences. According to Karagöz and Ekici (2004), especially for the researchers in social sciences, statistic is a very useful tool to reveal the mysteries of the data that collected within the scope of the research. It is almost impossible to reach reliable and valid conclusions unless refer to statistic. By means of statistical data analyses, the empirical studies that conducted are gathered systematically for trying to gain information cores about the subject (Karagöz & Ekici, 2004). Statistical data analysis techniques in this thesis included factor analysis and multiple regression analysis. Both of these statistical tools were used to analyze data from the questionnaire survey. Factor analysis was used to identify the underlying dimensions of partnering success and multiple regression analysis was used to seek the strongest predictors of partnering success. The analyses were conducted using the SPSS 15 (Statistical Package for the Social Sciences) software. SPSS software provides a comprehensive range of statistical programs suitable for manipulating the work of analysis (Norusis, 1993). The data analysis process of the questionnaire survey in this thesis is presented by Figure 3.2.

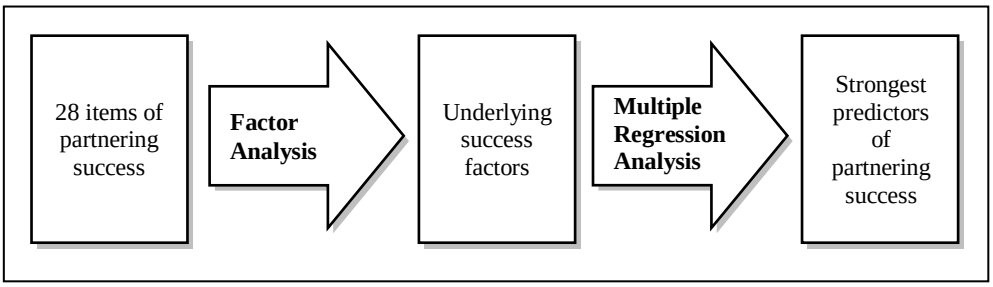

Figure 3.2. The data analysis process of the questionnaire survey

3.4.1. Factor Analysis

Factor analysis (FA) is a statistical technique used to identify a relatively small number of factors that can be used to represent relationships among sets of many interrelated variables (Norusis, 1993). Yang and Trewn (2004) state that FA is a powerful multivariate statistical method to extract small number of hidden factors in a massive amount of multivariate data. By the same way, according to Gorsuch (1983) FA assumes that all the variables on different attributes could be reduced down to a few important dimensions which are called factors. Cramer (2003) state that FA is a set of techniques for grouping variables or items that are related with each other for treating them as one combined factor or component rather than separate variables. These techniques are used for representing a model for the data which is more elaborated and interpretable (Larose, 2006). Therefore, by means of FA an underlying structure or pattern underneath a multivariate set of data could be identified (Yang & Trewn, 2004).

The basic steps in conducting FA are briefly explained below by reviewing the literature on FA (Hovardaoğlu, 2000; Cramer, 2003; Chan et al., 2004; Yang & Trewn, 2004; Bryman & Cramer, 2005; Larose, 2006; Kalaycı, 2009).

1. Evaluating the adequacy of the data set to FA: There are three methods to decide the adequacy of the data for FA. These are computation of the correlation matrix, Bartlett's test of sphericity and Kaiser-Meyer-Olkin's (KMO) measure of sampling adequacy. Computation of the correlation matrix helps to decide whether it is worthwhile to go on to conduct a FA to the data. If there are no significant correlations among items, it shows that they are unrelated and it could not expect them to form one or more factors. Items which have no correlations among them should be removed from

analysis. By means of KMO measure of sampling adequacy, sample is measured in order to testify whether it is adequate for FA or not. Bartlett's test of Sphericity tests the null hypothesis that the variables in the data are uncorrelated. In order to apply FA to the data, the null hypothesis must be rejected (Bryman & Cramer, 2005; Kalaycı, 2009).

2. Decide the factor models for the number of factors to be retained: Factor extraction is made by using appropriate factor models. By means of factor extraction, the numbers of the factors to be retained are decided. As seen in Figure 3.3, there are two kinds of factor models. These are principal component analysis (PCA) and common factor analysis (CFA). PCA is used for finding a small number of factors that explain and represent the most of the total variation. On the other hand, CFA is used to explain the structure of the correlation rather than the total amount of variance. In other words, objective of CFA is to use a small number of factors to represent most of the interrelationship among variables (Yang & Trewn, 2004).

In this thesis, principal component analysis was used for factor extraction. Gorsuch (1983) defines the principal component analysis as the extraction of principal component factors under the component model. As well, in this phase some items could have more than one relationship in the component model by having higher factor loadings under more than one factor. In order to prevent this problem, rotation of each factor should be done (Hovardaoğlu, 2000; Bryman & Cramer, 2005).

3. Rotation of each factor: In order to enhance the interpretability of the factors they are rotated to maximize the loadings of some items. By means of factor rotation, each variable or item majorly loaded under a few factors as possible. Factor rotation is performed by the transformation of coordinate axes with orthogonal or oblique transforms. Usually orthogonal with varimax rotation is used (Gorsuch, 1983; Hovardaoğlu, 2000; Bryman & Cramer, 2005; Larose, 2006). Varimax is an orthogonal method of rotation that minimizes the number of variables with high loadings on a factor. Thereby it enhances the interpretability of the factor (Hovardaoğlu, 2000).

4. Interpretation and labeling each factor: Factors that extracted from the data set can be interpreted in terms of the variables that load high on it. Therefore, the last step of FA is to interpret and attach a descriptive name to each factor. (Santos & Reynaldo,

1999; Chan et al., 2004, Kalaycı, 2009). Based on these basic steps, Figure 3.3 gives the flowchart of FA.

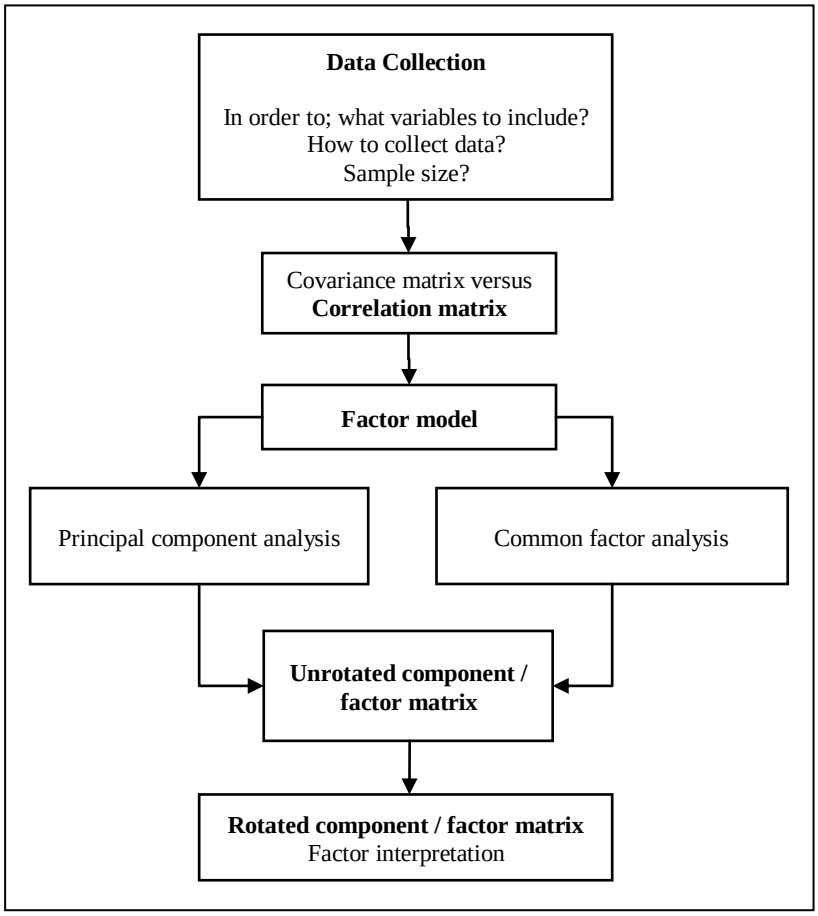

Figure 3.3. Factor analysis flow chart
(Source: Yang & Trewn, 2004)

FA has two types; these are exploratory factor analysis and confirmatory factor analysis (Gorsuch, 1983; Bryant & Yarnold, 1998; Hovardaoğlu, 2000; Cramer, 2003). In exploratory factor analysis, relationships between various variables are examined without depend a hypothesis or trying to fit the results to a particular model. On the other hand, confirmatory factor analysis compares the solution found against a hypothetical one (Bryman & Cramer, 2005). According to Gorsuch (1983), the preference of exploratory factor analysis in research studies is usually depending on to examine the area, thus the next research studies could be more powerful. In this thesis, exploratory factor analysis employing principal component analysis with the varimax

rotation method was used to determine the factors prompting partnering success. Exploratory factor analysis was used instead of confirmatory factor analysis because the factor analysis in this research was meant primarily not to test an established factor structure but to develop a factor structure classifying the elements prompting partnering success.

Therefore in this thesis, the 28 items of the partnering success are reduced into a small number of underlying success factors by using exploratory factor analysis. During factor analysis process 28 items of the questionnaire survey are entered to analysis as partnering success factor items.

3.4.2. Multiple Regression Analysis

A regression model is a mathematical model that can relate a number of independent variables to a dependent variable (Norusis, 1993). Multiple regression analysis (MRA) is the most widely used method for conducting multivariate analysis particularly when more than three variables are involved (Bryman & Cramer, 2005). However, MRA is not an all-purpose method for data reduction like FA. (Gordon, 1968). Patrocelli (2003) gives the definition of multiple regression as a set of methods which is very powerful for examining the specific relations among experimental data. According to Pedhazur (1997), MRA is applicable for analyzing the collective and separate effects of two or more independent variables on a dependent variable. By the same token, MRA is generally used as a data analyzing strategy to predict a dependent variable by means of the most efficient set of independent variables on the estimation of the dependent variable (Dunlap & Landis,1998; Patrocelli, 2003).

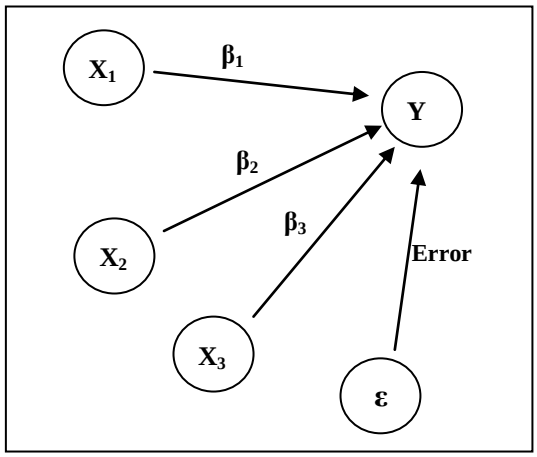

Figure 3.4. The path diagram for multiple regression analysis
(Source: Yang & Trewn, 2004)

The path diagram of a multiple regression procedure is illustrated by Figure 3.4. The equation of this multiple regression illustration is given below;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon \qquad (3.1)$$

In this equation above; Y is the dependent variable, X_1, X_2, X_3 are the independent variables, β_0 is the intercept, β_1, β_2, and β_3 are the regression coefficients for the three independent variables and finally ε is the error term (Yang & Trewn, 2004; Bryman & Cramer, 2005). In this thesis, MRA is performed to explore the levels of significance of the critical success factors that extracted from FA on partnering success. In the MRA process of this thesis, underlying success factors extracted from 28 items of the questionnaire by FA are entered to the analysis as independent variables. The remaining 1 item of the questionnaire is entered to analysis as being dependent variable.

CHAPTER 4

RESEARCH FINDINGS AND DISCUSSION

This chapter presents the research findings of this thesis by exhibiting respectively profiles of participants in the questionnaire survey and FA and MRA results of the survey data. Then, it presents the underlying success factors and the strongest predictors of the partnering success according to the practicing architects in İzmir. Finally, it compares the findings of the present research with the previous research studies on CSFs of partnering.

4.1. Profiles of Participants

104 practicing architects who own architectural design offices in İzmir attended in the questionnaire survey. The first part of the questionnaire survey was designed to find out information about participants' professional experience, frequency of making partnering work in the architectural design process, square meter amount of annual construction and which actors of construction industry they accept as partners in the architectural design process. Through the analysis of the data of the first part of the questionnaire survey with descriptive statistics and frequency tables, the following conclusions were drawn. The analyses were conducted using the SPSS 15 software.

- As can be seen from Figure 4.1, 41% of the participants have professional experience as practicing architects ranging from 21 years to 30 years and they constitute the majority of participants. 4% of the participants have either no professional experience or have professional experience up to 10 years. 25% of the participants have professional experience ranging from 11 years to 20 years, 16% of the participants have professional experience ranging from 31 years to 40 years and 14% of participants have professional experience ranging between 40 years and over 40 years. Distribution of participants' professional experience is presented in Figure 4.1.

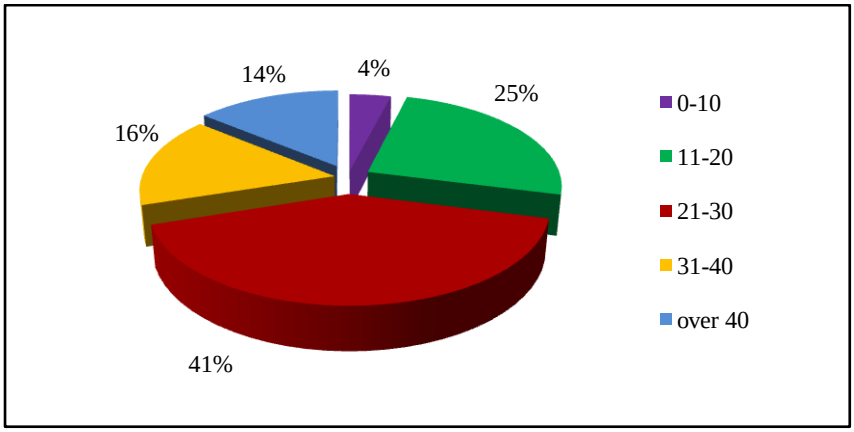

Figure 4.1. The distribution of the participants' professional experience

- The distribution of frequency of making partnering by the participants in the architectural design process is presented by Figure 4.2. 56% of the participants answered that they frequently make partnering in the architectural design process and they constitute the majority of the participants. 38% of the participants often, 5% of the participants sometimes and 1% of the participants rarely make partnering in the architectural design process.

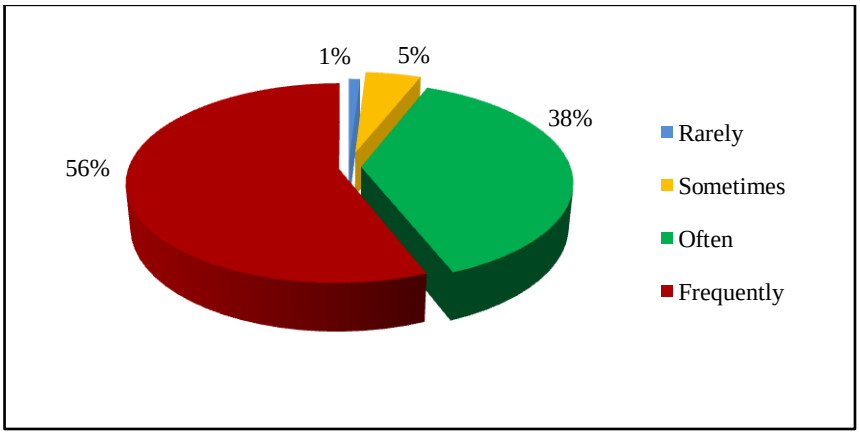

Figure 4.2. The distribution of frequency of making partnering in the architectural design process

- The preceding year's square meter amount of construction of architectural design offices participating in the questionnaire survey is presented by Figure 4.3. 65% of the participants have less than or equal to 20.000 m² amount of

construction in the preceding year and they constitute the majority of the participants. In the preceding year, 27% of the participants have amount of construction ranging from 21.000 m² to 50.000 m². 3 % of the participants have amount of construction ranging from 51.000 m² to 100.000 m² and 5% of the participants have amount of construction ranging from 101.000 m² to 250.000 m² in the preceding year.

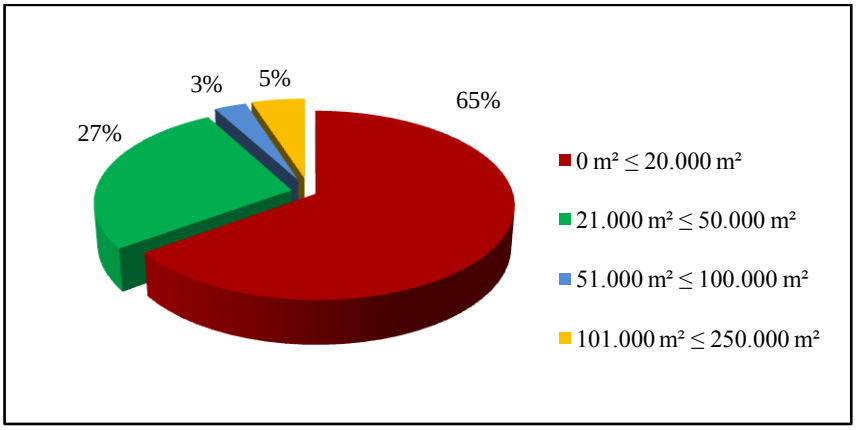

Figure 4.3. The distribution of preceding year's square meter amount of construction of the participating architectural design offices

- The descriptive statistics that presented in Table 4.1 describes the data for the question which actors of the construction industry participants accept as partners in the architectural design process. As seen in Table 4.1, the participants show variation on the answers. However, 28% of the participants agree on civil engineers, mechanical engineers, electrical engineers and clients are accepted as partners in the architectural design process. 17% of the participants accept civil engineers, mechanical engineers, electrical engineers as partners in the architectural design process. 18% of the participants accept all involved actors from various disciplines in the construction industry as partners in the architectural design process.

Table 4.1. Descriptive statistics for the question which actors of the construction industry accepted as partners in the architectural design process by the participants.

Partnering with	Partnering with	Frequency	Percentage	Cumulative percentage
a: Civil engineer	a,b,c,f	29	28	28
b: Mechanical engineer	h	19	18	46
c: Electrical engineer	a,b,c,d,	18	17	63
d: Architect	a	6	6	69
e: Landscape architect	a,f	4	4	73
f: Client	a,b,c,e,	4	4	77
g: Contractor	a,b,c	3	3	80
h: All of them	a,d,f,g	3	3	83
i: None of them	a,f,g	3	3	86
j: Others	a,b	2	2	88
	a,b,c,g	2	2	89
	a,c,f	2	2	91
	a,c,f,g	2	2	93
	a,d,f	2	2	95
	a,b,c,j	1	1	96
	a,d,g	1	1	97
	a,e,f,g	1	1	98
	a,d,e,g	1	1	99
	f	1	1	100
Total		104	100	

By reviewing the results it can be said that 18% of the participants recognize the actors of the architectural design and construction phases as partners in the architectural design process. Therefore, it can be concluded that 18% of the participants in the questionnaire survey accept partnering as an integrated approach for the architectural design and construction phases where all parties involved in the beginning of the architectural design process.

4.2. Factor Analysis (FA) Results

FA was used to classify the variables in the data into a few important dimensions. The first step of FA is to evaluate the adequacy of the data set. Thus, the adequacy of the sample data and the entire data were tested for FA via SPSS 15 software. The sample was tested by KMO measure of sampling adequacy in order to

testify the appropriateness for FA. High values of KMO statistics between 0,5 and 1,00 indicate that FA is appropriate for the data. However, small values of the KMO statistics less than 0,5 indicate that FA may not be appropriate for the data (Larose, 2006). Table 4.2 presents the values of the KMO statistics and their adequacy levels for FA (Kalaycı, 2009).

Table 4.2. KMO statistics and their adequacy levels
(Source: Kalaycı, 2009)

KMO statistic	Adequacy
0,9	Perfect
0,8	Well enough
0,7	Good
0,6	Tolerable
0,5	Weak
under 0,5	No acceptance

Before conducting FA, a preliminary analysis called Bartlett's test of sphericity was carried out to find whether the matrix used in the data was appropriate for FA. Bartlett's test of sphericity tests the null hypothesis that asserts the variables in the data are uncorrelated (Larose, 2006). In order to apply FA to the data, the null hypothesis must be rejected (Larose, 2006). Bartlett's test of sphericity statistic is reported by the *p*-value. Small *p*-values indicate evidence against the null hypothesis. Thus, FA can be appropriate for the data (Larose, 2006).

Therefore, in order to apply FA to the collected data, the adequacy of sample was measured by KMO measure of sampling adequacy and also the adequacy of the data was measured by Bartlett's test of sphericity. Table 4.3 presents the values of the KMO and Bartlett's test of sphericity statistics for the data. The KMO statistic in Table 4.3 has a value of 0,842, which is greater than 0,50 (0,842>0,50). Thus, it can be said that the sample is adequate for FA. As well, the *p*-value for Bartlett's test of sphericity statistic is 0,001. Thus, the null hypothesis that no correlation exists among the variables is rejected. Therefore, after testing the adequacy of the sample, the second step of FA can be established for the data set.

Table 4.3. KMO measure of sampling adequacy and Bartlett's test of sphericity statistics

KMO measure of sampling adequacy	0,842
Bartlett's Test of sphericity *p*-value	Sig. 0,001*
* $p \leq 0{,}001$	

The second step of FA is factor extraction, which is conducted by using appropriate factor models in order to decide the number of factors to be retained. In this thesis, PCA was used for factor extraction. Besides, in order to prevent the problem during factor extraction that some items could have higher loadings under more than one component, orthogonal (varimax) rotation was done. Therefore, PCA with varimax rotation was carried out via SPSS 15 software for examining the factor structures of the items that represent the data set. By means of the PCA, the items in the data set were reduced into small number of principal components which can be called as underlying dimensions of partnering success. In the analysis, the threshold level of 0,40 was accepted for the component loadings. The threshold level of 0,40 is acceptable when the previous research studies in literature are reviewed (Nooteboom & Six, 2003; Song, Koszalka & Grabowski, 2004; Cheung, Yiu &Yeung, 2006; Han, Kim & Kim, 2007; Eriksson, 2008). Seven principal components were extracted by means of the PCA. The cluster of matrix after varimax rotation is presented in Table 4.4.

Table 4.4. Rotated component matrix

Items	Component 1	Component 2	Component 3	Component 4	Component 5	Component 6	Component 7
Q1	**0,701**	0,267	0,116	0,032	0,213	-0,093	0,223
Q17	**0,661**	0,131	0,301	0,070	0,136	0,228	0,184
Q8	**0,640**	0,119	0,156	0,317	0,033	0,192	-0,063
Q26	**0,610**	0,456	0,112	-0,146	0,056	0,080	-0,059
Q14	**0,596**	-0,052	0,143	0,069	0,124	0,093	0,151
Q19	**0,575**	0,065	0,022	0,382	0,305	0,314	-0,099
Q3	**0,568**	0,178	0,193	0,121	0,255	0,220	0,227
Q28	**0,512**	0,103	0,176	0,303	0,477	-0,139	-0,084
Q13	0,355	**0,756**	0,113	0,066	0,055	0,029	0,127
Q25	-0,109	**0,730**	0,190	0,115	0,240	0,143	0,033
Q2	0,467	**0,490**	0,122	0,111	0,198	0,439	0,055
Q12	0,455	-0,134	**0,682**	-0,099	0,079	0,156	0,069
Q20	0,252	0,215	**0,654**	0,235	-0,046	-0,032	0,315
Q15	0,231	0,400	**0,578**	0,072	0,153	0,203	-0,083
Q27	0,076	0,321	**0,531**	-0,083	0,239	0,426	0,054
Q21	-0,089	-0,032	-0,014	**0,632**	0,222	0,026	0,075
Q7	0,379	0,328	0,258	**0,581**	-0,127	0,029	0,145
Q11	0,265	0,466	0,235	**0,514**	0,137	-0,006	0,075
Q24	0,198	-0,153	-0,215	**0,507**	-0,112	0,105	0,309
Q16	0,263	0,261	0,432	**0,468**	0,207	0,015	-0,008
Q22	0,287	0,023	-0,037	-0,046	**0,714**	0,075	-0,024
Q9	0,035	0,064	0,258	0,192	**0,653**	0,119	0,047
Q4	0,307	0,327	-0,015	-0,016	**0,543**	-0,023	0,135
Q23	0,123	-0, 040	0,202	0,045	-0,026	**0,781**	-0,028
Q6	0,204	0,409	-0,094	-0,025	0,019	**0,498**	0,134
Q18	0,093	0,198	0,092	0,325	0,274	**0,478**	0,312
Q10	0,029	0,031	-0,056	0,215	-0,017	0,021	**0,803**
Q5	0,192	0,111	0,367	-0,034	0,085	0,072	**0,732**

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 16 iterations

Table 4.4 presents the loadings of the items after rotation under each component. Which items belongs to which components can be seen in Table 4.4. The items are presented in bold under each component. Each bold item had the highest loading among all values clustered under the components. Based on the clustering of the highest loaded items under components, it can be said that seven components would be required to represent the data set. Based on the clustering of items under each component, Table 4.5 gives the factor structure of all the items.

Table 4.5. Factor structure of the partnering success factor items

Items	Comp. Loading	% of variance explained	∑ % of variance explained
Component 1			
Q1: Each party work for mutual goals to gain everyone rather than being in a competitive manner.	0,701		
Q17: My partners always inform me about the changes and the improvements in the architectural design process.	0,661		
Q8: My partners have effective communication strategies.	0,640		
Q26: All partners are willing to eliminate barriers for the improvement of the architectural design process.	0,610		
Q14: We always arrange meetings during the architectural design process in order to improve our communication.	0,596		
Q19: I believe to support my partners' decisions about the architectural design process.	0,575		
Q3: My partners always help me when I need information about the project.	0,568		
Q28: My partners do not have a competitive manner to gain advantage during the architectural design process.	0,512	15,132	15,132
Component 2			
Q13: Our relationships are always being in coordination with each other.	0,756		
Q25: I have a strategy to deal with problems which are being an obstacle for our coordination during the architectural design phase.	0,730		
Q2: All parties are willing to share information during design phase.	0,490	9,775	24,907
Component 3			
Q12: We always define mutual objectives during the architectural design process.	0,682		
Q20: Our problems in the architectural design process are always solved in a timely and responsive manner.	0,654		
Q15: Division of labor and responsibilities are clearly defined during the architectural design process.	0,578		
Q27: All parties support to share resources and ideas.	0,531	8,363	33,271
Component 4			
Q21: I am willing to have responsibility in common issues during our partnering in the architectural design process.	0,632		
Q7: I am willing to solve problems between me and my partners for the improvement of the architectural design process.	0,581		
Q11: My goals are aligned with my partners.	0,514		
Q24: I fulfill my responsibilities as being in the accordance with my partners expectations	0,507		
Q16: I do not have any communication problem to obstruct the architectural design process.	0,468	8,037	41,307
Component 5			
Q22: I do not want to develop a long term partnering process with my partners (R).	0,714		
Q9: My partners do not develop aligned relationships to support project's objectives (R).	0,653		
Q4: My partners always act for the benefits of themselves rather than the project's (R).	0,543	7,414	48,721
Component 6			
Q23: Partnering is started at the beginning of the design phase.	0,781		
Q6: I believe that it is important to establish mutual trust among me and my partners.	0,498		
Q18: I believe that my partners' decisions are very useful for the improvement of the architectural design process.	0,478	6,850	55,571
Component 7			
Q10: In order to establish partnering, I provide enough resource, budget, labor, time and authority as being a manager.	0,803		
Q5: Each manager in our design office willing to support partnering process.	0,732	6,678	62,249
(R): Recoded for factor analysis (1→5, 2→4, 3→3, 4→2, 5→1)			

Table 4.5 presents the component loadings, percentage of the variance and the cumulative percentage of the variance explained. The variances that explained by each component can be seen in the component loading column. The seven extracted components cumulatively explain 62% of the total variance approximately. When the research studies in literature about FA are reviewed, it can be seen that this account level of variance result is consistent with the research studies' account levels of variance in literature (Song et al., 2004; Zhang, 2006). The first component that accounted for approximately 15% of the variance had the largest variance. The other components' account level of variance can be seen in Table 4.5.

Finally, after conducting factor extraction with PCA it can be said that, there are seven underlying success factors of partnering in the architectural design process for practicing architects in İzmir.

4.2.1. Reliability and Validity Analyses

It is generally accepted in the literature that the measurement device in the questionnaire survey should be both reliable and valid to possess practical utility (Carmines & Zeller, 1979; Kenny, 1979; Hovardaoğlu, 2000; Foster, 2001; Bryman & Cramer, 2005; Kalaycı, 2009). Therefore, both reliability and validity analyses were conducted in order to testify the reliability and validity of the measure. Thus, each component's internal-consistency reliability and validity are examined.

Validity means the valid measurement of what is supposed to be measured (Foster, 2001). Carmines and Zeller (1979) define the validity as the extent for measurement devices to evaluate what they intended to measure. In order to prove that the measure of this thesis tests what it claims to test, the content validity of the measure was examined. Content validity based on the extent to which an empirical measurement reflects a specific domain of content (Carmines & Zeller, 1979). According to Domino and Domino (2006), content validity refers to the question of whether the measure adequately covers the dimension to be measured. Researchers in literature generally agree that content validity is often established through qualitative expert reviews (Carmines & Zeller, 1979; Hovardaoğlu, 2000; Domino & Domino, 2006). In order to reach a content valid measure in the context of this research, the judgments of experts on the relevance of the items of the measure with regard to the domain being assessed

were taken into consideration. Regarding the views of experts' in the field, content validity of the measure was proved.

According to Cronbach (1951), in the research studies based on measurement, researchers cannot avoid analyzing the reliability of their measures. The measurement device must have reliability or dependability (Cronbach, 1951). In literature, researchers agree that reliability of a measure refers to its consistency (Cronbach, 1951; Kenny, 1979; Hovardaoğlu, 2000; Foster, 2001; Bryman & Cramer, 2005; Kalaycı, 2009). Similarly, Domino and Domino (2006) give the definition of reliability as the consistency of the data or the results obtained. According to Cronbach (1951), if a measurement has substantial internal consistency, it is also psychologically interpretable. Therefore, in this thesis reliability analysis was used for testing the consistency of the components that extracted from factor analysis and examining the reliability of the measure. Examining the reliability of a measure means that, whether the items constitute the measure are consistent with each other or not. In this thesis, in order to test reliability of the components, Cronbach's alpha measure of reliability method is used by determination of Cronbach's alpha coefficients.

Cronbach's alpha, was developed by Cronbach (1951) as generalized measure of internal consistency of a multi-item scale. According to Cronbach (1951), alpha is the estimate of reliability. Cronbach's alpha is a commonly suggested and the most widely used measure of reliability in literature (Kenny, 1979; Cortina, 1993; Peterson, 1994; Santos & Reynaldo, 1999; Zhang 2006; Kalaycı, 2009). In a survey instrument for evaluating the reliability, Cronbach's alpha coefficient determines the internal consistency and average correlation of items (Santos & Reynaldo, 1999). The statistical formula of the Cronbach's alpha is given below where the n is the number of measures and Mr is the average correlation between measures;

$$\alpha = \frac{n\mathrm{Mr}}{1+(n-1)Mr} \tag{4.1}$$

Cronbach's alpha coefficient values range between 0 and 1 and the higher the score, the more reliable the scale is (Santos & Reynaldo, 1999; Kalaycı, 2009). Table 4.6 presents the reliability levels of Cronbach's alpha coefficients regarding their values that range from 0 to 1. As seen in Table 4.6, small values of Cronbach's alpha coefficient less than 0,5 indicate no reliability for the scale.

Table 4.6. Cronbach's alpha coefficients and their reliability levels
(Source: Kalaycı, 2009)

Cronbach's Alpha	Reliability
$0,00 \leq \alpha < 0,40$	Not reliable
$0,40 \leq \alpha < 0,60$	Lowly reliable
$0,60 \leq \alpha < 0,80$	Reliable
$0,80 \leq \alpha < 1,00$	Highly reliable

In this thesis, Cronbach's alpha coefficients were calculated via SPSS 15 software. Table 4.7 shows the values of Cronbach's alpha coefficients for the components. As seen from Table 4.7, all values are greater than 0,5. Therefore, it can be said that all components in the measure indicate acceptable reliability.

Table 4.7. Results of the reliability analysis for the components

Components	Cronbach's Alpha
Component 1	0,861
Component 2	0,748
Component 3	0,755
Component 4	0,668
Component 5	0,613
Component 6	0,525
Component 7	0,673

4.2.2. The Underlying Success Factors

The seven principal components were found by conducting principal component analysis. The last step of FA is labeling of each component in terms of the interpretations of the items that loaded on each component (Santos & Reynaldo, 1999; Chan et al., 2004; Kalaycı, 2009). Therefore, based on the interpretations of the components the seven extracted components were labeled. The seven principal components presented previously with their items in Table 4.5 were labeled respectively as follows:

- Component 1: Establishment of efficient communication towards mutual goals
- Component 2: Willingness to effective coordination
- Component 3: Commitment to mutual objectives by clear definition of responsibilities
- Component 4: Willingness to eliminate non-value added activities
- Component 5: Commitment to win-win attitude by focusing on long-term relationship
- Component 6: Mutual trust
- Component 7: Support from top management

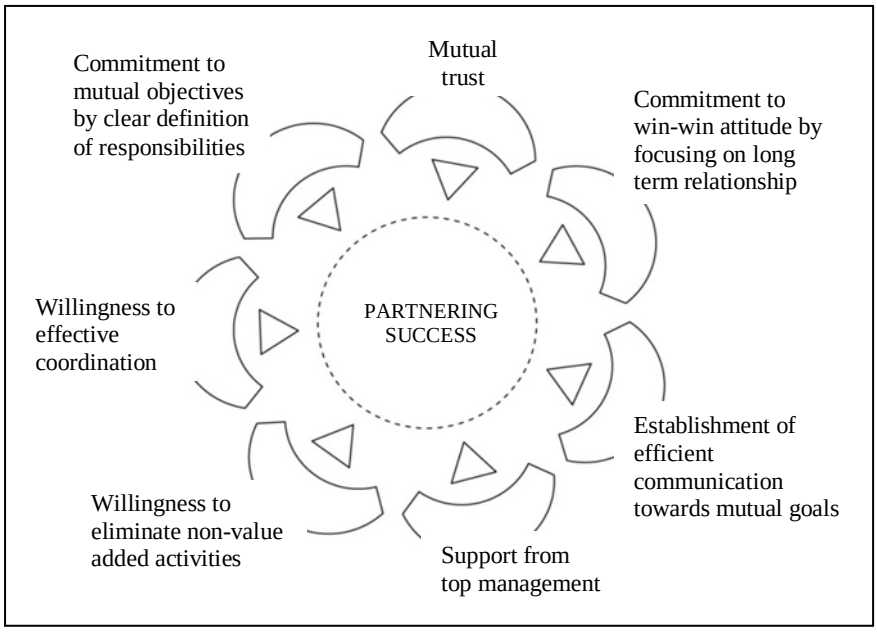

Figure 4.4. The diagrammatic scheme of the seven CSFs of partnering

Figure 4.4 presents an illustrated scheme of the seven CSFs of partnering in the architectural design process for practicing architects in İzmir. Based on the scheme, it can be concluded that these illustrated seven CSFs are vital for the success of partnering. Therefore, they can be called as the underlying success factors of partnering. The associated justifications about the labels of the seven extracted components as being the underlying success factors of partnering are explained hereinafter.

Component 1: Establishment of efficient communication towards mutual goals

Component 1 consists of 8 items and accounts approximately 15% of the variance. Items of component 1 have factor loadings ranging from 0,701 to 0,512. The items of component 1 are related to sharing mutual goals in order to avoid competition among partners during the architectural design process. The items are also related to effective communication strategies and enhancing communication between design team members for the streamlining of the architectural design process. Therefore, component 1 was labeled as *establishment of efficient communication towards mutual goals*.

Researchers in literature generally agree on behaviors aligned with mutual goals and establishment of efficient communication between parties to be vital for the success of partnering (Abudayyeh, 1994; Miles, 1995; Kwan & Ofori, 2001; Naoum, 2003; Nyström, 2005, Anvuur & Kumaraswamy, 2007). In order to gain advantage through successful partnering in the architectural design process, parties should establish effective communication strategies among them. Establishing effective communication provides the basis for information being shared freely and helps to eliminate barriers during the partnering process (Manley et al., 2007). Rather than behaving in a competitive manner, they should support and respect each other's decisions towards mutual goals. Literature and findings support that establishment of efficient communication towards mutual goals plays an important role for the success of partnering in the architectural design process.

Component 2: Willingness to effective coordination

Component 2 consists of 3 items and accounts approximately 10% of the variance. Items of component 2 have factor loadings ranging from 0,756 to 0,490. The items of component 2 are related to focusing on effective coordination in the architectural design process. The first one emphasizes being in coordination with partners during the architectural design process or not. Second one points out the willingness to share every kind of information for the benefits of the architectural design process. Third one explores whether the partners have a problem resolution strategy in order to prevent obstacles for the coordination in the architectural design process. Therefore, component 2 was labeled as *willingness to effective coordination.*

Being in coordination of parties in the architectural design process positively affect the productivity and the performance of the process, which leads to success in the construction stage as well (Bayramoğlu, 2001; Chen & Chen, 2007). According to Mohr and Spekman (1994), success in partnering is achieved through coordinated relationships. Willingness to share information and solve problems fosters coordination during the architectural design process (Cheng et al., 2000; Chan et al., 2004). Willingness to effective coordination refers being in coordination through willingness to share information and solving problems to eliminate communication barriers for the continuity of the coordination. The component willingness to effective coordination is also found to be important for the success of partnering as an underlying success factor.

Component 3: Commitment to mutual objectives by clear definition of responsibilities

Component 3 consists of 4 items and accounts approximately 8% of the variance. Items of component 3 have factor loadings ranging from 0,682 to 0,531. The items of component 3 are related to clearly defining mutual objectives, responsibilities and sharing tasks in a participative manner for the benefits of the architectural design process. Since component 3 consist of clear definition of responsibilities, solving problems in a timely and responsive manner and sharing tasks for commitment to mutual objectives during the architectural design process, it was labeled as *commitment to mutual objectives by clear definition of responsibilities*.

Researchers in literature generally agree on clear definition of responsibilities towards mutual objectives to be important in order to achieve success in partnering (Harback et al., 1994; Chan et al., 2004; Tang et al., 2006; Chen & Chen, 2007). During the definition of responsibilities in the partnering process, it is important to develop aligned relationships to achieve mutual objectives (Chan et al., 2004). Sharing resources and ideas bring out clear definition of responsibilities during partnering process (Tang et al., 2006). Besides, by solving problems in a timely and responsive manner, participants in the partnering process can establish a change from adversarial relationships to cooperative ones for mutual objectives (Black et al., 2000; Chen & Chen, 2007). Therefore, commitment to mutual objectives by clear definition of responsibilities plays an important role for the success of partnering in the architectural design process.

Component 4: Willingness to eliminate non-value added activities

Component 4 consists of 5 items and accounts approximately 8% of the variance. Items of component 4 have factor loadings ranging from 0,632 to 0,468. The items of component 4 are related to taking responsibility for aligned goals, reducing problems and barriers for the benefits of the architectural design process. Component 4 concerns willingness to eliminate barriers for preventing the architectural design process from improvement. Therefore, it was labeled as *willingness to eliminate non-value added activities*.

The non-value added activities are inappropriate for partnering success and in order to be successful in the partnering process, parties should avoid those (Chan et al., 2003). Having responsibility in common issues, willingness to solve problems, develop aligned relationships for aligned objectives and reduce problems based on lack of communication are important issues for the success of partnering (Harback et al., 1994; Cheng & Li, 2002; Chan et al., 2004; Manley et al., 2007). These issues avoid parties from having non-value added activities for the partnering success (Mohr & Spekman, 1994). Therefore, it can be said that the component willingness to eliminate non-value added activities is also important for the success of partnering as an underlying success factor.

Component 5: Commitment to win-win attitude by focusing on long-term relationship

Component 5 consists of 3 items and accounts approximately 7% of the variance. Items of component 5 have factor loadings ranging from 0,714 to 0,543. Component 5 concerns destructive behaviors to obstruct win-win thinking for the improvement of the partnering. Items are related to destructive manners for sharing mutual purpose, commitment for long term partnering and acting for the benefits of the design process. Items of component 5 in Table 4.5 offer negative statements for win-to-win environments. These negative items explore whether participants tend to behave in a destructive manner which absolutely obstructs win-win attitude or not. Therefore the items were recoded for FA and the component was labeled as *commitment to win-win attitude by focusing long-term relationship*.

Eliminating destructive behaviors by developing aligned relationships for mutual objectives bring out win-win environments (Chan et al., 2004; Tang et al., 2006). It is important to develop aligned relationships for mutual goals in order to make each party have benefits (Albanese, 1994; Kwan & Ofori, 2001; Chan et al., 2004; Tang et al., 2006). According to Chan et al. (2004), a long term commitment should be established and not to behave in win-lose attitude for being in a win-win environment (Chan et al., 2004). In order to be more committed for win-win attitude, parties should establish long-term relationships for long-term goals (Chen & Chen, 2007). Therefore, it can be said that commitment to win-win attitude by focusing long-term relationship plays an important role for the success of partnering in the architectural design process.

Component 6: Mutual trust

Component 6 consists of 3 items and accounts approximately 7% of the variance. Items of component 6 have factor loadings ranging from 0,781 to 0,478. Having a relationship based on trust, unsuspected belief on each other's decision from the beginning of the architectural design process constitutes the items of the component 6. Therefore, component 6 was labeled as *mutual trust.*

Researchers in literature agree that mutual trust is crucial for partnering success (Harback et al., 1994; Slater, 1998; Fong & Lung, 2007). By developing mutual trust, parties begin to feel confidence about the decisions of each others'. Partnering can easily be established at the beginning of the architectural design process by developing mutual trust (Crowley & Karim, 1995). Therefore, it can be said that mutual trust plays an important role for the success of partnering in the architectural design process as an underlying success factor.

Component 7: Support from top management

Component 7 consists of 2 items and accounts approximately 7% of the variance. Items of component 7 have factor loadings ranging from 0,803 to 0,732. The items of component 7 are related to the support of managers for partnering in the architectural design offices**.** Since the items of component 7 focuses on support of managers for partnering, the component 7 was labeled as *support from top management*.

Researchers in literature generally accept support from top management to be important for a successful partnering relationship (Harback et al., 1994; Slater, 1998; Black et al., 2000; Cheng et al., 2000; Cheng & Li, 2002; Chen & Chen, 2007). In order to have adequate resources for partnering success, the support of top management is needed (Cheng & Li, 2002). Therefore, it can be said that support from top management is also important for the success of partnering as an underlying success factor.

In order to find the strongest predictors of partnering success, MRA process and its findings are presented afterwards.

4.3. Multiple Regression Results

In this thesis in order to explore the relative significance of the components that extracted from FA, MRA was conducted via SPSS 15 software. There were seven underlying success factors which are called as independent variables and one dependent variable which is called as personal perception of partnering success. The codes of the independent and dependent variables are given in Table 4.8. The independent variables in the Table 4.8 are coded from X_1 toX_7 and the dependent variable is coded as Y.

Table 4.8. The codes of the dependent and the independent variables

Codes	Variables
X_1	Establishment of efficient communication towards mutual goals
X_2	Willingness to effective coordination
X_3	Commitment to mutual objectives by clear definition of responsibilities
X_4	Willingness to eliminate non-value added activities
X_5	Commitment to win-win attitude by focusing on long-term relationship
X_6	Mutual trust
X_7	Support from top management
Y	“My partners always have a great satisfaction in doing business with me”

The regression equation can be defined as below with the codes of the independent and dependent variables;

$$Y= \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \varepsilon \qquad (4.2)$$

Table 4.9 presents the descriptive statistics of the independent variables in the regression equation. It is clear from the Table 4.9 that the most commonly favorable factor on partnering success is X_7 with its 3,9426 mean value. The second and the third ones are X_6 and X_4 respectively. Table 4.9 suggests that the least favorable factor on partnering success is X_5. However, these statistics presented in Table 4.9 do not give the most important factors on partnering success. In order to determine the most effective factors on partnering success, it is important to determine the standardized coefficients (β) of the independent variables in the regression model and their significance levels. Before determining the standardized coefficients (β) in the regression model, it is important to examine whether the regression model is statistically significant or not.

Table 4.9. Descriptive statistics of dependent and independent variables

Variables	Mean *	Standard Deviation
X_1	3,4327	0,70183
X_2	3,7342	0,76757
X_3	3,7139	0,75236
X_4	3,8423	0,59752
X_5	2,6088	0,81475
X_6	3,9421	0,66058
X_7	3,9426	0,61129
Y	4,0481	0,71570

*1= do not agree *5= agree

Table 4.10. Regression model and model summary

Independent Variable (Underlying Success Factor)	Standardized Coefficient (β)	t value	Significance Level *(p)*	Collinearity Statistics Tolerance	VIF
Variable 1: Establishment of efficient communication towards mutual goals	0,104	0,940	0,350	0,424	2,356
Variable 2: Willingness to effective coordination	**0,473**	4,710	**0,001*****	0,520	1,925
Variable 3: Commitment to mutual objectives by clear definition of responsibilities	0,117	1,206	0,231	0,558	1,792
Variable 4: Willingness to eliminate non-value added activities	**0,237**	2,551	**0,012***	0,607	1,646
Variable 5: Commitment to win-win attitude by focusing on long term relationship	**0,183**	2,214	**0,036***	0,708	1,411
Variable 6: Mutual trust	0,009	0,107	0,915	0,672	1,488
Variable 7: Support from top management	0,007	0,083	0,934	0,659	1,518
Y: Dependent Variable: "My partners always have a great satisfaction in doing business with me"					
MODEL SUMMARY					
$R^2 = 0,497$	Adjusted $R^2 = 0,461$				
F = 13,754	Sig. 0,001 , $p \leq 0,001$				
* $p \leq 0,05$ ** $p \leq 0,01$	*** $p \leq 0,001$				

Table 4.10 presents the results of the MRA. It also presents coefficient of determination (R^2), adjusted R square (adjusted R^2), *p* and F values in the model summary. In order to determine whether the regression model is statistically significant or not, *p* and F values should be examined. F ratio in the regression model should be higher or *p*-value should range between 0 and 1 ($0 \leq p \leq 1$) for being sure from the reliability of the regression analysis (Kalaycı, 2009). Since the *p*-value is 0,001 ($p \leq 0,001$) and F value is 13,574, it can be said that the regression model is statistically significant.

In a regression model R^2 is defined as a measure of success of predicting the dependent variable from independent variables and takes values ranging from 0 to 1 (Bryman & Cramer, 2005). R^2 indicates the proportion of variance explained by the

regression model (Berry & Feldman, 1985; Nagelkerke, 1991). However, R^2 can be sometimes misleading on the proportion of variance explained in the regression model (Berry & Feldman, 1985). Since, R^2 always increases as variables are added to the equation even when they have no effect on the dependent variable. Unlike R^2, adjusted R^2 do not always increase as variables added to the regression model (Rawlings, Dickey & Pantula, 1998). In order to avoid this problem, adjusted R^2 should be computed (Berry & Feldman, 1985; Bryman & Cramer, 2005; Kalaycı, 2009). Therefore, the percentage of variability in the dependent variable could be interpreted from the adjusted R^2 result in Table 4.10. In order to summary the general performance of the regression model it can be said that 46,1% (adjusted R^2 result is 0,461) of variability in the dependent variable can be explained by independent variables. In other words, the regression model explain 46,1% of the variance in the partnering success.

Standardized coefficients (β) of the independent variables, significance levels (*p*-value), t value and collinearity statistics are presented in Table 4.10. In a regression model collinearity statistics indicate whether there is a multicollinearity problem in the model or not (Bryman & Cramer, 2005). It is important to ensure that a multicollinearity problem is not occurred in the regression model. Multicollinearity is regarded as a problem because it indicates the regression coefficients may be unstable (Cohen, Cohen, West & Aiken, 2003; Bryman & Cramer, 2005). Multicollinearity occurs when two or more independent variables in a multiple regression model are highly correlated (Berry & Feldman, 1985; Bryman & Cramer, 2005; Kalaycı, 2009). Multicollinearity in a regression model can be assessed by examining tolerance and variance inflation factor (VIF). Tolerance less than 0,2 and VIF greater than 10 indicates multicollinearity problem in the regression model (Cohen et al., 2003). In order to be sure of multicollinearity problem does not exist in the regression model, tolerance and VIF values should be examined. Tolerance and VIF values are presented under collinearity statistics column in Table 4.10. Tolerance and VIF values show that there is not a multicollinearity problem in the regression model, because tolerance values are not less than 0,2 and VIF values are also not greater than 10.

In order to determine the most effective independent variables on the partnering success, Table 4.10 presents the β coefficients of the independent variables and their significance levels. In the regression model it can be seen that variable 1 has β_1= 0,104 ($p\geq$0,05), variable 2 has β_2= 0,473 ($p\leq$0,001), variable 3 has β_3= 0,117 ($p\geq$0,05), variable 4 has β_4= 0,237 ($p\leq$0,05), variable 5 has β_5= 0,183 ($p\leq$0,05), variable 6 has β_6=

0,009 ($p \geq 0,05$) and variable 7 has $\beta_7 = 0,007$ ($p \geq 0,05$). As seen from the results, β coefficients of the independent variables indicate positive, statistically significant and insignificant relationships between the dependent and independent variables. Since the computed significance levels of β_1, β_3, β_6 and β_7 are greater than 0,05 ($p > 0,05$), they are statistically insignificant. However, the variables 2, 4 and 5 are statistically significant because the computed significance levels of β_2, β_4 and β_5 are lower than 0,05 ($p < 0,05$).

In Figure 4.6, the results of the data analysis process of this research are illustrated. As can be seen in Figure 4.6, the most important CSFs as being the strongest predictors of partnering success are as follows: *willingness to effective coordination willingness to eliminate non-value added activities* and *commitment to win-win attitude by focusing on long-term relationship*.

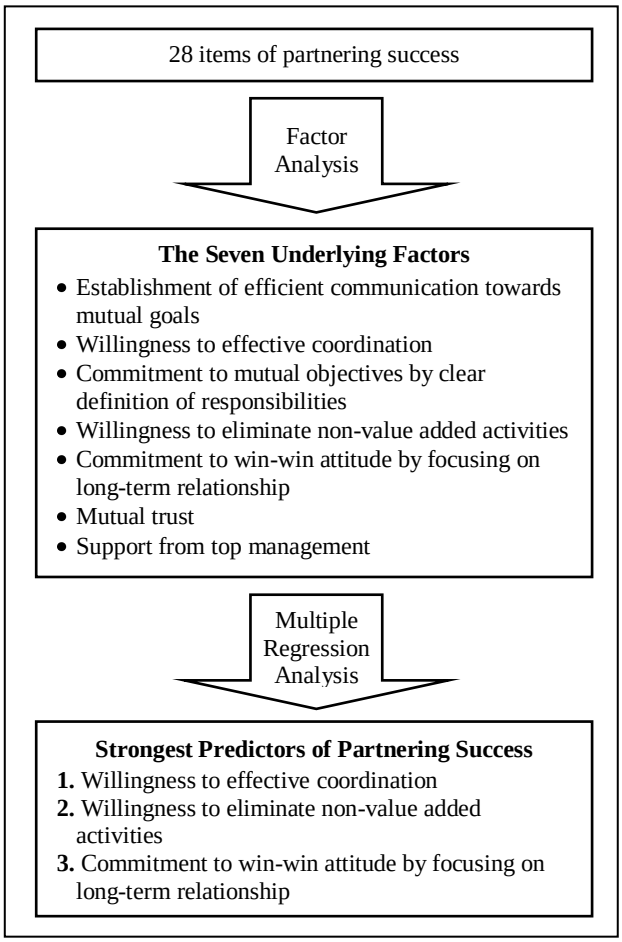

Figure 4.5. The results of the data analysis process of the research

4.3.1. Strongest Predictors of Partnering Success

Results of the MRA showed that *willingness to effective coordination, willingness to eliminate non-value added activities* and *commitment to win-win attitude by focusing on long-term relationship* are the strongest predictors of partnering success according to practicing architects in İzmir.

The CSF that found most important for partnering success by practicing architects in İzmir is *willingness to effective coordination*. The items of this CSF are related to being in coordination with other parties, willingness to share information and having a constructive problem resolution strategy. Being in effective coordination with other parties during partnering arrangement is important for partnering success (Mohr & Spekman, 1994; Ronco & Ronco 1996; Cheng et al., 2000; Bayramoglu, 2001; Chan et al., 2004). Coordination is crucial in the building process from design to construction (Saram & Ahmed, 2001). On account of the fragmented structure of construction industry, coordination problems are common in both construction and design processes (Ronco & Ronco 1996; Evbuomwan & Anumba, 1998; Bayramoğlu, 2001; Saram & Ahmed, 2001). Coordination problems affect project performance and productivity (Chen & Chen, 2007). According to Bayramoğlu (2001), absence of effective coordination in the design process causes redundant design solutions, costly design costs and as well leads to failure in the construction stage. Lack of efficient coordination in the design process negatively affect the construction process where problems related to schedule, quality, manpower, materials used and cost are increased (Bayramoğlu, 2001). According to Chan et al. (2004), one of the essential ingredients of partnering is effective coordination. Similarly, Mohr and Spekman (1994) state that effective coordination is one of the predictors of partnering success. Successful partnering arrangements are achieved by coordinated actions towards mutually agreed goals (Mohr & Spekman, 1994). According to Cheng and Li (2002), partnering team members having effective coordination establish a partnering arrangement that focus on common goals. Various researchers in literature state that willing to be sharing information and having a constructive problem strategy to deal with problems improve coordination among parties (Cheng et al., 2000; Bayramoğlu, 2001; Chan et al., 2004). Sharing resources such as information and knowledge with other parties is important in terms of continuity of coordination towards common goals (Cheng et al., 2000). Avoiding

adversarial relationships by having a constructive problem resolution strategy provides high level of coordination among parties towards common goals (Cheng et al., 2000; Chan et al., 2004). Thus, willingness to effective coordination for a successful partnering refers to being in coordination in the architectural design process and includes willingness to share information for the benefits of the project and having a constructive problem resolution strategy to deal with problems occurred. It is found that willingness to effective coordination is the most important CSF as being one of the strongest predictors of the partnering success.

The second most important CSF for partnering success is *willingness to eliminate non-value added activities*. The items of this CSF are related to eliminating problems and barriers that are not aligned with mutual goals during the architectural design process. Changes in inappropriate attitudes and adversarial situations are important for partnering to succeed (Black et al., 2000; Chen & Chen, 2007). Having a problem resolution strategy, focusing on mutual goals and communication quality serve to align partners' expectations and objectives. As well, avoid them having inappropriate attitudes and non-value added activities for achieving partnering success (Mohr & Spekman, 1994). Developing mutual goals among parties provides a deeper understanding of the overall objectives of project and difficulties in their establishment (Tang et al., 2006). Moreover, parties can agree on problematic issues and share many common issues by developing mutual goals (Tang et al., 2006). According to Tang et al. (2006), sharing mutual goals can change the attitude of parties and enable them to eliminate non-value added activities. Kwan and Ofori (2001) state that there must be a shared vision for the success of partnering with mutual goals through sharing of ideas and expectations. Similarly, Black et al. (2000) mention that partnering arrangement will not succeed unless parties act consistent with their mutual goals. Having different goals and expectations in the partnering rather than having mutual goals caused conflicting issues that obstruct improvement in the partnering success (Chen & Chen, 2007). In order to be successful in the partnering process and avoid non-value added activities, it is important to have willingness to improve processes, eliminate waste and barriers and reduce duplication (Chan et al., 2004). In order to avoid non-value added activities that adversely affect the partnering success, each party assume responsibility for the improvement of the process (Harback et al., 1994; Chan et al., 2004; Tang et al., 2006; Chen & Chen, 2007). According to Liu and Fellows (2001), in order to avoid non-value added and destructive activities that cause failure in partnering, problems and

conflicts should be resolved before developing into disputes. When problems arose, parties should solve it productively in order to acquire productive solutions for the improvement of the process (DeVilbiss & Leonard, 2000; Nyström, 2005). Effective and productive conflict resolution is crucial for partnering (Crowley & Karim, 1995). When a conflict occurred, parties should solve it productively (DeVilbiss & Leonard, 2000). In order to get productive resolutions, partners should be committed to work together openly to reach win-win solutions (DeVilbiss & Leonard, 2000). Crowley and Karim (1995) state that if a conflict is managed properly it leads to creative solutions and contributes to success. The productive resolution of a conflict may enhance the ability to work together for mutual goals in the future (Crowley & Karim, 1995).

Chan et al. (2003) state that the success of partnering depends on people who implement it. According to Chan et al. (2003), partnering requires each participant to commit himself or herself to the process. Partnering encourages parties to reverse the adversarial relationships to more cooperative ones (Larson, 1995; Wilson et al., 1995; Chan et al., 2003). However, the inappropriate attitudes of parties obstruct the development of cooperative relationships during partnering (Chan et al., 2003). Therefore, in order to be successful in partnering, parties should avoid non-value added activities by behaving in harmony with mutual goals, willing to solve problems and taking responsibility in common issues.

The third and last most important CSF for partnering success in the architectural design process is *commitment to win-win attitude by focusing on long-term relationship*. The items of this CSF related to destructive behaviors which obstruct win-win thinking for the improvement of the partnering process. The items of this CSF are recoded because they comprise negative statements against win-win environments. This recoding is due to the fact that partnering success depends on eliminating destructive behaviors. Since the items are recoded, the CSF is labeled as commitment to win-win attitude by focusing on long-term relationship. If parties can be committed to work in a team environment by eliminating their destructive behaviors, it will foster win-win relationships (Chan et al., 2003). In win-win relationships, neither party wins due to the other's loss (Albanese, 1994). Win-win attitude is achieved by all parties involved in the process to create advantages for all parties (Albanese, 1994; Kwan & Ofori, 2001; Ng, Rose, Mak & Chen, 2002; Naoum, 2003). According to Tang et al. (2006), commitment to win-win attitude enables project participants to change the adversarial situations during project and make maximum contributions for achieving a successful project to

the benefit of all. As well, equity is important to achieve commitment for win-win attitude among parties (Chan et al, 2004; Beach et al., 2005).

Researchers in literature agree that partnering seeks to change traditional relationships to a shared culture where all parties are committed to win-win attitude (Harback et al., 1994; Conley & Gregory, 1995; Larson, 1995; Koraltan & Dikbaş, 2002; Chan et al., 2003; Tang et al., 2006; Anvuur & Kumaraswamy, 2007). Adversarial relationships among project participants cause win-lose environment in partnering (Chan et al, 2004). However, eliminating adversarial relationships by developing aligned relationships for mutual goals fosters win-win attitude between participants (Chan et al, 2004; Tang et al., 2006). According to Chan et al. (2004), a long term commitment should be established for creating win-win environments (Chan et al., 2004). In order to be more committed for win-win attitude, parties should establish long-term relationships for long-term goals (Chen & Chen, 2007). Therefore, it can be concluded that commitment of the project participants to win-win attitude is crucial for partnering success (Chan et al, 2004; Tang et al., 2006; Eren, 2007; Manley et al., 2007).

4.4. Comparison of Research Findings with Previous Studies on Critical Success Factors of Partnering

Under the light of previous findings on CSFs of partnering, the present section of this chapter compares the findings of this thesis with previous research studies on CSFs of partnering. As indicated previously, seven CSFs extracted from the results of the questionnaire survey are as follows: *establishment of efficient communication towards mutual goals, willingness to effective coordination, commitment to mutual objectives by clear definition of responsibilities, willingness to eliminate non-value added activities, commitment to win-win attitude by focusing on long-term relationship, mutual trust* and *support from top management.* The MRA listed the most important CSFs as being the strongest predictors of partnering success according to the practicing architects in İzmir. The strongest predictors of partnering success are as follows: (1) willingness *to effective coordination,* (2) *willingness to eliminate non-value added activities* and (3) *commitment to win-win attitude by focusing on long-term relationship*. However, according to the findings of the questionnaire survey which is conducted in

UK by Black et al. (2000), the strongest predictors of the partnering success are as follows: (1) mutual trust, (2) effective communication and (3) commitment from senior management. The respondents of Black et al. (2000)'s survey are comprised of contractors, clients and design teams from 51 construction companies in UK. On the other hand, the respondents in the present research are comprised of 104 practicing architects in İzmir. Although the respondents in the present research are limited to the practicing architects, the findings of both of the research studies draw similar conclusions. In the both of the research studies, respondents agree that mutual trust, effective communication and support from management are crucial for partnering to succeed. However, considerations of the respondents on the most important CSFs of partnering are differing in the both of the research studies. In the research of Black et al. (2000) respondents agree that mutual trust, effective communication and commitment from senior management are the most important CSFs of partnering. On the other hand, the respondents of the present research do not have this consideration. The respondents of the present research agree that willingness to effective coordination, willingness to eliminate non-value added activities and commitment to win-win attitude by focusing long term relationship are the most important CSFs of partnering.

The respondents of the research of Black et al. (2000) found mutual trust is the most important CSF for partnering success. Since the traditional relationships among clients, contractors and design teams are mistrustful, the respondents agree that mutual trust is the most important CSF for success in the partnering relationship (Black et al., 2000). Otherwise, the respondents in the present research found willingness to effective coordination as the most important CSF for partnering success. Since the lack of efficient coordination in the design process affect performance and costs, the respondents in the present research agree that effective coordination is the most important CSF for partnering success. The respondents of the research of Black et al. (2000) found effective communication as the second important CSF for partnering success. Since respondents in the research of Black et al. (2000) agree that poor communication between contractors, design teams and clients caused problems on site, they rated this CSF high and found important. The respondents in the present research found willingness to eliminate non-value added activities as the second important CSF. Since to change inappropriate attitudes and adversarial situations in design process are important for partnering success, the respondents in the present research are rated this CSF high. The respondents in the research of Black et al. (2000) found commitment

from senior management as the third important CSF for partnering success. According to the respondents in the research of Black et al. (2000), partnering success is achieved with the backing of senior management. Since in the present research the respondents are comprised of architects who are working with partnership based relationships instead of with directions and support of senior management, they do not found this CSF as one of the strongest predictors of partnering success. According to the respondents in the present research, commitment to win-win attitude by focusing on long-term relationship is the third important CSF for partnering success. Since eliminating the destructive behaviors for win-win attitude improves partnership based relationships and fosters success of partnering, they found this CSF important.

Therefore it can be said that, different considerations of the respondents on the strongest predictors of partnering success can be derived from the profiles of the respondents in the research studies. The respondents in the research of Black et al. (2000) are comprised of contractors and design teams who are working in construction companies and clients who are working with them. However, the respondents in the present research are comprised of practicing architects own their architectural design firms. The comparison of the results of the two research studies is also presented in Table 4.11.

Table 4.11. The comparison of the present research findings with the findings of the research of Black et al. (2000)

	Black et al.	Kılıç
Date	2000	2010
Location	UK wide	İzmir, Turkey
Respondents	contractors, clients and design teams from 51 construction companies	104 practicing architects own their design firms
CSFs of partnering	• mutual trust • effective communication • commitment from senior management • acting consistently with joint objectives • dedicated team • flexibility to change • commitment to continuous improvement.	• mutual trust • establishment of efficient communication towards mutual goals • support from top management • commitment to mutual objectives by clear definition of responsibilities • willingness to effective coordination • willingness to eliminate non-value added activities • commitment to win-win attitude by focusing on long-term relationship
The most important CSFs	(1) mutual trust (2) effective communication (3) commitment from senior management.	(1) willingness to effective coordination (2) willingness to eliminate non-value added activities (3) commitment to win-win attitude by focusing on long-term relationship

In order to determine the important CSFs of partnering a questionnaire survey is conducted from Cheng and Li (2002) to 79 respondents from construction professionals around the world. The results of the survey listed the most important CSFs for partnering success as follows: (1) top management support, (2) open communication, (3) mutual trust and (4) effective coordination. According to Cheng and Li (2002), these CSFs are important for each of the formation, application and completion partnering stages. Although a worldwide sample is used in the research of Cheng and Li (2002) and the profiles of the respondents of the two research studies are diverse, findings draw similar conclusions. Respondents of both of the research studies agree that top management support, open communication, mutual trust is crucial on partnering success. While in the research of Cheng and Li (2002) these factors are considered as the most important factors of partnering, in the present research these factors are considered as critical to partnering success. In the both of the research studies, effective coordination factor is the common factor which is considered as one of the strongest predictors of partnering success. Table 4.12 presents the comparison of the results of the two research studies.

Table 4.12. The comparison of the present research findings with the findings of the research of Cheng and Li (2002)

	Cheng & Li	Kılıç
Date	2002	2010
Location	worldwide	İzmir, Turkey
Respondents	79 construction professionals	104 practicing architects own their design firms
The most important CSFs	(1) top management support (2) open communication (3) mutual trust (4) effective coordination	(1) willingness to effective coordination (2) willingness to eliminate non-value added activities (3) commitment to win-win attitude by focusing on long-term relationship

In order to identify the CSFs for partnering projects in construction industry in Hong Kong, a postal questionnaire survey is conducted by Chan et al. (2004). 78 respondents who are comprised of clients, contractors and the design teams with partnering experience attended in the survey. CSFs of partnering are explored in the research of Chan et al. (2004) as follows: (1) establishment and communication of conflict resolution strategy, (2) commitment to win-win attitude, (3) regular monitoring of partnering process, (4) clear definition of responsibilities, (5) mutual trust, (6) willingness to eliminate non-value added activities, (7) early implementation of partnering process, (8) willingness to sharing resources, (9) ability to generate innovative ideas, (10) subcontractors' involvement. The strongest predictors of partnering success are explored in the research of Chan et al. (2004) as follows: (1) establishment and communication of conflict resolution strategy, (2) willingness to sharing resources, (3) clear definition of responsibilities, (4) commitment to win-win attitude, (5) regular monitoring of partnering process. By comparing the research of Chan et al. (2004) with the present research, it can be indicated that findings draw similar conclusions. Commitment to win-win attitude, clear definition of responsibilities, mutual trust and willingness to eliminate non-value added activities are commonly assessed as CSFs of partnering in both of the research studies. However, the determination of the strongest predictors of partnering success is differing in the research studies. For instance, while commitment to win-win attitude is determined as one of the strongest predictors of partnering success in both of the research studies, the other strongest predictors are differing. The respondents in the research of Chan et al. (2004) agree that establishment and communication of conflict resolution strategy,

willingness to sharing resources, clear definition of responsibilities and regular monitoring of partnering process are the other strongest predictors of partnering success. Since commitment of all parties for improving communication within the project team is achieved by solving conflicts, establishment and communication of conflict resolution strategy assessed as the most important CSF by the respondents in the research of Chan et al. (2004). Willingness to sharing resources is found as the second important CSF by the respondents in the research of Chan et al. (2004). Since for achieving success in partnering, parties should be willing to share resources that would benefit overall organizational goals (Chan et al., 2004). Clear definition of responsibilities is found as the third important CSF by the respondents in the research of Chan et al. (2004). According to Chan et al. (2004), in order to achieve success in partnering the roles and responsibilities should be properly defined. Commitment to win-win attitude is found as the fourth important CSF by the respondents in the research of Chan et al. (2004). Since win-win thinking is the essential element of successful partnering, parties should work hand-in-hand with one another for partnering to succeed (Chan et al., 2004). Regular monitoring of partnering process is found as the fifth important CSF by the respondents in the research of Chan et al. (2004). Since regular monitoring of partnering process improves performance, this CSF assessed as the last strongest predictors of partnering success (Chan et al., 2004). The difference on determination of the strongest predictors of partnering success between two research studies can be arisen from the professional and the cultural differences of the respondents. The comparison of the findings of the two research studies is presented in Table 4.13.

Table 4.13. The comparison of the present research findings with the findings of the research of Chan et al. (2004)

	Chan et al.	Kılıç
Date	2004	2010
Location	Hong Kong	İzmir, Turkey
Respondents	78 respondents who are comprised of contractors, clients and design teams from construction industry	104 practicing architects own their design firms
CSFs of partnering	• commitment to win-win attitude • clear definition of responsibilities • mutual trust • willingness to eliminate non-value added activities • establishment and communication of conflict resolution strategy • early implementation of partnering process • willingness to sharing resources • regular monitoring of partnering process • ability to generate innovative ideas • subcontractors' involvement	• commitment to win-win attitude by focusing on long-term relationship • commitment to mutual objectives by clear definition of responsibilities • mutual trust • willingness to eliminate non-value added activities • establishment of efficient communication towards mutual goals • willingness to effective coordination • support from top management
The most important CSFs	(1) establishment and communication of conflict resolution strategy (2) willingness to sharing resources (3) clear definition of responsibilities (4) commitment to win-win attitude (5) regular monitoring of partnering process	(1) willingness to effective coordination (2) willingness to eliminate non-value added activities (3) commitment to win-win attitude by focusing on long-term relationship

In 2006, Tang et al. conducted a questionnaire survey to 115 respondents from different professions of construction industry in China. According to the results of the research, CSFs of partnering are identified as follows: (1) mutual goals/objectives, (2) attitude, (3) commitment, (4) equality, (5) trust, (6) openness, (7) team building, (8) effective communication, (9) problem resolution and (10) timely responsiveness. Results of the survey indicated that trust is the most important CSF of partnering. In order to make a comparison it can be said that, trust is found pivotal in the success of partnering in both of the research studies. The CSF trust is also accepted as one of the strongest predictor of the partnering success in the research of Tang et al. (2006). Trust in partnering encourages parties to make maximum contributions to achieve successful results in partnering to the benefit of all (Tang et al., 2006). Thus, trust is accepted as crucial for partnering success by respondents in the both of the research studies. Although trust is found pivotal in the present research, it is not accepted as one of the

strongest predictors of partnering success according to the respondents. This divergence can be arisen from the sample differences such as number of respondents, professions, cultures etc. Table 4.14 presents the comparison of the results of the two research studies.

Table 4.14. The comparison of the present research findings with the findings of the research of Tang et al. (2006)

	Tang et al.	Kılıç
Date	2006	2010
Location	Hong Kong	İzmir, Turkey
Respondents	115 respondents from different professions of construction industry	104 practicing architects own their design firms
CSFs of partnering	• trust • mutual goals/objectives • attitude • commitment • equality • openness • team building • effective communication • problem resolution • timely responsiveness	• mutual trust • establishment of efficient communication towards mutual goals • willingness to effective coordination • commitment to mutual objectives by clear definition of responsibilities • willingness to eliminate non-value added activities • commitment to win-win attitude by focusing on long-term relationship • support from top management
The most important CSFs	(1) trust	(1) willingness to effective coordination (2) willingness to eliminate non-value added activities (3) commitment to win-win attitude by focusing on long-term relationship

In 2007, Chen and Chen conducted a questionnaire survey to 221 construction professionals in Taiwan in order to determine and rank the CSFs of partnering. The 221 respondents of the questionnaire survey are comprised of designers, contractors, government employees and owners with first hand partnering experience. CSFs of partnering are explored in the research of Chen and Chen (2007) as follows: (1) effective communication, (2) technical expertise, (3) consistent with objectives, (4) questioning attitudes, (5) commitment to quality, (6) mutual trust, (7) financial security, (8) commitment from senior management, (9) clear understanding, (10) total cost perspective, (11) equal power, (12) commitment to continuous improvement, (13) company wide acceptance, (14) flexibility to change, (15) availability of resources, (16)

partnership formation at design stage, (17) dedicated team, (18) long term perspective and (19) good cultural fit. Among the nineteen CSFs, the three most important CSFs are determined as follows: (1) effective communication, (2) technical expertise and (3) consistent with objectives.

Since communication problems in the fragmented nature of construction industry affect the performance and productivity, effective communication is found to be the most important CSF by the respondents of the research of Chen and Chen (2007). According to Chen and Chen (2007), respondents ranked this CSF as the first one because partnering requires timely communication of information among parties in order not to fail. Respondents in the research of Chen and Chen (2007) found technical expertise as the second most important CSF of partnering. Since construction projects depend on integrating the experience and knowledge of different professionals involved, it is crucial to organize information, skills, requirements and experience possessed by the parties (Chen & Chen, 2007). Respondents in the research of Chen and Chen (2007) found consistent with objectives as the third most important CSF of partnering. Since parties in a partnering arrangement working as a team towards common goals, it is important to have relationships consistent with mutual objectives (Chen & Chen, 2007).

By comparing the findings of the two research studies it can be said that the two research studies do not have parallel findings with each other. In both of the research studies effective communication, mutual trust and support from senior management CSFs are found as pivotal. However, the most important CSFs of partnering are differing. This difference can be arisen from the features of the samples. In order to exemplify, Chen and Chen (2007) conducted the questionnaire survey to 221 construction professionals in Taiwan, the questionnaire survey of the present research is conducted to 104 professional architects in İzmir. The differences of viewpoints can be due to the sample sizes, different professional backgrounds and different cultures. The comparison of the results of the two research studies is presented by Table 4.15.

Table 4.15. The comparison of the present research findings with the findings of the research of Chen and Chen (2007)

	Chen & Chen	Kılıç
Date	2007	2010
Location	Hong Kong	İzmir, Turkey
Respondents	221 respondents from different professions of construction industry	104 practicing architects own their design firms
CSFs of partnering	• effective communication • mutual trust • commitment from senior management • technical expertise • consistent with objectives • questioning attitudes • commitment to quality • financial security • clear understanding • total cost perspective • equal power • commitment to continuous improvement • company wide acceptance • flexibility to change • availability of resources • partnership formation at design stage • dedicated team • long term perspective • good cultural fit	• establishment of efficient communication towards mutual goals • mutual trust • support from top management • willingness to effective coordination • commitment to mutual objectives by clear definition of responsibilities • willingness to eliminate non-value added activities • commitment to win-win attitude by focusing on long-term relationship
The most important CSFs	(1) effective communication (2) technical expertise (3) consistent with objectives	(1) willingness to effective coordination (2) willingness to eliminate non-value added activities (3) commitment to win-win attitude by focusing on long-term relationship

Another research is conducted by Eren (2007) in the scope of a master thesis. In order to determine the CSFs of partnering found important by Turkish contractors, Eren (2007) conducted a questionnaire survey. The respondents are comprised of 49 contractors from the Turkish construction industry. The findings are indicated that (1) mutual trust, (2) top management support and (3) commitment to win-win attitude are determined as the most important CSFs for partnering success according to Turkish contractors. In order to compare the two research studies it can be said that, mutual trust, top management support and commitment to win-win attitude found important for partnering to succeed by the respondents in the both of the research studies. Although mutual trust and top management support found as pivotal for partnering success by Turkish architects, these factors not found as the strongest predictors of partnering

success by the Turkish architects as opposed to Turkish contractors. In the present research, the respondents are comprised of architects who are working with partnership based relationships instead of with directions and support of top management. Due to the absence of top management, respondents who own architectural design offices do not find top management support as one of the strongest predictors of the partnering success. By comparing the two research studies it can be said that commitment to win-win attitude is the third important factor in both of the research studies according to the Turkish architects and contractors. Therefore it can be said that the results of the two research studies draw similar conclusions. Table 4.16 presents the comparison of the results of the two research studies.

Table 4.16. The comparison of present research findings with the findings of the research of Eren (2007)

	Eren	Kılıç
Date	2007	2010
Location	Turkey	İzmir,Turkey
Respondents	49 contractors from Turkish construction industry	104 practicing architects own their design firms
The most important CSFs	(1) mutual trust (2) top management support (3) commitment to win-win attitude	(1) willingness to effective coordination (2) willingness to eliminate non-value added activities (3) commitment to win-win attitude by focusing on long-term relationship

Finally in order to make an overall comparison of the findings of each previous research with the findings of the present thesis research, Table 4.17 lists the comparison of the research findings with the previous ones. Table 4.17 is an integrated summary of Table 4.11, 4.12, 4.13, 4.14, 4.15 and 4.16. As seen in Table 4.17, the most important CSFs explored from the previous research studies are as follows: (1) mutual trust, (2) top management support, (3) establishment of efficient communication and (4) commitment to win-win attitude. The present thesis research finds the most important CSFs to be as follows: (1) willingness to effective coordination, (2) willingness to eliminate non-value added activities and (3) commitment to win-win attitude by focusing on long-term relationship.

Table 4.17. The comparison of the present research findings with the previous research studies on CSFs of partnering

Research Studies	• Black et al. (2000) • Cheng et al. (2002) • Chan et al. (2004) • Tang et al. (2006) • Chen & Chen (2007) • Eren (2007)	• Kılıç (2010)
Respondents	• contractors, and • clients • design teams from construction industry	• practicing architects own their design firms
Location	• UK • Hong Kong • Turkey	• İzmir, Turkey
CSFs of partnering	• establishment of efficient communication • mutual trust • top management support • efficient coordination • clear definition of responsibilities • willingness to eliminate non-value added activities • commitment to win-win attitude • mutual objectives • team building • commitment to continuous improvement • early implementation of partnering process • willingness to sharing resources • flexibility to change • equality • establishment and communication of conflict resolution strategy • regular monitoring of partnering process • ability to generate innovative ideas • subcontractors' involvement • timely responsiveness • technical expertise • questioning attitudes • commitment to quality • financial security • total cost perspective • dedicated team • long term perspective • good cultural fit • company wide acceptance • clear understanding	• establishment of efficient communication towards mutual goals • mutual trust • support from top management • willingness to effective coordination • commitment to mutual objectives by clear definition of responsibilities • willingness to eliminate non-value added activities • commitment to win-win attitude by focusing on long-term relationship
The most important CSFs	(1) mutual trust (2) top management support (3) establishment of efficient communication (4) commitment to win-win attitude	(1) willingness to effective coordination (2) willingness to eliminate non-value added activities (3) commitment to win-win attitude by focusing on long-term relationship

Architects generally prefer partners who they already have made partnering for previous architectural projects. Since, being partners for a long time bring along mutual trust and efficient communication after a while, they may feel CSFs of *mutual trust* and

establishment of efficient communication as default inputs for partnering success. Although the practicing architects in İzmir did not score *mutual trust* and *establishment of efficient communication* as the most important CSFs of partnering, they recognize their importance on partnering success by listing them as CSFs of partnering.

Since the traditional architectural design process is fragmented, consecutive and difficult to coordinate, it is usual for architects to have problems related to coordination deficiency. Regarding these it can be concluded that practicing architects in İzmir accept *willingness to effective coordination* as the most important CSF of partnering. In order to establish coordination among parties, firstly it is vital to establish efficient communication and mutual trust between parties. Therefore, it can be said that the efficiencies of the efficient communication and mutual trust factors on the partnering success are nested.

In the present research the respondents are comprised of architects who are working with partnership based relationships instead of working with directions and support of senior management. Therefore, they may not accept top management support as one of the most important CSFs of partnering success. Since the architectural design process depends on partnering among professionals from various disciplines, *willingness to eliminate non-value added activities* could be accepted as one of the most important CSFs of partnering in the present research.

Both in the present and previous research studies *commitment to win-win attitude* is accepted as one of the most important CSF of partnering. Consequently it can be concluded that construction sector generally agrees on commitment to win-win attitude is vital for the success of partnering.

CHAPTER 5

CONCLUSIONS

5.1. Concluding Remarks

The research presented in this study explores critical success factors of partnering in the context of architectural design practice in İzmir. Partnering is an integrative and coordinated approach by bringing engineers and architects together in the architectural design phase. Successful partnering eliminates the problems caused by fragmentation. This study is an initial step that can guide architects towards successful partnering for the architectural design phase.

Literature review suggests that partnering is very common in construction sector and immediately begins in the architectural design phase. Making successful partnering demands defining the objectives, understanding the benefits and applying the critical success factors of partnering. Therefore, this research begins with reviewing partnering concept. Research continues with the statistical analysis of a conducted survey to practicing architects in İzmir setting. Findings are compared with recent studies conducted in construction sector.

Review suggests objectives to principal benefits of partnering to be:

1. Resolving the problems in the construction industry
2. Changing confrontational relationships to cooperative ones with the achievement of trust
3. Establishing continuous development
4. Providing on time and within budget delivery
5. Increasing the quality of the product and opportunity for innovation
6. Providing better customer satisfaction

Review suggests key concepts for critical success factors of partnering to be:

1. Mutual trust
2. Effective communication
3. Support from senior management
4. Clear definition of responsibilities

5. Mutual goals
6. Teambuilding
7. Commitment to continuous improvement
8. Commitment to win-win attitude

Factor analysis and multiple regression methods used for statistical analysis. Data were collected over a survey to 104 practicing architects in İzmir setting. Results indicate that 7 factors are critical to partnering in architectural design and the first three factors are most significant respectively:

1. Willingness to effective coordination
2. Willingness to eliminate non-value added activities
3. Commitment to win-win attitude by focusing on long-term relationship
4. Commitment to mutual objectives by clear definition of responsibilities
5. Establishment of efficient communication towards mutual goals
6. Mutual trust
7. Support from top management

Findings are compared with recent studies conducted in construction sector in the world. Recent research studies indicate most significant critical success factors to be respectively mutual trust, top management support, establishment of efficient communication and commitment to win-win attitude. This research discerns most significant critical success factors for architectural design practice to be willingness to effective coordination, willingness to eliminate non-value added activities and commitment to win-win attitude by focusing on long-term relationship.

Overall research findings suggest that win-win attitude accompanied by effective coordination and efficient communication are critical to successful partnering in the construction sector beginning from the initial architectural design phase.

5.2. Future Research Recommendations

The primary objective of this research is to explore partnering success criteria in the architectural design phase. Therefore findings represent architects' view of successful design partnering. Yet architects are not the only partners of architectural design. Therefore further studies should involve other partners (i.e., engineers, clients,

main- and sub-contractors) and should enlarge size of respondents over İzmir with a more detailed survey for all phases of construction.

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APPENDIX A

THE ORIGINAL QUESTIONNAIRE IN TURKISH

İZMİR YÜKSEK TEKNOLOJİ ENSTİTÜSÜ
Mimarlık Bölümü

MİMARİ TASARIMDA İŞ ORTAKLIĞI
ANKET ARAŞTIRMASI **Kuşadası, 9/11/08**

1. **Lütfen mimari tasarım ofisiniz hakkında bilgi vermek için aşağıdaki soruları yanıtlayınız.**

Kaç yıldır mesleğinizi yapıyorsunuz?

Farklı disiplinlerden gelen inşaat sektörünün diğer disiplinleri ile mimari tasarım sürecinde hangi sıklıkta ortaklık yapıyorsunuz?

1-Asla 2- Nadiren 3- Bazen 4- Çoğu kez 5- Sıklıkla

Lütfen ofisinizin bir önceki yıl gerçekleştirmiş olduğu yaklaşık inşaat üretim miktarını işaretleyiniz.

A- $0m^2 \leq 20.000m^2$
B- $21.000m^2 \leq 50.000m^2$
C- $51.000m^2 \leq 100.000m^2$
D- $101.000m^2 \leq 250.000m^2$
E- $250.000m^{2'}$nin üzerinde

Lütfen inşaat sektörünün hangi aktörlerini mimari tasarım sürecinde ortak olarak görüyorsunuz işaretleyiniz.

a) İnşaat Mühendisi
b) Makine Mühendisi
c) Elektrik Mühendisi
d) Mimar
e) Peyzaj Mimarı
f) Müşteri
g) Müteahhit
h) Hepsi
ı) Hiçbiri
j) Diğer

2. **Lütfen mimari tasarım süreciniz için aşağıda belirtilen cümleleri 1'den 5'e kadar işaretleyiniz.**

1.Strongly disagree **2.Disagree** **3.Neutral** **4.Agree** **5.Strongly agree**

		1	2	3	4	5
1.	Tüm katılımcılar rekabetçi bir tutumda bulunmadan herkesin kazanabilmesi için ortak hedefler uğruna çalışırlar	☐	☐	☐	☐	☐
2.	Tasarım sürecinde tüm katılımcılar bilgi paylaşımı için isteklidirler.	☐	☐	☐	☐	☐
3.	Ortaklarım projede herhangi bir bilgiye ihtiyaç duyduğumda bana hemen yardımcı olurlar.	☐	☐	☐	☐	☐
4.	Ortaklarım her zaman projenin çıkarları yerine kendi çıkarları doğrultusunda davranırlar.	☐	☐	☐	☐	☐
5.	Ofisimizdeki tüm yöneticiler iş birliğini destekler.	☐	☐	☐	☐	☐
6.	Ortaklarımla aramda ortak güvenin oluşturulmasının önemli olduğuna inanırım	☐	☐	☐	☐	☐
7.	Tasarım sürecinin gelişim için ortaklarımla aramda oluşabilecek problemlerin çözümü konusunda istekliyimdir.	☐	☐	☐	☐	☐

		1	2	3	4	5
8.	Ortaklarım etkili iletişim becerilerine sahiptirler.	☐	☐	☐	☐	☐
9.	Ortaklarım projenin amaçlarını desteklemeye uyumlu ilişkiler gerçekleştiremezler	☐	☐	☐	☐	☐
10.	Patron olarak iş birliğinin oluşması için yeterli kaynak, bütçe, zaman, işgücü ve otorite sağlayarak destek olurum.	☐	☐	☐	☐	☐
11.	Ortaklarımla hedeflerim aynı çizgidedir.	☐	☐	☐	☐	☐
12.	Mimari tasarım sürecinde ortaklarımla her zaman ortak hedefler belirleriz	☐	☐	☐	☐	☐
13.	İlişkilerimiz her zaman koordinasyon içindedir.	☐	☐	☐	☐	☐
14.	Mimari tasarım sürecinde iletişimimizi arttırmak için her zaman toplantılar düzenleriz	☐	☐	☐	☐	☐
15.	Mimari tasarım sürecinde iş bölümü ve sorumluluklar her zaman açıkça bellidir.	☐	☐	☐	☐	☐
16.	Ortaklarımla aramda tasarım sürecimizde engel oluşturabilecek herhangi bir iletişim problemi yaşamam.	☐	☐	☐	☐	☐
17.	Mimari tasarım sürecinde her türlü değişiklik ve gelişme hakkında ortaklarım beni her zaman bilgilendirirler.	☐	☐	☐	☐	☐
18.	Ortaklarımın kararlarının mimari tasarım sürecinin gelişimi için çok faydalı olacağına inanırım.	☐	☐	☐	☐	☐
19.	Ortaklarımın tasarım süreci hakkındaki kararlarının desteklenmesi gerektiğine inanırım.	☐	☐	☐	☐	☐
20.	Mimari tasarım sürecinde aramızda oluşabilecek problemler zamanında ve sorumluluklarımızı unutmadan çözülür.	☐	☐	☐	☐	☐
21.	Mimari tasarımda ortaklık sürecimizde ortak konularda sorumluluk alma konusunda istekliyimdir.	☐	☐	☐	☐	☐
22.	Ortaklarımla uzun vadeli bir iş ortaklığı yapmayı düşünmem	☐	☐	☐	☐	☐
23.	Ortaklığımız mimari tasarım sürecinin başlangıcında başlar.	☐	☐	☐	☐	☐
24.	İş yükümlülüklerimi iş ortaklarımın beklentilerine uygun olarak yerine getiririm.	☐	☐	☐	☐	☐
25.	Mimari tasarım sürecinde koordinasyonumuza engel olabilecek problemleri çözmek için bir çözüm stratejim vardır.	☐	☐	☐	☐	☐
26.	Tüm katılımcılar mimari tasarım sürecinin gelişim için engelleri ortadan kaldırma konusunda isteklidirler.	☐	☐	☐	☐	☐
27.	Tüm katılımcılar düşünce ve veri paylaşımını destekler.	☐	☐	☐	☐	☐
28.	Ortaklarım mimari tasarım sürecinde kendilerine çıkar sağlayacak rekabetçi bir tutum sergilemezler	☐	☐	☐	☐	☐
29.	Ortaklarım benimle iş yapmaktan her zaman memnun kalırlar	☐	☐	☐	☐	☐

Katılımınız için teşekkür ederiz.
Anket sonuçları hakkında bilgi alabilmek için lütfen e-mail adresinizi belirtiniz.
……..…

APPENDIX B

ENGLISH TRANSLATION OF THE QUESTIONNAIRE

İZMİR INSTITUTE OF TECHNOLOGY
Department of Architecture

PARTNERING in the ARCHITECTURAL DESIGN PROCESS
THE QUESTIONNAIRE SURVEY **Kuşadası, 9/11/08**

1. Please answer the below mentioned questions in order to give information about your architectural design office.

How long have you been in the professional life?

How frequent you are making partnering with the other actors from the various disciplines of the construction sector during the architectural design process?

1-Never 2- Rarely 3- Sometimes 4- Often 5- Frequently

Please designate your office's approximate square meter amount of construction in the preceding year.

A- $0m^2 \leq 20.000m^2$
B- $21.000m^2 \leq 50.000m^2$
C- $51.000m^2 \leq 100.000m^2$
D- $101.000m^2 \leq 250.000m^2$
E- over $250.000m^2$

Please designate which actors of the construction industry you accept as partners in the architectural design process.

a) Civil Engineer
b) Mechanical Engineer
c) Electrical Engineer
d) Architect
e) Landscape Architect
f) Client
g) Contractor
h) All of them
ı) None of them
j) The others

2. Please designate the below mentioned statements on a scale from 1 to 5 for your architectural design process.

1.Strongly disagree **2.Disagree** **3.Neutral** **4.Agree** **5.Strongly agree**

		1	2	3	4	5
1.	Each party work for mutual goals to gain everyone rather than being in a competitive manner.	☐	☐	☐	☐	☐
2.	All parties are willing to share information during design phase.	☐	☐	☐	☐	☐
3.	My partners always help me when I need information about the project.	☐	☐	☐	☐	☐
4.	My partners always act for the benefits of themselves rather than the project's.	☐	☐	☐	☐	☐
5.	Each manager in our design office willing to support partnering process.	☐	☐	☐	☐	☐
6.	I believe that it is important to establish mutual trust among me and my partners.	☐	☐	☐	☐	☐
7.	I am willing to solve problems between me and my partners for the improvement of the architectural design process.	☐	☐	☐	☐	☐

		1	2	3	4	5
8.	My partners have effective communication strategies.	☐	☐	☐	☐	☐
9.	My partners do not develop aligned relationships to support project's objectives.	☐	☐	☐	☐	☐
10.	In order to establish partnering, I provide enough resource, budget, labor, time and authority as being a manager.	☐	☐	☐	☐	☐
11.	My goals are aligned with my partners.	☐	☐	☐	☐	☐
12.	We always define mutual objectives during the architectural design process.	☐	☐	☐	☐	☐
13.	Our relationships are always being in coordination with each other.	☐	☐	☐	☐	☐
14.	We always arrange meetings during the architectural design process in order to improve our communication.	☐	☐	☐	☐	☐
15.	Division of labor and responsibilities are clearly defined during the architectural design process.	☐	☐	☐	☐	☐
16.	I do not have any communication problem to obstruct the architectural design process.	☐	☐	☐	☐	☐
17.	My partners always inform me about the changes and the improvements in the architectural design process.	☐	☐	☐	☐	☐
18.	I believe that my partners' decisions are very useful for the improvement of the architectural design process.	☐	☐	☐	☐	☐
19.	I believe to support my partners' decisions about the architectural design process.	☐	☐	☐	☐	☐
20.	Our problems in the architectural design process are always solved in a timely and responsive manner.	☐	☐	☐	☐	☐
21.	I am willing to have responsibility in common issues during our partnering in the architectural design process.	☐	☐	☐	☐	☐
22.	I do not want to develop a long term partnering process with my partners.	☐	☐	☐	☐	☐
23.	Partnering is started at the beginning of the architectural design phase.	☐	☐	☐	☐	☐
24.	I fulfill my responsibilities as being in the accordance with my partners expectations.	☐	☐	☐	☐	☐
25.	I have a strategy to deal with problems which are being an obstacle for our coordination during the architectural design phase.	☐	☐	☐	☐	☐
26.	All partners are willing to eliminate barriers for the improvement of the architectural design process.	☐	☐	☐	☐	☐
27.	All parties support to share resources and ideas.	☐	☐	☐	☐	☐
28.	My partners do not have a competitive manner to gain advantage during the architectural design process.	☐	☐	☐	☐	☐
29.	My partners always have a great satisfaction in doing business with me.	☐	☐	☐	☐	☐

Thanks for your attention.
Please inform your e-mail address in order to have information about the research findings
……..…….