การสำรวจปัจจัยที่มีผลต่อคุณภาพการให้บริการของบริษัทที่ปรึกษางานก่อสร้างอาคารในประเทศอินโดนีเชียจากมุมมองเจ้าของงาน

นาย วิลเลี่ยม มูลิจาดิ

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิศวกรรมศาสตรมหาบัณฑิต
สาขาวิชาวิศวกรรมโยธา ภาควิชาวิศวกรรมโยธา
คณะวิศวกรรมศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

EXPLORING FACTORS INFLUENCING SERVICE QUALITY OF CONSTRUCTION MANAGEMENT CONSULTANT IN INDONESIAN BUILDING CONSTRUCTION PROJECT FROM OWNERS‘ POINT OF VIEW

Mr. William Mulijadi

A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Engineering Program in Civil Engineering
Department of Civil Engineering
Faculty of Engineering
Chulalongkorn University
Academic Year 2010

Thesis Title	EXPLORING FACTORS INFLUENCING SERVICE QUALITY OF CONSTRUCTION MANAGEMENT CONSULTANT IN INDONESIAN BUILDING CONSTRUCTION PROJECT FROM OWNERS' POINT OF VIEW
By	Mr. William Mulijadi
Field of Study	Civil Engineering
Thesis Advisor	Assistant Professor Vachara Peansupap
Thesis Co-Advisor	Associate Professor Tanit Tongthong

Accepted by the Faculty of Engineering, Chulalongkorn University in Partial Fulfillment of the Requirements for the Master's Degree

.....Dean of the Faculty of Engineering

(Associate Professor Boonsom Lerdhirunwong, Dr. Ing.)

THESIS COMMITTEE

..... Chairman

(Associate Professor Wisanu Subsompon, Ph.D.)

..... Thesis Advisor

(Assistant Professor Vachara Peansupap, Ph.D.)

..... Thesis Co-Advisor

(Associate Professor Tanit Tongthong, Ph.D.)

..... Examiner

(Assistant Professor Noppadon Jokkaw, Ph.D.)

..... External Examiner

(Tirachai Pipitsupaphol, Ph.D.)

วิลเลี่ยม มูลิจาดิ : การสำรวจปัจจัยที่มีผลต่อคุณภาพการให้บริการของบริษัทที่ปรึกษางานก่อสร้างอาคารในประเทศอินโดนีเซียจากมุมมองเจ้าของงาน. (EXPLORING FACTORS INFLUENCING SERVICE QUALITY OF CONSTRUCTION MANAGEMENT CONSULTANT IN INDONESIAN BUILDING CONSTRUCTION PROJECT FROM OWNERS' POINT OF VIEW) อ.ที่ปรึกษาวิทยานิพนธ์หลัก: ผศ.ดร. วัชระ เพียรสุภาพ, อ. ที่ปรึกษาวิทยานิพนธ์ร่วม: รศ.ดร. ธนิต ธงทอง, 225 หน้า.

บริษัทที่ปรึกษาการบริหารและจัดการโครงการก่อสร้างมีบทบาทสำคัญในโครงการก่อสร้าง เนื่องจากบริษัทที่ปรึกษาฯ มีความเกี่ยวข้องกับกิจกรรมภายในขั้นตอนการก่อสร้างเช่น ขั้นตอนการออกแบบ การประมูล การจัดการและให้คำปรึกษาระหว่างการดำเนินการก่อสร้าง แม้ว่าบริษัทที่ปรึกษาฯ จะมีบทบาทสำคัญแต่การดำเนินการของบริษัทที่ปรึกษาฯ ในประเทศอินโดนีเซียยังมีข้อบกพร่องด้านคุณภาพของการให้บริการและขาดความเชี่ยวชาญ นอกจากนี้งานวิจัยในอดีตพบว่าขาดการสำรวจรายการและปัจจัยที่มีผลต่อคุณภาพการให้บริการของบริษัทที่ปรึกษาฯ งานวิจัยนี้จึงมีวัตถุประสงค์เพื่อประเมินระดับความสำคัญของรายการและกำหนดปัจจัยที่เกี่ยวกับคุณภาพการให้บริการของบริษัทที่ปรึกษาฯ นอกจากนี้งานวิจัยยังอธิบายความสำคัญของคุณภาพการให้บริการของบริษัทที่ปรึกษาฯ ในมุมมองของเจ้าของโครงการก่อสร้างอาคารในประเทศอินโดนีเซีย งานวิจัยแบ่งการศึกษาออกเป็นสองส่วนได้แก่การวิจัยเชิงปริมาณและการวิจัยเชิงคุณภาพ สำหรับการวิจัยเชิงปริมาณมีจุดมุ่งหมายเพื่อประเมินระดับความสำคัญของรายการคุณภาพการให้บริการของบริษัทที่ปรึกษาฯ และวิเคราะห์ปัจจัยของคุณภาพการให้บริการ ในขณะที่การวิจัยเชิงคุณภาพมีวัตถุประสงค์เพื่ออธิบายความสำคัญของรายการคุณภาพในมุมมองเจ้าของงาน การวิจัยใช้แบบสอบถามและการสัมภาษณ์เพื่อรวบรวมข้อมูลจากเจ้าของโครงการต่างๆ โดยผู้ตอบแบบสอบถามในวิจัยมีทั้งสิ้น 71 ราย ซึ่งข้อมูลที่รวบรวมได้จะถูกวิเคราะห์โดยดัชนีชี้วัดระดับความสำคัญและการวิเคราะห์หากลุ่มปัจจัย

ผลการวิเคราะห์ค่าดัชนีชี้วัดระดับความสำคัญพบรายการที่เกี่ยวข้องกับคุณภาพการให้บริการที่สำคัญมากที่สุดคือ "บริษัทที่ปรึกษาฯ สามารถเตรียมการป้องกันปัญหา ก่อนที่ปัญหานั้นจะเกิดขึ้นในโครงการ" รายการด้านคุณภาพที่สำคัญรองลงมาคือ "บริษัทที่ปรึกษาฯ ดำเนินการภายใต้ขั้นตอนมาตรฐานการดำเนินการ (Standard operation procedure: SOP)" ซึ่งได้รับการยอมรับในเบื้องต้น นอกจากนี้ผลการวิจัยพบ 10 ปัจจัยที่ส่งผลต่อคุณภาพด้านการให้บริการของที่ปรึกษาโครงการก่อสร้างอาคาร เช่น "ความเข้าใจต่อจุดมุ่งหมายของเจ้าของโครงการและตอบสนองต่อจุดมุ่งหมายนั้น" "การปรับเปลี่ยนลักษณะการให้บริการของพนักงาน" "การตระหนักถึงสถานภาพและข้อมูลของโครงการ" เป็นต้น ผลการศึกษาทำให้บริษัทที่ปรึกษาฯ ทราบถึงปัจจัยที่เกี่ยวกับคุณภาพการให้บริการ

ภาควิชา.....วิศวกรรมโยธา.....ลายมือชื่อนิสิต.....

สาขาวิชา.....วิศวกรรมโยธา..... ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก.....

ปีการศึกษา .....2553.....ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์ร่วม .....

5170695121: MAJOR CIVIL ENGINEERING
KEYWORDS: SERVICE QUALITY / FACTOR ANALYSIS / CONSTRUCTION MANAGEMENT CONSULTANT'S SERVICES / INDONESIAN BUILDING CONSTRUCTION PROJECTS

WILLIAM MULIJADI: EXPLORING FACTORS INFLUENCING SERVICE QUALITY OF CONSTRUCTION MANAGEMENT CONSULTANT IN INDONESIAN BUILDING CONSTRUCTION PROJECT FROM OWNERS' POINT OF VIEW. THESIS ADVISOR: ASST. PROF. VACHARA PEANSUPAP, Ph.D., THESIS CO-ADVISOR: ASSOC. PROF. TANIT TONGTHONG, Ph.D., 225 pp.

Construction Management (CM) consultant has an important role in construction project. It involves in many activities during the construction processes such as designing, tendering, consulting and managing the construction. Based on that sequence, it can be seen that CM consultant's role starts from the beginning of the construction. Despite its important role, the service quality of CM consultant in Indonesia can still be improved. In addition, previous studies show lack of research in exploring service quality in context of CM consultant in construction projects. Therefore, the objectives of this research are to evaluate the importance level of CM consultant's service quality items; to analyze factors of CM consultant's service quality; and to describe the importance of CM consultant's service quality based on owners' perception in Indonesian building construction projects.

This research is classified as quantitative and qualitative research approach. The quantitative research approach aims to evaluate the importance level of service quality items and explore factors that influence CM consultant's service quality. The qualitative research approach aims to explain the importance of each service quality item based on owner's perception. The survey questionnaire and interview techniques were used to gather data from project owners. There were 71 respondents who participated in this research. The collected data was analyzed by conducting relative importance index and factor analysis.

The result shows the importance level of each CM consultant's service quality item. Based on the relative importance index, the most important item is "The CM consultant is able to anticipate the problem before it happens in the project". The next most important item is "The CM consultant does a job according to the SOP that has already been agreed". In addition, the results show 10 factors influencing consultant's service quality in Indonesian building construction projects. The examples of factors are "Understanding & providing individualized attention for the owner"; "Service oriented characteristic of the staff"; "Awareness of the project's status and information"; etc. The findings can help CM consultant understand the service quality factors that should be provided.

Department : Civil Engineering ..... Student's Signature .....

Field of Study : Civil Engineering ..... Advisor's Signature .....

Academic Year : 2010 ..... Co-Advisor's Signature .....

ACKNOWLEDGEMENTS

I would like to thank my advisor, Dr. Vachara Peansupap for his continuous support in this Master‘s degree program. He taught me how to conduct my research properly, made me a better researcher and inspired me when I doubted myself. He was always there to meet, to give advice, talk about my ideas, to proofread and mark up my papers and chapters. A special thanks goes to my co-advisor, Dr. Tanit Tongthong, for helping me complete the writing of this dissertation. He taught me how to analyze and conclude my research properly. Without their encouragement and constant guidance, I could not have finished this thesis. Besides my advisors, I would like to thank the rest of my thesis committee: Dr. Wisanu Subsompon, Dr. Noppadon Jokkaw and Dr. Tirachai Pipitsupaphol for their challenging questions, insightful comments and for reviewed my work on a very short notice. In addition, I also thank Dr. Kasem Choocharukul for his suggestions about factor analysis and for showed me different ways to interpret the results.

During the course of this work at Chulalongkorn University (2008 – 2010), I was supported by AUN/SEED-Net scholarship. My great thanks to Japan International Cooperation Agency (JICA) and ASEAN Foundation for supporting my research. I would also extend my grateful thanks to all official staffs employing in International School of Engineering and AUN/SEED-Net.

My thanks to my parents, Santoso Mulijadi, and Gita Satyabrata, for giving me life in the first place, for supporting and encouragement to pursue my master degree. My brother Erick Mulijadi, for encouraging me to finish my dissertation as soon as possible. My uncles, Edy Sukardi and Jimmy Rusli, and my cousin, Reuben Suryamega, for helping me during my data collection in Jakarta. My girlfriend Natthanicha Nanta, for sharing her experience of the dissertation writing endeavor with me, for listening to my complaints and frustrations and for believing in me.

Last, but not least, let me also say _thank you‘ to the following people: Agus Nugroho, Kitti Duangai, Yanyong Apaanan, Picha Sriprachan, and Peerapat Vanichluxamee for helping and supporting me at any time. Also thanks to all students and classmates in CM division for interesting discussions and being fun with.

CONTENTS

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER I
INTRODUCTION

1.1 Service Quality in Construction

Quality in construction can be viewed from two aspects, the product quality and the service quality (Yasamis, Arditi et al., 2002). Product quality can be judged mostly from their tangible dimensions. The product quality in construction can be seen from its appearance such as the quality of workmanship and material specification conformity with the design/contract (Yasamis, Arditi et al., 2002). On the other hand, service quality is more focused on delivery of process which involves reliability, assurance, tangibility, empathy and responsiveness (Parasuraman, Zeithaml et al., 1985). Compared to product quality, service quality has less tangible dimension. In general, the tangible dimension of service quality in construction can be the facilities and equipments that are provided by the service‘s provider to does a job. In summary, service quality is more difficult to evaluate and measure than product quality because of its dominant intangible nature (Parasuraman, Zeithaml et al., 1985).

In addition, service quality has received considerable attention in recent years (Karna, 2004). The study of services is becoming more important as the size of the service sector is growing hand in hand with the global economy growth (Landrum, Prybutok et al., 2009). As the industry has grown, there has been a significant increase of demand on management consulting services throughout the world. These consulting companies are competing with each other by simultaneously improving their consulting service quality. Therefore, it is necessary for a consultant company to have its own competitive advantage to survive within the market industry. The improvement of service quality is essential for the success of the company and withstanding the competition (Fisher, 1989).

Moreover, the construction industry is a very competitive industry. Most companies are similar in their substance, structure and approaches to the production of construction project (Segura, 1991). With the exception of price, there is very little

that distinguishes one company from another. That is the reason why lump-sum bid system is used so widely in construction. Similarly product quality can be accomplished and imitated by other competitors. With tight competition among several companies, they attempt to differentiate themselves from their competitor (Tam, 2000). In order to gain a market edge, an improvement on price and product quality may not be enough to ensure their competitive advantage. Therefore, improving service quality has been suggested as a way to develop a competitive advantage (Parasuraman, Zeithaml et al., 1988; Clow and Vorhies, 1993; Gowan, Seymour et al., 2001; Hensher, Stopher et al., 2003).

In summary, it is important to start looking of service quality from CM consultant as one part of the construction process. It is because CM consultant is involved in many activities during the construction process such as designing, tendering, consulting and managing the construction. Based on that sequence, it can be seen that CM consultant‘s role starts from the beginning of the construction. The role of CM consultant during the construction project can be as a construction supervisor, procurement manager, quality inspector and quantity surveyor. Therefore, the role of CM consultant in the construction project is very important. In summary, the quality of CM consultant‘s service performance can determine the success of the project (Santosa, 2002).

1.2 The Importance of Service Quality for CM Consultant

Service quality for CM consultant is very important because the nature of the consultant company is delivering a good service to owner. It is important because the services provided by CM consultant mostly are not tangible things. It cannot be touched, seen and felt, but it can be seen more as intangible deeds and performances provided for its owners. In summary, the performance of CM consultant is mainly based on their service quality performance (Santosa, 2002). In addition, service quality directly affects the performance which may affect the efficiency and effectiveness of the company (Ali, Talib et al., 2009). Identifying the service quality is important in order to examine the efficiency, effectiveness and the quality level of the service performed by the consultant company. In addition, it has been previously explained that the CM consultant plays a significant role during the whole operation starting from the beginning of the project until the end. Therefore, it would be

necessary to consider the service quality of the CM consultant company due to their high contribution to the construction project.

Improving service quality in consultant may also bring indirect benefit to the construction. Those services performed earlier in the project may have direct or indirect effects to services provided later in the project (Wang and Chen, 2003). Eventually it can improve the quality of the construction such as reducing cost, reducing defects occurrences, reducing construction time and finally improving coordination & management within construction (Enshassi, Mohamed et al., 2009).

The improvement of service quality also gives benefits to survive and compete in the market. It is because improving service quality can give owner better satisfaction. This is due to the fact that an owner always has a desire for a better quality of the service (Segura, 1991). In addition, service quality is also considered as a major influence on the owner satisfaction (Landrum, Prybutok et al., 2009). Moreover, owner satisfaction has been viewed as the most important indicator to retain an owner (Gan, Cohen et al., 2006). Retaining an owner is very important for a company in getting another project in the future. Retaining the owner can be achieved from preserving the long term relationships with the owner and gaining their satisfaction. Many companies in construction have changed their strategy to focus on owner retention in order to sustain long term relationships with their owners (Yang and Peng, 2006). In addition, service quality is also important for CM consultant reputation due to word-of-mouth from the owner (McLachlin, 2000). Word-of-mouth from owner can affect the consultant‘s reputation which can increase or reduce their chances of being selected for future projects (Dawes, Dowling et al., 1991). In summary, providing a high level of service quality can increase the owner satisfaction, retain the owner, create good word-of-mouth from the owner and improve the reputation of CM consultant.

1.3 Problem Statement

Although the importance of service quality and its benefits is recognized by practitioners, the current performance of CM consultant‘s service quality is not synchronized with the increasing development of Indonesian construction (Santosa, 2002). The current practice shows that Indonesian consultant still has some limitations

mainly such as the inefficient management and inadequate human resources (Veronika, Sugiarto et al., 2006).

The reality in Indonesia shows that CM consultants still need to improve their service quality. It will be better if CM consultant can improve their service quality as a professional management should. In addition, many deviations may happen in the project if CM consultant does not perform its service quality professionally (Santosa, 2002). CM consultant should deliver their service as well as it should. This is a challenge and a problem that needs to be solved. In the future, situation, condition and problem in construction‘s project may become more complex and difficult (Santosa, 2002). It is necessary for CM consultants to increase the quality of their service and implement a better management performance that can be relied on.

To achieve high service quality in construction, many approaches were applied into construction such as identifying the service quality gaps, identifying the key performance and measuring the owner satisfaction. For example, Samson and Parker (1994) identified the service quality gaps in consulting engineering industry. They measured the owner‘s expectations and perceptions of the service quality provided by consulting engineers. Furthermore, Tang, Lu et al. (2003) tried to measure owner satisfaction of engineering consulting companies in Hong Kong using a questionnaire survey. In another research in 2005, Woo and Ennew offered an approach to service quality measurement using interaction dimensions of business-to-business professional service quality. Furthermore, Cheng, Proverbs et al. (2006) identified the key performance of engineering and CM consultant. They tried to measure the performance of construction consultants in UK. Yang and Peng (2006) developed an owner satisfaction evaluation model for construction project management in Taiwan. Lastly, Chow and Ng (2007) evaluated the performance of engineering consulting companies with a fuzzy gap analysis model.

Although all are very good researches, some of them such as Samson and Parker (1994), Woo and Ennew (2005) and Chow and Ng (2007) did not focus on CM consultant‘s service. Instead, they focused on the engineering consultant‘s service. Meanwhile, it is important to implement it in context of CM consultant‘s service quality which has a high influence on the overall processes of construction project. Previous research from Tang, Lu et al. (2003), Cheng, Proverbs et al (2006) and Yang

and Peng (2006) were focused on the owner satisfaction‘s viewpoint instead of the service quality viewpoint. Previous researches did not make clear distinction between service quality and owner satisfaction in construction. It should be clear that service quality is just one part of owner satisfaction. In addition, Cheng, Proverbs et al. (2006) focused the research on both private and public owners, which is considered to be inappropriate. The reason is that the perception level of quality from private and public owners may be different. Meanwhile, the research didn‘t conduct independent t-test to check whether there is a significant difference between the perceptions undertaken by public and private owners.

It can be summarized from the research gaps that there are some limitations in the previous service quality researches. First, the lack of research in identifying CM consultant‘s service quality items. Second, previous researches did not make clear distinction between service quality and owner satisfaction in construction. Third, previous researches did not focused on owners‘ perception but emphasized on other project participants‘ perception such as engineers and architects. Therefore, this research aims to explore service quality in context of CM consultant in construction projects. It explores the list of items and factors of service quality for CM consultant in construction projects. This can give clear information to understand the nature of service quality of CM consultant in construction projects. Furthermore, this research tries to determine the importance level of CM consultant‘s service quality based on owners‘ perception.

1.4 Research Objectives

Based on problem statement above, the objectives of this research are:

1. To determine the importance level of CM consultant‘s service quality items in Indonesian building construction projects.
2. To explore factors of CM consultant‘s service quality in Indonesian building construction projects.
3. To describe the owners‘ perception of CM consultant‘s service quality in Indonesian building construction projects.

1.5 Scope of Research

This research was focused on CM consultant companies in building construction projects due to the dominance and increasing rate of building construction projects in Indonesia. This research was conducted specifically in building construction project because it has the most involvement of CM consultant. In addition, this research was focused on private construction project which recently has more projects and has higher service quality standards than the public project. The research was conducted in Jakarta, Indonesia. This is due to the fact that Jakarta is a city that has the highest number of building construction projects in Indonesia (Indonesian Central Bureau of Statistics, 2008).

1.6 Research Methodology

The research methodology consists of several steps such as conducting literature review and pilot survey to develop the items of CM consultant‘s service quality. The list of items was collected from previous researches that are related to service quality or owner satisfaction of consultant construction management in construction projects (Samson and Parker, 1994; Tang, Lu et al., 2003; Woo and Ennew, 2005; Cheng, Proverbs et al., 2006; Yang and Peng, 2006; Chow and Ng, 2007). In addition, the group of items was developed from the ten basic dimensions of service quality (Parasuraman, Zeithaml et al., 1985).

In addition, pilot survey was conducted to twelve owners in the field of CM consultant to check the validity of service quality items and whether all of them are in the context of CM consultant‘s service. The reasons for conducting this are to: (1) check unclear meaning from sentences in the questions and the items; (2) check item that is unsuitable to be included in the questionnaire; (3) check additional item to be included in the questionnaire. Furthermore, the list of items was modified based on the pilot survey. The sentence in the questions and items were rewritten to improve their clarity and then distributed for final data collection.

The next step was data collection which was conducted by survey questionnaire and interview. The respondents provided the importance rate of each service quality factor with range from 1 (i.e. very unimportant to be provided) to 5 (i.e. very important to be provided). Furthermore, the research also interviewed the

respondents regarding their opinion about the importance of each service quality item, how to perform them and what the current practice in Indonesia is.

The final step was data analysis which consists of three steps. First, the research identified the importance level of service quality items. The importance level was ranked by the value of relative importance index (RII) of each service quality item. Relative importance index was calculated based on the score points given by the respondents. Second, factor analysis was conducted to reduce similar items into group of factors. The main concept of reducing the items was to reduce the difficulty in analyzing those items due to the high correlation between the items. Third, the weight of each item was calculated from the result of factor analysis. This is necessary due to the facts that each item can differently influence on the evaluation of overall service quality performance.

1.7 Research Outline

This thesis consists of seven chapters. Chapter 1 introduces an overall view of this research such as the background of the study, problem statement, research objectives, scope of research, research methodology, research outline, research outcome and benefits.

Chapter 2 reviews the literature to give understanding about service quality in general and in construction industry. It reviews the nature of service quality such as the differences between service and product, the interchangeable meaning of service quality and owner satisfaction, distinction between service quality and owner satisfaction, service failure, service recovery, previous research that related to service quality in construction industry, research gaps, items and factors of CM consultant‘s service quality. The chapter concludes with a list of items that influence the service quality of CM consultant in construction projects.

Chapter 3 describes the research methodology which consists of research approach, research design, data collection method, data analysis and conclusion. In summary, the chapter describes two main research methods: survey questionnaire and interview.

Chapter 4 presents the quantitative data analysis of this research. This chapter consists of description of survey data, the importance level of CM consultant‘s service quality and the factor analysis.

Chapter 5 describes the findings of interviewing owner of building construction projects in Indonesia. It describes each of CM consultant‘s service based on three main questions: why it is important for the service to be provided; what is the current practice of each service; and how to implement this service based on owners‘ perception.

Chapter 6 discusses the findings of quantitative data analysis in chapter 4 and qualitative data analysis in chapter 5. This chapter discusses the findings of importance level and factors of CM consultant‘s service quality items.

Chapter 7 summaries research findings based on three research objectives. The chapter then describes the contribution of this research and presents the recommendations for future research.

1.8 Research Outcome and Benefits

The first outcome of this research is the list of CM consultant‘s service quality items and factors of in Indonesian building construction projects. It gives contribution to the future research for measuring the service quality of CM consultants in Indonesian building construction projects.

The second outcome is the importance ranking and weight of each service quality items and factors of CM consultant‘s service quality in Indonesian building construction project. It gives benefit to understand which CM consultant‘s service quality item is important and needs more attention by CM consultant in Indonesian building construction projects.

The third outcome is the description of owner perception for each item and factor that influences the service quality of CM consultant in Indonesian building construction project. It gives benefit to understand the importance of each item and how to implement it based on owners‘ perception. In addition, it also reveals the

owners‘ perception of each service quality item‘s current practice in Indonesian building construction project.

Improving the quality of CM consultant‘s service can lead to the owner satisfaction and also lead to the better management of construction and increase in the quality of the project. In summary, the outcome of this research can be used to improve CM consultant‘s service quality to compete in the market.

CHAPTER II
LITERATURE REVIEW

The purpose of this chapter is to review the relevant information that relates to service quality in construction project. First, this chapter illustrates the current construction industry in Indonesia. Next, it describes more detail about service quality and product quality. Furthermore, this chapter explains the distinctions between service quality and client satisfaction. Then, it shows previous research studies related to service quality in construction industry. Finally, this chapter shows the research gaps and the development of CM consultant‘s service quality items from several previous research studies.

2.1 Current Construction Industry in Indonesia

In Indonesia, construction industry is one of the industrial sectors that utilizes a lot of labor and contributes a large GDP to the country. Figure 2.1 and figure 2.2 show the contribution of the construction industry, which has been growing rapidly from 6.6% of total GDP in 2004 to 9.9% of total GDP in 2009. The construction industry is also one of the industrial sectors that contributes largely to the development of Indonesia. The construction industry affects almost all economic sectors starting from infrastructure to buildings such as roads, bridge, dam, drainage systems, residential buildings, school and other commercial buildings that develop both economics and living standards (Santosa, 2002). In summary, the construction industry has a very important role in the national economic growth.

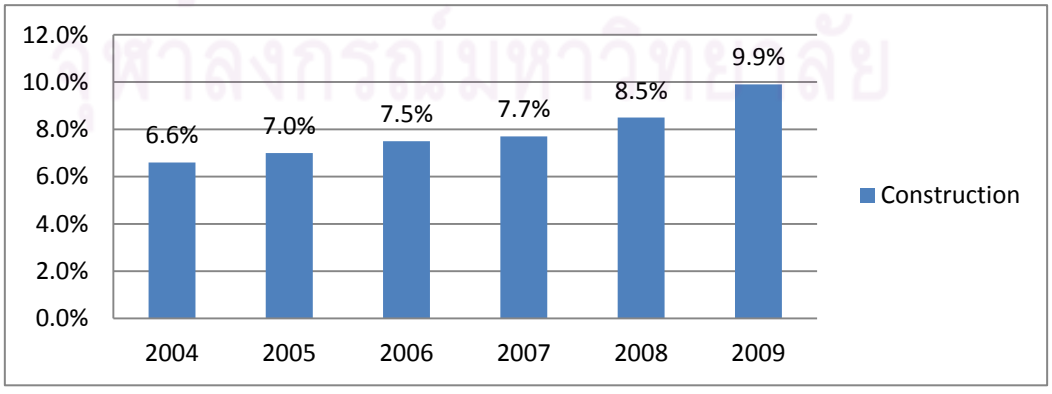


Figure 2.1 Contribution of construction industry to Indonesian GDP during 2004-2009.

Source: CBS (2009)

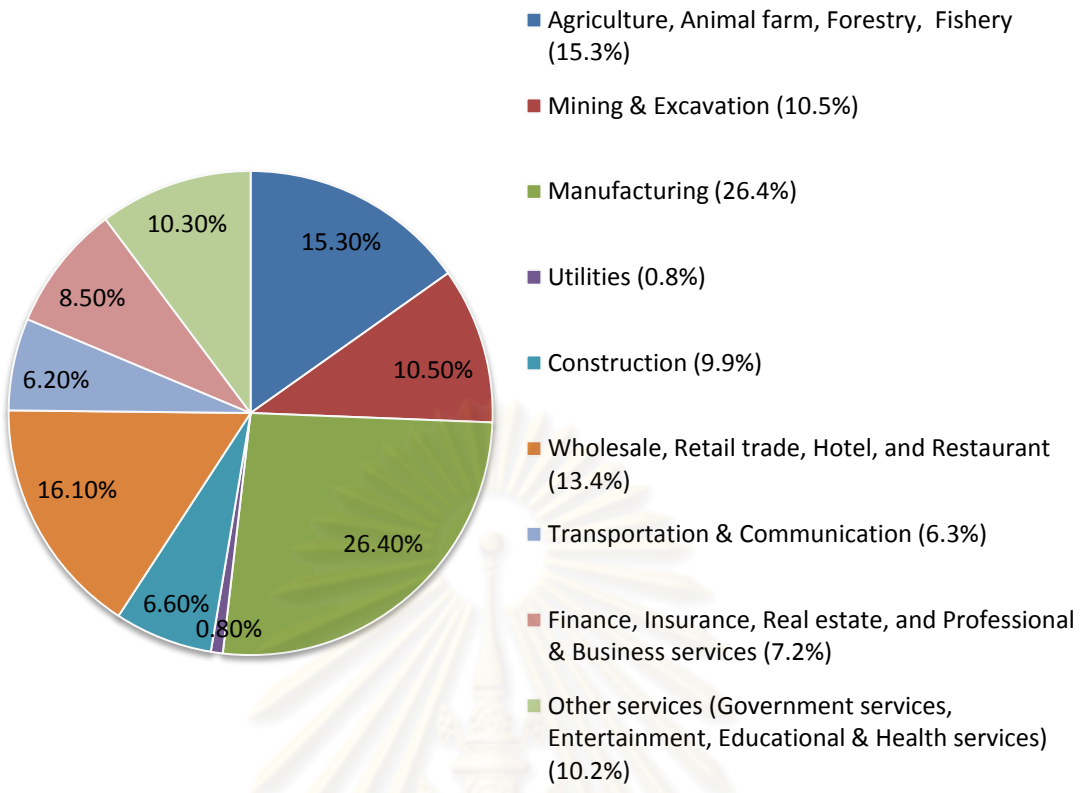


Figure 2.2 Distribution of Indonesian GDP in 2009.

Source: CBS (2009)

Indonesian Central Bureau of Statistics (2008) shows that the development of the construction industry is mostly located on Java Island (i.e. Jakarta, West Java, Central Java, Yogyakarta, East Java, Banten). Figure 2.3 shows that total value of construction projects on Java Island is 51 Trillion of all 88 Trillion IDR. This means that fifty eight percent of construction projects in Indonesia are located on Java Island. Figure 2.3 also shows that Jakarta and West Java have the most construction projects compared to other provinces in Indonesia.

Based on the statistical data from Indonesian Central Bureau of Statistics (2008), there has been an increasing demand of building construction projects in Indonesia. Figure 2.4 shows the increasing value of construction projects on Java Island from 2005 to 2008. The statistical data shows that construction projects in Indonesia are growing constantly each year, especially in Jakarta, which has the highest number of construction projects.

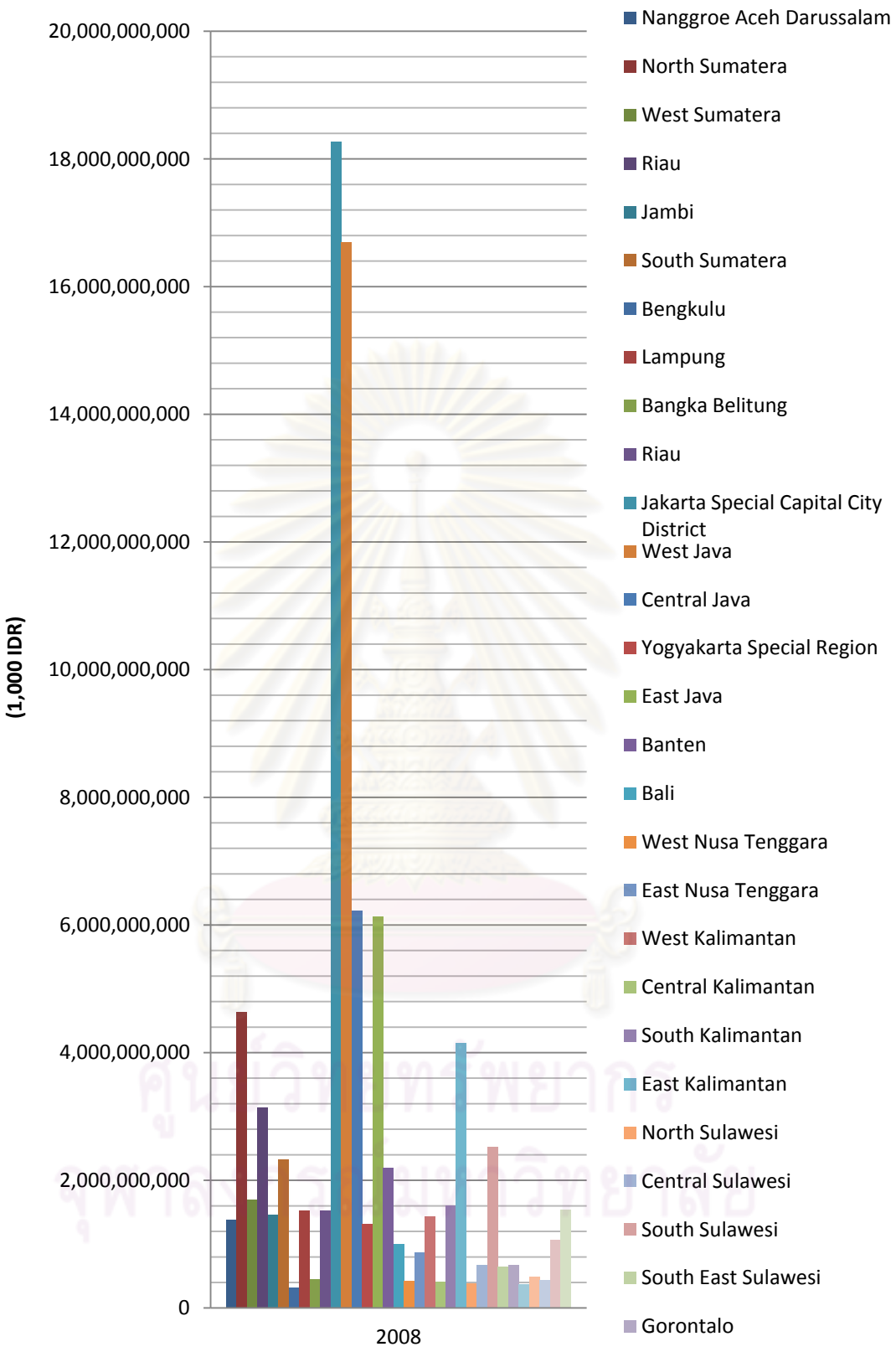
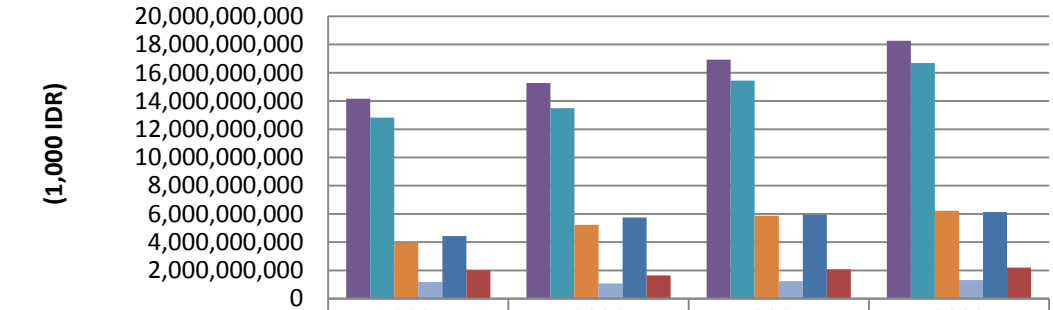


Figure 2.3 Value of construction completed according to the location in 2008.

Source: CBS (2008)



	2005	2006	2007	2008
Jakarta Special Capital City District	14,157,681,465	15,276,572,859	16,932,840,601	18,267,154,000
West Java	12,825,404,970	13,491,149,640	15,438,788,919	16,692,524,000
Central Java	3,978,874,466	5,226,542,060	5,875,051,833	6,227,782,000
Yogyakarta Special Region	1,184,257,860	1,081,631,011	1,236,396,881	1,319,221,000
East Java	4,434,593,683	5,746,749,477	5,940,052,225	6,131,858,000
Banten	2,009,283,640	1,648,541,703	2,073,643,088	2,194,042,000

Figure 2.4 Value of construction completed on Java Island during 2005 – 2008.

Source: CBS (2008)

Figure 2.5 shows the value of completed construction in Indonesia based on its type of construction. It shows the dominance of building construction projects in Indonesia compared to other construction works. Information on figure 2.5 shows that the value of building construction projects in Indonesia is 37 Trillion IDR of all total 88 Trillion IDR during year 2008. It shows that forty two percent of construction projects in Indonesia are building construction projects. As a result, the number of building construction projects tends to increase.

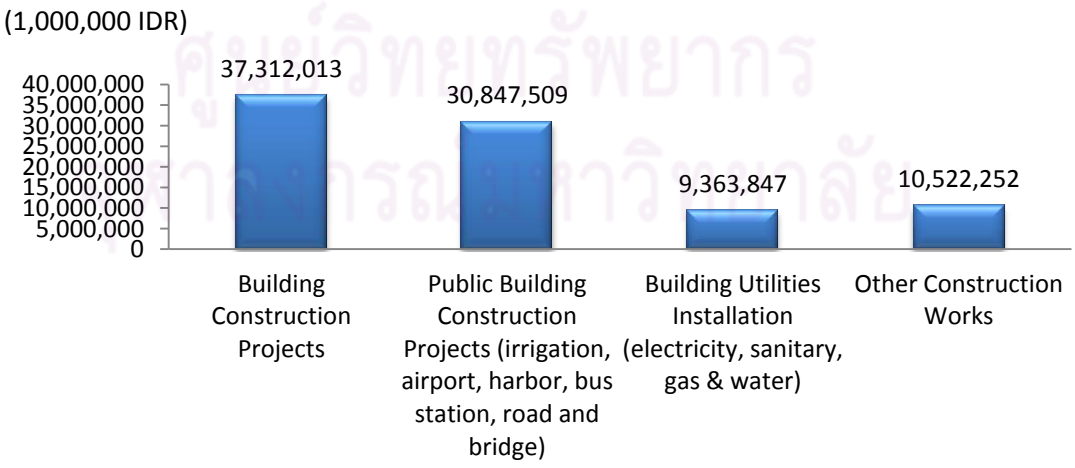


Figure 2.5 Value of construction completed by type of construction in 2008.

Source: CBS (2008)

Even though there are a large number of building construction projects, local companies may still face a competitive environment. The reason is that globalization of the marketplace has brought some foreign companies compete with local companies‘ price, product quality and service quality. The number of foreign companies that have come to Indonesia has been increasing since a few years ago. In 2008, the number of foreign construction companies in Indonesia was 79 companies, which mostly came from Japan and about 67 consulting companies also mostly came from Japan (Suraji and Krisnandar, 2008). Current growth of construction industry in Indonesia has created the competitive environments among companies. Therefore, local companies needed to improve their services.

The above facts illustrate that the high demands on quality in the construction industry are driven by the owner and the competition among companies in the same markets. Therefore, it is very important to focus more on the problems that can cause a decrease in the quality of the construction industry (Sudarto, Veronika et al., 2006). It is very obvious that there are needs to manage and improve the quality of the construction project (Alshawi and Ingirige, 2003). As a result, it can be summarized that the development of construction industry needs to be in conformity with its quality.

2.2 The Nature of Quality in Construction

Quality in construction is one of the important issues in both construction and consultant companies. Both should be able to guarantee the owner to get the desired quality products and services. That way, both of them can compete effectively in their respective construction market. There are several reasons for producing appropriate and specified quality in construction. The first reason is that the requirement of quality is written and required to be performed exactly as in the contract (ASCC and ACI, 2005). Contract document is a legal, binding contract and its purpose is to ensure that the quality of workmanship and materials for the finished construction achieve the specified requirements. It should be ensured that the project is constructed in compliance with plans and specifications in the contract documents and the end product should be satisfactory for both the owner and designer. The second reason is that lots of benefits can be gained from producing quality as it is specified in the contract. Producing a specified quality can save the contractor‘s cost and time and it

saves the owner an extra cost that occurs when a project cannot be completed on the scheduled date. The best and most profitable way to achieve that is to build it right the first time (Deakins and Dillon, 2005). It also gives the benefit of minimizing the direct and indirect costs of repairing unacceptable work. The benefit of producing good quality can lead to owner‘s satisfaction which can increase the company reputation. On the other hand, producing poor quality can lead to owner dissatisfaction. Dissatisfied owner unlikely offers a new work for the next project, which becomes a long term effect from poor quality. In summary, producing good quality can lead to more business for the company, lower costs (it is less costly to build it right the first time) and continued employment for the next project.

However, several researchers state that the current practice is lack of concern about the quality in construction projects. Problems of quality in construction can be found in several aspects such as plan failure, poor workmanship, unsafe structures, time completion delays, cost overruns and lots of contract disputes (Bertelsen, 2002). This lack of quality may occur due to several reasons such as the complexity of construction, lots of parallel activities and dynamic nature of construction. In addition, lots of participants such as the owner, contractor, designer, consultant, subcontractors and suppliers are involved in the construction. In summary, the complexity of construction project results in the difficulty to manage the quality of construction.

2.3 Service and Product

As described in section 1.1, quality in construction can be viewed from two aspects, the service quality and the product quality (Yasamis, Arditi et al., 2002). In order to understand more about quality in construction, this section describes the differences between service and product. Service can mostly be described as performances, deeds and processes provided by the service provider to fulfill the request or demand from the client (Zeithaml, Bitner et al., 2009). Service can also be described as the activity whose output is not a physical product and is consumed at the time it is produced.

On the contrary, product can be described as a tangible thing that can be sensed by touching it, smelling it, or visualizing it. The description of a product‘s characteristics is easier to describe than service. In addition, it is easier to evaluate its

quality from its appearance. In addition, product can be stored and consumed at later time, or can be returned if the quality does not satisfied the client.

It is very obvious there are several different characteristics between service and product. From previous literature, four main characteristics can be used to differentiate between service and product. Those characteristics are classified into different groups as shown the table 2.1 below.

Table 2.1 Different characteristics between products and services (Zeithaml, Bitner et al., 2009)

No.	Products	Services
1	Tangible	Intangible
2	Standardized	Heterogeneous
3	Production separate from consumption	Simultaneous production and consumption
4	Nonperishable	Perishable

2.3.1 Intangibility

The first characteristic is the intangibility. It is very clear and obvious in differentiating the service and product from the intangibility nature of service (Bebko, 2000). The main reason is that service exists in the forms of performances or actions rather than objects, which cannot be seen, felt, tasted or touched in the same way as the product. For example, CM consultant service are actions such as consulting, managing, supervising and inspecting, which are performed and directed toward the project and the client. These services cannot actually be seen or touched by the client. Sometimes the client may be able to see and touch certain tangible components of the service such as the equipment or report. In fact, many construction services such as consulting and supervising are difficult for the consumer to touch the intangible outcome, but some evidence of the service such as records and report documents may be quite apparent.

In addition, there are several challenges for this service‘s characteristic because of its intangible nature. The nature of intangibility cannot make service inventoried and therefore fluctuations in demand are often difficult to handle and manage (Zeithaml, Bitner et al., 2009). Lastly, service are also difficult to be assessed by the client and difficult to calculate its cost or price.

2.3.2 Heterogeneity

Services can be seen as performances which mostly are produced by humans. The performances of employees in delivering the service may differ from day to day. This means that no two services are precisely alike (Wolak, Kalafatis et al., 1998). In addition, the client also has the nature of heterogeneity. Every client has their own unique demands or experience the service in a unique way. Thus the heterogeneity connection with service is quite large due to human interaction between employees and clients. For example, a consultant may provide a different service level to two different clients on the same day depending on their individual needs. The condition of consultant also affects their performance to the clients. For example, a consultant may perform better supervision when he or she is fresh in the morning rather than when he or she is already tired at the end of a long day of activities.

There are challenges for service due to its heterogeneous nature. The most difficult problem concerning the heterogeneity of service is to ensure consistent level of service quality. There are many factors that affect the service quality which cannot be fully controlled by the service provider such as the interest and enthusiasm of staff to satisfy client‘s needs (Zeithaml, Bitner et al., 2009). As a consequence, the service manager cannot always know for sure that the service is being delivered consistent with what was originally planned.

2.3.3 Simultaneous Production and Consumption

The third characteristic is the nature of simultaneous production and consumption. The nature of a product is to be produced first and then sold and consumed. However, the nature of a service is to be sold first and then produced and consumed simultaneously (Zeithaml, Bitner et al., 2009). For example, precast concrete (i.e. product) can be manufactured in the factory, then later on sent to the construction site. But a consultant‘s service is consumed simultaneously as it is being performed. For example, the client may receive an advice or suggestion from consultant after the client asked for it or requests it. The example shows that the experience of client in receiving the consulting service is essentially produced and consumed at the same time. Simultaneous also means that client and service provider are interacting with each other during the service production process such as in the

meeting. The meeting provides interaction between owner and consultant. This simultaneous nature also shows that the services provider is playing a role as part of the product itself and therefore their service performance is essential to satisfy the client. In summary, the assessment of service should be conducted during the service encounters (Hume and McColl-Kennedy, 1999). The reason is that the nature of service being inseparable between production and consumption (Siu, bridge et al., 2001).

2.3.4 Perishability

This section explains the perishability nature of service which cannot be saved, stored and returned. For example, the CM consultant working hours per day cannot be reclaimed and used or resold at a later time. The perishability nature of service clearly shows the differences with the product which can be stored or resold another day or even returned if the client is unsatisfied (Vargo and Lusch, 2004).

The perishability nature of service gives some limitations in its implementation. The perishability nature makes the service become unable to be stored. Therefore, there is a need to forecast the service‘s demand in the future and create planning for providing services accordance with the demand (Zeithaml, Bitner et al., 2009). In addition, the fact that services cannot be returned or resold, also implies a need for strong recovery strategies when the service goes wrong. For example, a bad time management of the project cannot be returned, but the consultant can and should have strategies for recovering the client‘s satisfaction such as increasing the pace of progress of the construction.

In order to understand more about service quality, it is also important to distinguish it from client satisfaction. Previous researchers tend to use the terms of service quality and satisfaction interchangeably (Theodorakis, Kambitsis et al., 2001; Peters and Mazdarani, 2008). Therefore, section 2.4 explains the meaning of service quality and client satisfaction. Furthermore, section 2.5 illustrates clear distinction between service quality and client satisfaction.

2.4 Interchangeable Meaning of Service Quality and Client Satisfaction

There are a lot of previous researchers who attempt to precisely explain each of their meanings and try to measure both of them in different methods (Iacobucci, Ostrom et al., 1995). Many researchers try to clarify the relationships between service quality and client satisfaction. In fact, there are several things in common and some relationships between service quality and client satisfaction (Sureschandar, Rajendran et al., 2002). Previous research claimed that service quality should be considered as an important indicator of client satisfaction (Al-hawari, 2008). It was proven that service quality has a significant effect and leads to client satisfaction (J. Joseph Cronin and Taylor, 1992; Spreng and Mackoy, 1996). Furthermore, previous research suggest that service quality should be treated as an antecedent of client satisfaction (Ruyter, Bloemer et al., 1997).

2.4.1 Service Quality Definition

In order to understand the service quality in construction, it is better to understand the meaning of quality. The definition of quality may vary from person to person and from situation to situation. From the client‘s viewpoint, quality can be defined as the fitness of the product or service to the client‘s requirements (Juran, 1988). Quality is defined as ―fitness to purpose", which means in providing a product or service, it should be provided in an appropriate level of quality according to its purpose. From the manufacturing‘s viewpoint, quality is the sum of attributes for a product or service that enables it to meet the client‘s requirements or specifications (Harris, McCaffer et al., 2006). In addition, from the value viewpoint, it is the combination of price and features. Quality is the acceptance level of reasonable price and conformance of the specification (Broh, 1982).

Furthermore, service quality can be defined as the quality of delivering the process or the quality of the performance of the service providers. This is because service quality is the dominant element in evaluating the service providers‘ performance. In order to understand more detail about service quality, it is easier to see it from client‘s viewpoint. It was suggested that the service quality should be judged by client‘s perceptions on processing the outcome (Zeithaml, Bitner et al., 2009). For example, the quality of consultant‘s service is focused on how the problem

in construction has been solved by the consultant. In addition, the process can be seen from the series of consultant‘s performance from the beginning of issue until the problem was solved. Another example of consultant‘s service is the responsiveness of consultant in answering owner‘s queries; the progressiveness of consultant performance; and the communication of the consultant with the other project participants.

2.4.2 Service Quality Dimensions

To understand the service quality, it is necessary to understand the dimensions of service quality. Parasuraman et al (1985) proposed ten dimensions that represent service quality. Later, they simplified those ten dimensions into five dimensions of service quality (Parasuraman, Zeithaml et al., 1988). Previous research suggests that client may judge quality based on multiple factors related to the context. In addition, previous research suggests that cultural differences can affect the relative importance placed on the five dimensions. In the other word, there can be differences in service quality dimensions from the study in the different countries.

The first, reliability, is the ability to perform the promised service dependably and accurately (Choi and Chu, 2001). Reliability is the most important criteria for service quality; it affects the company‘s reputation. In addition, it is really essential for a company to be reliable in performing their service quality, because clients are more likely to do business with companies that keep their promises.

The second, responsiveness, can be described as the willingness to help client and provide immediate service (Segura, 1991). In order to have good responsiveness, a company must view the process of service delivery and the handling of requests from the client‘s viewpoint (Choi and Chu, 2001; Khan, 2003; Akbaba, 2006). For example, quick problem solving ability of the personnel‘s service can impress the client. This dimension emphasizes attentiveness and promptness in confronting client requests, questions, complaintsand problems.

The third, tangibles, is the physical facilities, equipment, appearance of personnel and the physical evidence of the service that client‘s eyes can see to determine the level of service quality. Tangibles provide physical representations or images of the service that clients may use to evaluate quality. Tangibles are often used

by service companies with the combination of other dimensions to improve their level of service quality.

Fourth, assurance, is guaranteeing the process of performing services (Monteson and Singer, 1992). It is defined as employees‘ knowledge, courtesy, the ability of the company and its employee effort to gain client‘s trust and confidence. Assurance consists of several items such as competence (the required skills and knowledge to perform the service); courtesy (politeness, respect, consideration and friendliness of personnel); credibility (trustworthiness, believability, honesty); and security (away from danger, risk or doubt). For example, friendly attitude from the service‘s personnel make the client feel respected and can increase the impression of their service quality. In summary, assurance is necessary in performing service quality as it can build up client trust for the company, particularly the company that seeks to build trust and loyalty between key contact people and individual clients.

Fifth, empathy, is the caring or attention that the companies provide to the client, such as providing additional services (Hsieh, Lin et al., 2007). Empathy consists of several items such as access (easy approachability, easy to contact and easy to obtain service); communication (communicate with the client in understandable language and listening to them); and understanding the client (the effort to understand the client‘s needs). The essence of empathy is expressed through personalized or customized service showing that clients are special and their needs are understood. The clients want the service‘s provider companies to understand their industries and issues. This empathy can bring a better service quality level to the client. In fact, many small consulting companies succeed competing with large companies because they provide more empathy to the client. Although larger companies have better resources, the small companies are known better in understanding clients‘ specific issues and needs. In summary, the company should give individualized attention to its clients.

2.4.3 Client Satisfaction Definition

The definition of client satisfaction is the client‘s evaluation of whether product or service has met the client‘s needs and expectations (Oliver, 1993; Brady and Robertson, 2001). Failure to meet needs and expectations is dissatisfaction of the

product or service. Client may determine satisfaction from several aspects such as from perceptions of product and service quality; personal factors such as client‘s mood or emotional state; and situational factors such as weather conditions (Zeithaml, Bitner et al., 2009). Client‘s emotion can affect the perception of satisfaction with products and services. Sometimes evaluation of client depends on his previous emotions. For example, when a client is in a good mood, his/ her positive feelings may influence the satisfaction about the service that the consultant provides. On the other hand when client is in a bad mood, he/she may have more negative feelings toward the service that consultant provides. Their negative feelings may lead them into dissatisfaction of the service.

In addition, previous research found that there is an important relationship between client satisfaction and client loyalty (Heskett, Jones et al., 1994). This relationship is particularly strong when clients are very satisfied. Thus companies that simply aim to satisfy clients may not be doing enough to generate loyalty. They should instead give more efforts to satisfy or even delight their clients.

2.5 Distinction between Service Quality and Client Satisfaction

There are some distinctions between service quality and client satisfaction, which have been proven by lots of previous researchers (Iacobucci, Ostrom et al., 1995; Al-hawari, 2008; Zeithaml, Bitner et al., 2009). The distinction between perceived service quality and satisfaction is that they use different standards of comparison (Parasuraman, Zeithaml et al., 1988). Satisfaction is generally viewed as a broader concept, whereas service quality focuses specifically on dimensions of service (Zeithaml, Bitner et al., 2009). For example, service quality of CM consultant is judged on attributes such as whether staff are working and available when needed, how responsive the staff are to client needs, how skilled the manager is and whether the facility is well maintained. On the other hand, client satisfaction of CM consultant is a broader concept that is influenced not only by the perceptions of service quality but also includes the perceptions of product quality such as quality of document records; price of the service; personal factors such as client‘s emotional state; and situational factors such as weather conditions. Based on these views, service quality is a component of client satisfaction as seen in figure 2.6 below.

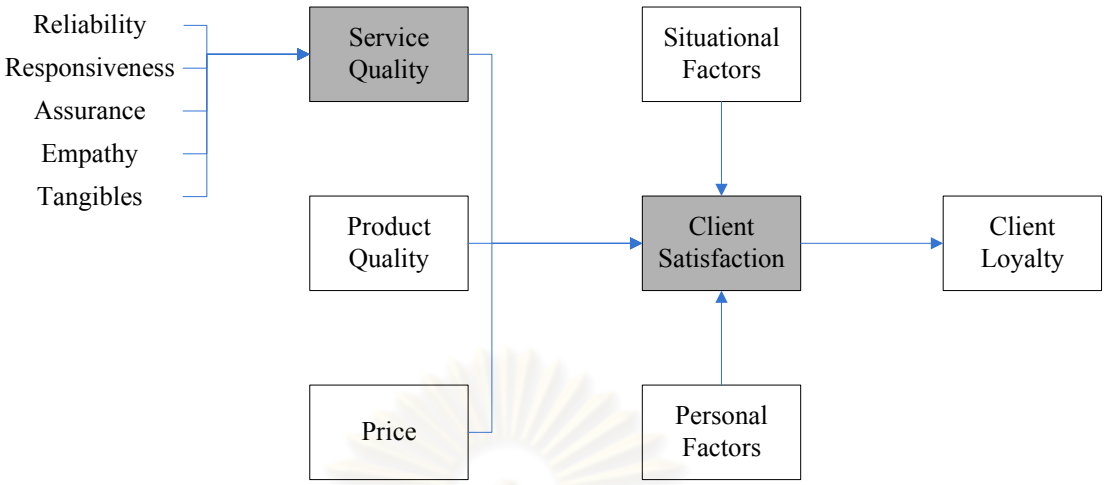


Figure 2.6 Client perceptions of service quality and client satisfaction (Zeithaml, Jo et al., 2008)

The figure shows that service quality is a focused evaluation that reflects the client's perception of reliability, assurance, responsiveness, empathy and tangibles. Service quality is often defined as the differences between service expectations with the actual performance perceptions (Zeithaml, A. et al., 1990). Service quality is a perception that results from when clients compare their expectations to their perceptions of the service that they received (Parasuraman, Zeithaml et al., 1985). In another words, service quality is a mathematical difference between expectations and perceptions of performance (Ruyter, Bloemer et al., 1997). On the other hand, client satisfaction, which is more inclusive, is influenced by perceptions of service quality, product quality and price, as well as situational factors and personal factors. Client satisfaction may lead to the increase or decrease of client loyalty.

In addition, service quality exists in every party in construction such as contractor, designer, architect and CM consultant. Service quality in contractor can be seen in their process constructing the building. Designer's service quality can be seen in the design process of the project which is similar to the architect (Segura, 1991). CM consultant's service quality is represented to the owner such as managing the project, problem analysis activities, meetings with the owner and presenting the progress which are a series of deeds, processes and performances (Segura, 1991). In addition, the service quality of CM consultant may include a tangible report or in the case of supervising is the tangible supervising equipment. In summary, every party in

construction contribute themselves by giving service based on their expertise. The way they performed their service is different depending on each of their own nature. The contractor has the nature of profit motivated and profit oriented. On the other hand, the designer, architect and CM consultant are owner oriented due to their predetermined fee (Segura, 1991).

Improving service quality gives benefit to gain client satisfaction. This is due to the fact that service quality is a major influence for the client satisfaction (Landrum, Prybutok et al., 2009). In addition, client satisfaction has been viewed as the most important indicator to retain a client (Gan, Cohen et al., 2006). Retaining a client is very important for a consultant company to get another project in the future. Obtaining client retention must be gained from preserving the long term relationships with the client and gaining their satisfaction.

2.6 Service Failure

A service failure is described as service performance that reduces a client‘s expectations, which leads to client dissatisfaction (Alexander, 2002). Failure may occur for various reasons. For example, the service may be unavailable when promised, it may be delivered late or too slowly, the outcome may be incorrect or poorly executed, or employees may be rude or uncaring. These failures can cause negative feelings and responses from clients.

As a consequence of service failure, a client is more likely to complain. It is because the client believes a positive outcome may occur from complaining. It is the nature or personality of humans to complain (Alexander, 2002). Thus clients believe they should get compensation for the service failure. In addition, a client feels a social responsibility to complain to help others avoid similar situations or to punish the service provider.

The action of clients following service failure can be of various types. A dissatisfied client can choose to complain about the problem to service provider or giving the company the opportunity to respond immediately. This reaction is the best case for the company because there is a second chance to satisfy the client, keep his or her business in the future and avoid any negative word of mouth. Clients who do not

complain immediately may choose to complain later to the provider by phone, in writing, or via the Internet. For this case, the company still has a chance to recover.

Some clients do not choose to complain directly to the provider but rather by word-of-mouth to friends, family and colleagues. Previous research suggests that there is a big portion of clients who experience a problem with service delivery and complain it to the employees serving them (Zeithaml, Bitner et al., 2009). However, there are only small numbers of clients who complain to someone at the company main office. Their silence can have additional bad effects on the company. The company may never know that their employees performed a bad service. This situation gives no chance for the company to fix or improve on their mistake to the client.

This negative word-of-mouth communication can be extremely harmful because it can create client‘s feelings of negativism and increase this negative impression to others as well. Moreover, the company has no chance to recover unless the negative word-of-mouth is accompanied by a compliant directly to the company. Therefore, understanding and controlling word-of-mouth communication is important for service companies. Nowadays, word-of mouth communication is more important than before and increasing. In addition, clients may have taken to complaining via the Internet. A variety of websites, including web-based consumer opinion platforms, have been created to facilitate client complaints (Hennig-Thurau, Gwinner et al., 2004). This can provide clients with the possibility of spreading negative word-of-mouth communication to a much broader audience. In addition, there are also some dissatisfied clients that develop websites targeting the company‘s current and prospective clients. On these sites, angry clients voice their complaints against the company. In summary, avoiding negative word-of-mouth communication is very important and therefore improving service quality to satisfy the client is essential.

The best way to get positive word-of-mouth communication is providing good service quality for good memory and positive service experiences. In addition, previous research in psychology and consumer behavior found that people remembered negative events and occurrences more than positive things (Zeithaml, Bitner et al., 2009). Negative information also has more influence than positive information. Therefore, service recovery is needed to fix and erase the negative

experiences from the client‘s mind. This can also give benefits in understanding and retaining the clients. The company has to know what clients expect when service failures occur and has to prepare effective strategies for service recovery.

2.7 Service Recovery

Service recovery refers to the actions prepared by an organization for taking responsibility and resolving the service failure. ―Service recovery involves those actions designed to resolve problems, alter negative attitudes of dissatisfied customers and to ultimately retain these customers” (Miller, Craighead et al., 2000). Previous research has shown that resolving client‘s problems reduces client dissatisfaction or obtains positive word-of-mouth communication and possibly gets more loyalty (Hoffman, Kelley et al., 1995). Clients who experience service failures are finally satisfied on recovery efforts from the company. Clients are more loyal than those whose problems are not resolved. This loyalty translates into profitability and shows the power of good service recovery. However, previous research has found that clients who are dissatisfied with the recovery process after making a complaint, are less likely to repurchase the service than clients who do not complain (Zeithaml, Bitner et al., 2009).

An effective service recovery strategy has multiple potential impacts. First, it increases client satisfaction and loyalty and initiates positive word-of-mouth communication (Lin, Lin et al., 2007). Second, a well-documented service recovery strategy also provides information that can be used to improve service as part of a continuous improvement effort. However, based on previous service recovery experiences, companies should increase the possibility of ―doing it right the first time” (Deakins and Dillon, 2005). Ultimately, this can reduce costs of failures and increase initial client satisfaction.

In addition, clients also want justice and fairness for their complaints. Previous research classified three specific types of justice which clients are looking for following their complaints (Tax, Brown et al., 1998). The first is outcome fairness which is the results that clients receive from complaints. The second is procedural fairness such as the policies, rules and timeliness of the complaint process. Lastly, the

third is interactional fairness which is the interpersonal treatment received during the complaint process.

2.8 Previous Research Related to Quality Improvement

There were many approaches applied into construction to achieve proper quality of construction. Many concepts, methods and tools have been developed such as quality control, quality assurances, total quality management and quality management system.

Quality Control (QC) also includes inspection which emphasizes checking the products to uncover defects and reports to management whether it is acceptable or needs to be rejected. QC introduced inspection to the processing stages, which service are being delivered and to ensure that they are undertaken to specified requirements. Usually QC is done on a sampling basis dictated by statistical methods. For example, sampling concrete by making cubes is the most common and best known example in construction. QC is used in developing systems to ensure products or services are designed and produced to meet or exceed client‘s requirements, which in the end may give a better quality for the results (Gerhard P. Muenchmeyer, 2005).

Furthermore, Quality Assurance (QA) is a set of activities to ensure that products or services satisfy client‘s requirements reliably. QA‘s objectives are to improve and stabilize process of the production and to avoid or at least minimize issues that may lead to the defects in the quality of construction. Two key principles that characterize QA: "fit for purpose" (the product should be suitable for the intended purpose) and "right first time" (mistakes should be eliminated) (Gerhard P. Muenchmeyer, 2005). In summary, it was developed to ensure that specifications are consistently met.

Total Quality Management (TQM) is based on the philosophy of continuously improving products or services. A TQM approach, which attempts to ensure that the organization consistently meets and exceeds client‘s requirements is essential to long term survival in business including in construction. TQM is based on quality management from the client's viewpoint. TQM is achieved through an integrated effort among personnel at all levels to increase client satisfaction by continuously improving performance (Arditi and Gunaydin, 1997). The key factor for TQM is that

everyone in the company should be involved and committed from the top to the bottom of the organization. The successful TQM requires their products and services to be fit for purpose on a consistently reliable basis, delight the client with the service which accompanies the supply of products and supply a quality of the product that is so much better than the competition that clients want it regardless of the price.

Quality management system is a set of processes that ensure the attainment of defined quality standards for the provision of services and products by the project or a company. This quality of services and products can be proved using the ISO 9000 which is the international standard that is commonly used worldwide. This is an internationally recognized standard which acts as a form of guarantee that everything is managed to the highest quality standards. This ISO 9000 specifies the requirements and framework that are needed to perform an effective quality management system in order to constantly satisfy and meet the client quality standards.

In summary, many approaches and efforts such as quality control, quality assurance and TQM have been carried out in order to improve the quality and meet or exceeds the standards. In addition, there are several researches that specifically focus on the service quality in construction. The objective in each research may be different, but these research move forwards to improve both product and service quality. Previous research in context of service quality in construction industry is described in section 2.9 below.

2.9 Previous Research Related to Service Quality in Construction Industry

This section reviews previous researches related to the construction industry. The previous research is separated into sections based on their theme of research. From the literature review, previous researches can be classified into four main research themes such as developing model (McLachlin, 2000; Forsythe, 2008; Karna, Junnonen et al., 2009); identifying factors (Ahmed and Kangari, 1995; Casadesus, Viadiu et al., 2002; Karna, Junnonen et al., 2004; Viadiu and Fransi, 2005; Ling, Ibbs et al., 2006; Karna, Sorvala et al., 2009); developing tools (Arditi and Lee, 2002; Yasamis, Arditi et al., 2002); and level measurement (Al-Momani, 2000; Karna, 2004; Wang, Chuang et al., 2009). The summary of four main categories can be seen in figure 2.7 below.

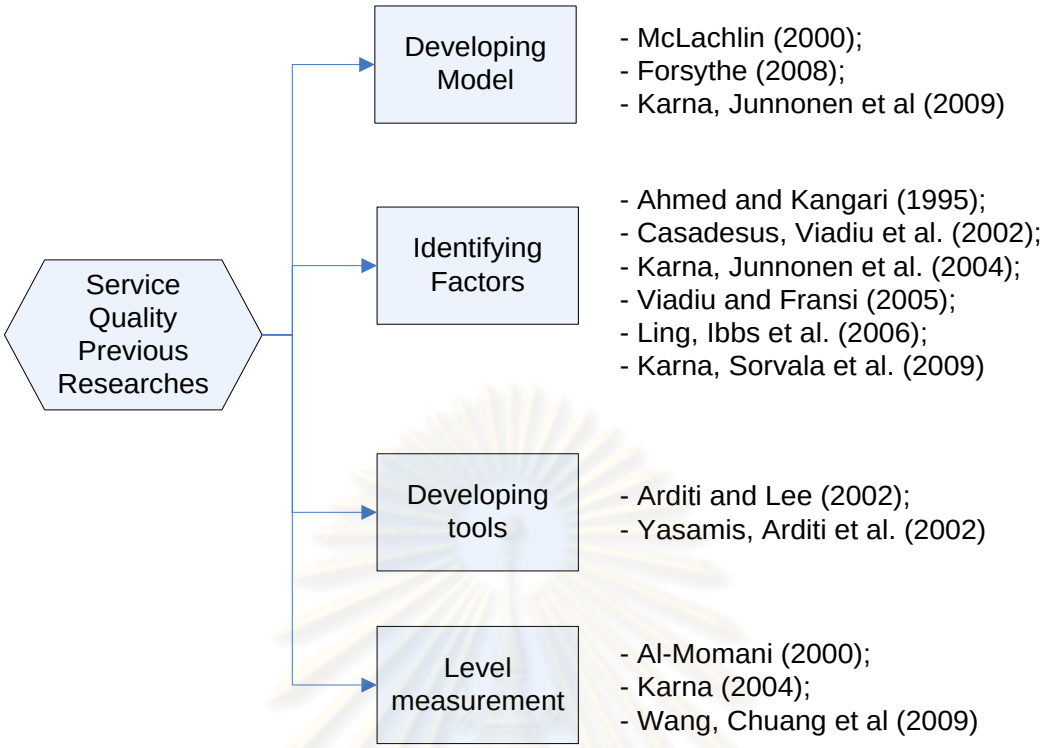


Figure 2.7 Service quality previous research themes

2.9.1 Developing Model

This research theme contains the explanation of previous researches that were conducted in developing a model to understand more about service quality in construction. In construction, lots of research has been undertaken on the achievement of quality from both project management and production points of view. However, a gap still exists specifically in the area of service quality. Thus McLachlin (2000) explored what is the engagement success in consulting from both the client and consultant points of view. The research explored the literature from several disciplines and conducted interview with seven consultants including owners in consulting business engagements. The research concluded that the consulting engagement can be successful if the consultant has met client expectations. The research also created 4 quadrants of consulting engagements between whether the expectations have been met or not and between whether the core needs have been addressed or not. Finally, the research suggested to improve the consultant‘s service quality toward the first quadrant.

In addition, Forsythe (2008) developed a theoretical model concerning the way service quality impacts on the perceptions of clients in housing construction. The

method combined the Parasuraman et al.‘s gap model with the Winch et al.‘s model of service quality in construction projects. It involved the clients‘ evaluation of service quality based on perceptions of the actual service compared to the expected service. The model proposed in this research showed a structured and contextualized view of how service quality theoretically occurs in housing construction.

Furthermore, Karna, Junnonen et al. (2009) built a tested model and framework for describing the structure and factors influencing client satisfaction in the construction industry. Data for the model were based on 831 assessments obtained from project clients. To analyze, they used factor analysis, correlations between factors, structural equation model and interpretation of the model. The outcome is to introduce a structural equation model illustrating and the interdependencies of the factors influencing client satisfaction.

2.9.2 Identifying Factors

This research theme contains the explanation of the previous research regarding the indentifying factors of service quality in construction. Ahmed and Kangari (1995) did research to discover the most important factors influencing owner satisfaction in the construction industry and the level of importance assigned to each owner satisfaction factor. They applied six owner-satisfaction factors; time, cost, quality, owner orientation, communication skills and response to complaints. The research conducted a survey for analyzing the owner-satisfaction factors. The list of owners was collected from data on public companies compiled by McGraw-Hill's Compustat Services, Inc. Then they used correlation matrix, statistical analysis, multiple regression analysis, Tukey's Analysis and ANOVA to analyze. The research found that owner satisfaction model concluded that these six factors are equally important when evaluating owner satisfaction.

In addition, Casadesus, Viadiu et al. (2002) summarized the main conclusions drawn from the research study which analyses the expectations and fulfillment of expectations among owner companies which have used consultancy services to introduce ISO 9000. The research used SERVQUAL questionnaire in Europe consultant company; independent professional and small company. The research analyzed the data using factor analysis and pearsons chi square. The research found

the gap detected between the previous expectations, actual benefits, relationship between perceived quality and benefits provided by consultant.

Client satisfaction can be seen either as a goal or as a measurement tool in the development of construction quality. In addition, client satisfaction enables construction companies to differentiate themselves from their competitors and create sustainable advantage. Karna, Junnonen et al. (2004) empirically explored the main owners‘ satisfaction/ dissatisfaction factors and measured the performance of Finnish construction companies according to the degree of client satisfaction as perceived by client themselves. The survey data were gathered from 400 construction projects; construction [office (54%), residential (27%) and other (i.e. industrial and infrastructures) project types (19%).]. The target owner (i.e. owner, or general contractor in case of subcontracts) came from RALA (i.e. construction quality association) in Finland. The measurement of five factors consists of QA and handover, environment and safety, co-operation, personnel, site supervision and subcontracting. A regression analysis technique was applied to identify those factors that have the greatest influence on overall satisfaction. Quality, environment and safety at work, personnel, co-operation and site supervision and subcontracting were used as the predictor variables. Finally, the overall client satisfaction score is the outcome variable. The overall satisfaction score was produced by summing the mean satisfaction ratings of the five variables and dividing by five. The outcome found that clients were typically satisfied with the contractor‘s abilities to co-operate and the skills of contractor‘s workers and supervisors. However, low satisfaction could be found for the items related to quality assurance and handover: workability of handover material and maintenance manual, quality of assignment material, maintenance manual and repair of defects and deficiencies noticed during handover inspection.

Furthermore, Viadiu and Fransi (2005) investigated whether there were any basic differences in the way that companies behaved when implementing a quality system based on ISO 9000 and how the quality of the consultant can be measured. Their empirical study is a sample of companies that obtained their ISO 9000 certifications in the years 1997, 1998 and 1999. All of these companies were based on consultancy services in Catalonia (i.e. Spain). The research used cluster analysis of

K-averages, the correlations between the variables and the Bartlett statistic. The results are the service quality can be appreciated in terms of three factors. The research provided a tool to measure the service quality of consultancy companies which can improve their performance. In addition, several recommendations for consultants companies were pointed regarding the services of specialized consultants in ISO 9000.

As China becomes a member of the World Trade Organization, many international architectural, engineering and construction (AEC) companies are undertaking or expected to undertake projects there. Ling, Ibbs et al. (2006) attempted to identify the factors that affect the success level of projects undertaken by foreign AEC companies in China. Specifically, the paper investigated the variables that are correlated to project success in China. The research used questionnaire and interviews with top USA companies consisting of contractors and designers ranked by the Engineering News Record in 2001 & 2002. These companies undertook international work that has been completed in China. Independent samples t-test was firstly undertaken to check significant difference between the performances of projects undertaken by U.S. (n=15) and Singapore (n=20) companies. The result found no significant differences between these two countries. Therefore, it is appropriate to put the sampling together for further data analysis. Factors that affect project success were determined by Pearson‘s correlation analysis. The correlation analysis provided the correlation coefficients and levels of significance between success measures and explanatory variables. This research found that the most important variable that can bring good project quality performance & owner satisfactions is the AEC ability or understanding owner's requirement. The variables that are significantly correlated to the success measures are those that are more likely to affect the outcome of a project and hence should be given more attention.

Construction is often a long-term project described as a dynamic and complex entity. This is one of the factors making the assessment of construction quality so difficult. It needs versatile and systematic data about the quality of the construction process and the building in order to be able to operate in a client-oriented manner and develop their own operations. Thus Karna, Sorvala, et al. (2009) examined the typical factors in a construction project as regards client satisfaction and examined into which

kind of groups the projects can be divided from the perspective of the assessment made by the commissioner of the construction project. Cluster analysis assists in defining the characteristics of projects assessed as successful and less successful. The research collected feedback data with a total of 831 construction projects as regards the success and quality of construction projects in Finland comprising 22 measurable variables with scale of 1-5. The sample is from RALA (construction quality association) feedback system. Cluster analysis was conducted to divide the observations into various categories or clusters, so that the observations within one category are similar to each other but different from observations of the other clusters. The results showed the typical factors with good levels (Clusters 6, 4, 1, 2) and poor levels (Clusters 3, 5 and 7).

2.9.3 Developing Tools

This research theme described the previous research that focused on developing the tools to evaluate the service quality in construction. Arditi and Lee (2002) developed a tool that measures the quality performance of D/B companies at the corporate level using Quality Function Deployment (QFD). They measured service quality performance at the corporate level, survey questionnaires, degree of satisfaction of clients' (i.e. construction owners) needs and expectations by assessing tube performance of the D/ B company quality management system and the quality culture place in the D/ B company. The samples of this research were the construction owners, senior executives of D/ B companies and quality system assessors and consultants from database of the Design Build Institute of America (DBIA). The results showed that the tool developed can be used by construction owners to rank D/B companies relative to corporate service quality as well as by D/B companies to benchmark themselves against their competitors. Quality performance measurement tools may be used for tube qualification, approval, registration, certification or accreditation of D/B companies. It is also important for the self-diagnosis and continuous quality performance improvement of D/B companies.

In addition, it is necessary to develop a method that can improve the quality of the construction process and the levels of client satisfaction from the performance of the contractor. Yasamis, Arditi et al. (2002) developed the list of Contractor Quality Performance (CQP) indicators based on perception from the owner (i.e. the agency or

organization funding the project) and the end-user of the construction (i.e. the general public). Yasamis, Arditi et al. (2002) found that CQP indicators are operationalized within the theoretical framework of the CQP evaluation model. CQP evaluation model can be used in a contractor prequalification and selection system.

2.9.4 Level Measurement

There was an almost complete lack of attention devoted to owner‘s satisfaction which undoubtedly contributed to poor performance. A recent survey by (Al-Momani, 2000) points out that many projects are not achieving what was expected of them. The failures of many public projects are due to many reasons such as cost overrun, time delay and disputes which require immediate attention. In addition, there is little work in the specific areas of project owners in the developing countries. There have been no reports of owner‘s satisfaction in Jordan or its neighbors. A common factor running through all of the papers cited above is that they investigate the project success, none has attempted to question the quality of construction services.

Thus Al-Momani (2000) did a research to define and measure owner satisfaction with the construction performance. In addition, their research objective was to discussed and to demonstrated a methodology for assessing the performance of the construction contractors. The service quality gap analysis was used to analyze the strengths and weaknesses of construction processes. He used service quality gap analysis as a diagnostic tool on the differences and similarities of the views of project owners and contractors concerning 15 attributes for measuring expectation and actual performance (panel A and B). Panel C is an overall opinion of how well the construction process was carried out by five-point scale for each item. The samples of this research are 260 contractors randomly drawn from project owners of both private and public sectors. The questionnaire survey was completed by 138 participants. For analysis, Al-Momani (2000) used t-tests, service quality gap analysis and subtracting the 15 expected attributes in panel A from the corresponding and 15 perceived attributes in panel B. These techniques are formal, practical, inexpensive, easy to use and the analysis can be conducted in a short period of time. The result of research found that the performance index is a value to individual contractors who can use it to compare their performance in different projects and take measures to maximize their

performance index in future projects. They can also benchmark themselves against their competitors.

Thus Karna (2004) examined client satisfaction and quality in construction and developed a framework to evaluate the dynamics of client satisfaction & quality. The research collected the data from RALA (construction quality association) feedback system which is similar to Japan. This empirical research analyzed two client groups; public and private clients. The research evaluated the satisfaction level based on five-point scale. To evaluate attributes, means, gap sizes and p-values, he used chi-square test to compare mean responses. The outcome is a list of 22 attributes and performance analysis based on public and private clients.

Service performance in the design stage most affects the overall project results. However, currently it is hard to quantify the results and make a proper determination of the quality of the professional construction management (PCM) design service because the evaluation mechanism and procedures have not been completely implemented yet. Wang, Chuang et al. (2009) investigated owners' opinions and thereby established the representative performance indicators of PCM design service and constructed an evaluation approach of PCM service performance in the design stage. They combined the fuzzy theory with DEA and forty-six cases which conform to the following item were selected; (1) duration: the duration was from 1998 to 2008, (2) characteristics: they were all public building works and (3) size: budget ranged between 30 and 60 million U.S. dollars for research methodology. The samples are six companies acknowledged to be the representatives handling Taiwan PCM projects. The outcome is a list of rank and level of design service performance in Professional Construction Management (PCM) projects.

2.10 Research Related to Service Quality of Consultant in Construction Industry

To achieve high service quality in construction, many approaches are applied into construction such as identifying the service quality gaps, identifying the key performance and measuring the owner satisfaction. For example, Samson and Parker (1994) identified the service quality gaps in consulting engineering industry. They measured the owner expectations and perceptions of the service quality provided by

consulting engineers. The used a SERVQUAL survey to the 6 different disciplines of engineering consultant company. Those participating company disciplines are structural, civil & structural, civil, mechanical & electrical, geotechnical and multidisciplinary. The outcome of their research is the ranked sources of owner dissatisfaction regarding the service performance of the engineering consultant. Although this is a very good research, it was not implemented in the construction management discipline whereas CM consultant service quality is very important and has a very big influence to the overall process of construction project.

Table 2.2 Service quality items of engineering consultant in Australia (Samson and Parker, 1994)

Service Features	Items
Tangibles	1. Produce detailed and accurate documents and drawings 2. Ensure documentation that is easily understood by owners and that represents what the owner will receive 3. Ensure materials and equipment that are commissioned and operate within the design parameters 4. Use computerized systems and software which are compatible with those of their owner, for direct information transfer 5. Provide owners with a detailed programme, which is based on realistic expectations and shows how deadlines will be administered
Assurance	6. Commence and complete jobs on the scheduled dates 7. Properly administer jobs through daily vigilance and regular progress reviews 8. Co-ordinate the various engineering disciplines, to bring all within the agreed budget 9. Allocate sufficient resources (including back-up resources) to ensure good quality, timely work 10. Apply established quality control procedures to detect and eliminate errors rapidly 11. Promptly respond to owner requests for information
Reliability	12. Have qualified and experience staff who have technical expertise and who instill confidence 13. Have staff with good conceptual skills, which enable them to contribute proactively to the design process 14. Maintain complete owner confidentiality 15. Ensure that personnel assigned to jobs are readily accessible to owners 16. Be aware of and conform to, requisite regulations, e.g. standards and codes

Service Features	Items
Empathy	17. Give personalized service 18. Have a good understanding of the industry and/or circumstances (political, financial etc.) in which their owner operates 19. Be sensitive to and incorporate, specific owner needs 20. Display genuine interest in and enthusiasm for, the work done for their owner
Communication	21. Have contract administrators with strong communication and interpersonal skills 22. Explain at the outset exactly how jobs will be administered and what the owner can expect from the company 23. Ensure, by communicating with owners at the pre-design stage, that briefs are sufficiently detailed and accurately reflect the owner‘s needs 24. Inform owners of personnel assigned to the various tasks and report any significant staffing changes 25. Identify and define problems and their cost implications to owners as soon as they are encountered 26. Ensure their staff are able to communicate in a —non-technical” way with owners, who may not be conversant with a particular discipline
Client Focus	27. Conduct post-project reviews to assess their service quality, to determine the level of owner satisfaction and to ascertain where improvements can be made 28. Have a multi-disciplinary approach, offering clients a broader array of services, which are better co-ordinated through in-house communication 29. Offer —elegant” design solutions and options, which reflect refinement and resolution of inconsistencies 30. Be creative and progressive in making new products and services available to existing owners 31. Display initiative, i.e. go beyond what has been requested; anticipate issues of concern to the owner and introduce new ideas, rather than reprocessing information provided by the owner 32. Provide products and services which are customized for individual owners, rather than using a standardized format, i.e. display greater flexibility 33. Constantly improve their products, services and technical capabilities and keep informed of new developments in their industry

Furthermore, Tang, Lu et al. (2003) tried to measure owner satisfaction of engineering consulting companies in Hong Kong using a questionnaire survey. They used 29 factors to measure the overall owner satisfaction and the outcome of the research is the level of owner satisfaction. This research has a similar objective to previous research in Australia. However, this research did not use the SERVQUAL-based survey. Instead, they developed their own questionnaire-based survey of owner satisfaction. In addition, this research focuses more on the owner satisfaction viewpoint instead of the service quality. Similarly with the previous research in

Australia, this research does not fulfill the need to identify the service quality item of CM consultant.

Table 2.3 Factors for measuring owner satisfaction of engineering consulting companies (Tang, Lu et al., 2003)

Factors	Indicators
A. Professionalism of service:	1. Quality and reliability of advice by professional/ technical staff. 2. Skill of communication with owner and other consultants. For example, architects and engineers from different disciplines. 3. Courtesy/manner of professional/technical staff.
B. Competitiveness of service:	1. Academic and professional qualifications of professional/ technical staff. 2. Competitiveness of consulting fee. 3. Track record of consulting companies in similar projects. 4. Goodwill of the company.
C. Timeliness of service:	1. Promptness of responding to queries and complaints. 2. Ability to meet owners‘ deadlines.
D. Quality of design:	1. Complete coverage of work by engineering drawings and reports. 2. Accuracy of information conveyed by engineering drawings and reports. 3. Easiness of understanding of reports, engineering drawings and contract documents produced 4. Completeness of office records.
E. Degree of innovation:	1. Adoption of pioneer theories in design. 2. Utilization of advanced computer programs in design. 3. Allowance for innovative construction technology. 4. Aesthetic consideration of completed work in future.
F. Completeness of other considerations:	1. Environmental consideration in design. 2. Economic consideration in design. 3. Allowance for minimum maintenance of completed work in future. 4. Reliability of finished structures. 5. Fitness for purpose.
G. Availability of support to owner:	1. Readiness with which professional/ technical staff could be reached by owner. 2. Enthusiasm of professional/technical staff in surmounting problems raised by owner.
H. Supervision at implementation stage:	1. Academic and professional qualifications of site supervisory staff. 2. Control of progress of work. 3. Control of costs of work. 4. Control of quality of material and workmanship incorporated in permanent work. 5. Completeness of site records.

Another research, Woo and Ennew (2005) offered an approach to service quality measurement using interaction dimensions of business-to-business professional service quality. The proposed measurement was applied to consulting engineering industry. This research was conducted by sending the questionnaire to 273 government seniors and 367 professional architects. In summary, this research more focused in the interaction dimensions rather than identifying the item of service quality and it was conducted based on engineers and architects‘ viewpoint.

Table 2.4 Dimensions of business-to-business professional service quality (Woo and Ennew, 2005)

Dimensions	Items
Product/service exchange	PE1. The consulting engineer (or CE in short) provides customized, rather than standardized, professional services to meet our needs. PE2. The CE‘s services are technically sound. PE3. The CE is able to achieve cost-effectiveness for the project. PE4. Through its established quality control procedures, the CE provides reliable services. PE5. The CE‘s design scheme meets our specific project requirement. PE6. The CE is able to meet the time schedule for the project. PE7. The CE is able to meet the agreed budget for the project.
Financial exchange	FE1. The CE‘s payment claims are made timely. FE2. The CE‘s payment claims are accurate. FE3. The CE‘s payment claims are legitimate.
Information exchange	IE1. The CE submits technical documentation that is easily understood by our project team. IE2. The CE submits technical documentation that meets our needs. IE3. The technical information supplied by the CE is adequate.
Social exchange	SE1. The CE builds up trust in the working relationship with us. SE2. The CE has good understanding of how our organization operates. SE3. The CE‘s consultants are enthusiastic in dealing with us. SE4. The CE‘s consultants are easy to make friends with.
Cooperation	CO1. The CE cooperates closely with us in project management. CO2. The CE is able to handle our complaints. CO3. The CE is collaborative in resolving conflicts with us.
Adaptation	AD1. The CE constantly improves technical capabilities to keep abreast with new developments in the engineering profession. AD2. The CE proactively offers us new technical solutions when conditions change. AD3. The CE makes operational changes to project management when required by our project team. AD4. The CE is able to coordinate the various engineering disciplines when required by our project team.

Furthermore, Cheng, Proverbs et al. (2006) identified the key performance of engineering and CM consultant. They tried to measure the performance of construction consultants in the UK. The outcome of this research is the rankings of the key performance that may affect the owner satisfaction. They also show the item of choosing consultant based on the importance mean result of their research. However, this research was conducted on the owner of UK international engineering and management consultant, whose business covers both private and public owners from various sectors including building, energy, transport and utilities. The scope of this research is considered too general and not focused on the service quality of CM consultant at process level. Measuring the level of owner satisfaction from both private and public owners is considered to be inappropriate. The reason is that the perception level of quality from private and public owners may be different. Meanwhile, the research didn‘t conduct independent t-test to check whether there is a significant difference between the perceptions undertaken by public and private owners. If there is no significant difference than it is appropriate to put the owners together for further data analysis.

Table 2.5 Key performance items of engineering and CM consultant (Cheng, Proverbs et al., 2006)

Factors	Criteria
Service delivery	1. Overall quality of service and advice 2. How does it compare with other consultants you use 3. Do you employ other companies of cost consultants? 4. Understanding your business 5. Problem solving 6. Speed of response 7. Technical accuracy 8. Innovation in methods and approach 9. Meeting your expectations (exceeding expectations) 10. Delivering value for money
People (of consultants)	1. Quality of people 2. Providing right level of staffing 3. Level of commitment team/ central management 4. Working with your staff and other consultants 5. Friendliness of people 6. Accessibility of people
Communication	1. Quality and timing of consultants‘ reports 2. Regular dialogue on progress of the project 3. Regular dialogue to establish dynamics of your business 4. How good is the consultant at listening

	5. Informing you on commercial/ business issues which may affect your business 6. Value of regular mailings advising you of our latest news/information 7. Quality/ usefulness of corporate entertainment 8. Quality/ usefulness of corporate literature 9. Quality/ usefulness of corporate website

Yang and Peng (2006), developed an owner satisfaction evaluation model for construction project management in Taiwan. This research developed a client satisfaction evaluation model for construction project management service. They used a questionnaire-based survey and make the evaluation framework of construction project management service. They sent the questionnaire to 109 government projects and 6 school projects. The outcome of this research gives benefit to evaluation and assessing construction project management service performance. However, this research was conducted based only on the owner satisfaction‘s viewpoint and not considering the importance of service quality item. Furthermore, it was conducted on the government project‘s owner which may have lower perception of quality than the private project‘s owner.

Table 2.6 Factors of construction project management service performance (Yang and Peng, 2006)

Dimensions	Items
Ability for change management	· Regular consultant meeting · Interfaces coordination and integration · Review and recommendation of change orders · Involvement of service provider to owner · Overall management ability · Examination or audit on construction payment
Ability for schedule management	· Handling of construction warrant interfaces · Control of project schedule · Forecast of project schedule · Management and coordination of schedules in different phases · Coordination and management of design schedule · Examination of construction feasibility study · Works of acceptance and transfer of project · Financial analysis and recommendation on the sources of finance
Ability for resource management	· Evaluation on the source of required resources · Formulation of preliminary budget · Examination of construction budget · Assessment of tender documents · Assistance in tendering works · Assistance in signing contracts · Recommendation on the selection of providers for professional services and technical service

Dimensions	Items
Ability for data inspection	· Development and control of service quality assurance system · Development of the chart of duty and authority of various providers for professional services and technical service
	· Examination of environmental impact assessment report · Examination of design, specifications, drawings · Examination of the payment of providers for professional services · Reasonable analysis of resources prices · Examination of budgets of construction project and equipment · Audit of information on payment settlement · Schedule planning of project
Ability for other activities	· Evaluation and recommendation of design requirements · Examination of interfaces of design and construction · Computerization of document management and construction · Evaluation of contract disputes and claims · Service attitude of project team members · Achievement of regular project meetings
Team performance	· Abilities of project team members in alternative study and evaluation · Collaboration of project team members
Achievement of in-service activities	· Service quality management system and achievement of quality · Quality of value engineering report · Achievement of examining construction plan · Schedule achievement of examining construction plan · Quality of schedule reports · Schedule achievement of schedule reports · Achievement of executing project meetings · Integrality of project minutes · Achievement of managing construction documents and contracts
Achievement of construction payment and inspection	· Accuracy of payment · Schedule achievement of payment · Integrality of payment certificate · Schedule achievement of submitting acceptance reports · Schedule achievement of submitting as-built drawings and documents · Schedule achievement of project completion
Achievement of Construction tendering	· Preparation of tender documents · Schedule control of tendering · Achievement of tendering works · Schedule control of signing contracts

Lastly, Chow and Ng (2007) evaluated the performance of engineering consulting companies with a fuzzy gap analysis model. It is a model that can facilitate the assessors to compare the owner‘s expectation and actual service quality of an engineering consultant. The objective of the research was to improve the practice of consultant performance evaluation system (CPE). Similarly with previous research, this research was focused on the engineering consultant company performance. This

is a very good research that can compare the owner‘s expectation and actual service quality of an engineering consultant. However, it was not implemented in the CM consultant and not considering the importance of each service quality item.

Table 2.7 Factors for evaluating the performance of engineering consulting companies

Criterion	Indicators
CPE 1 Compliance to and understanding the owner's brief	QI-1.1 Percentage of consultancy services that adhere to the design brief
CPE 2 Compliance to legislative requirements	QI-2.1 Number of design submission(s) required for design approval from all relevant government departments
CPE 3 Identification of owner's requirements and project objectives	QI-3.1 Percentage of consultancy services fulfilling the project's technical requirements QI-3.2 Percentage of consultancy services fulfilling the project's financial requirements QI-3.3 Percentage of consultancy services fulfilling the project's time requirements
CPE 4 Quality of design	QI-4.1 Percentage of design solution fulfilling the project‘s technical standard QI-4.2 Percentage of design solution fulfilling the project's financial standard QI-4.3 Percentage of design solution fulfilling the project's environmental standard QI-4.4 Percentage of design solution fulfilling the project's safety standard QI-4.5 Percentage of design solution fulfilling the project's quality standard QI-4.6 Percentage of project risks being effectively covered in the design recommendations QI-4.7 Percentage of design solution that comprehensively examine all constructability aspects
CPE 5 Availability of innovative and alternative solutions	QI-5.1 Percentage of design elements that carefully examine all possible solutions QI-5.2 Percentage reduction of construction duration as compared to the owner's expectation QI-5.3 Percentage reduction of construction cost as compared to the owner's expectation
CPE 6 Approach to overall cost effectiveness	QI-6.1 Percentage reduction of all project resources as compared to the owner's expectation
CPE 7 Quality of drawings/documents	QI-7.1 Percentage of drawings/documents that are comprehensive, clear and well-defined
CPE 8 Adequacy of cost estimate	QI-8.1 Percentage deviation from the overall project cost as compared to the owner's expectation

2.11 Research Gaps

In summary, many researchers and practitioners conducted several approaches in order to improve the quality of service and standards. However, lack of service

quality still becomes an issue that has yet to be solved entirely. The previous research studies lack a focus into the service quality of CM consultant which has the biggest quality influence in the construction project. In addition, previous research studies lacks in exploring the nature of service quality in construction project and specifically in the context of CM consultant. Previous research may not make clear distinction between service quality and owner satisfaction in construction. It should be clear that service quality is just one part of owner satisfaction item.

Previous research has some limitations on the list of service quality items specifically in context of CM consultant. Therefore, it is necessary to conduct research in identifying the service quality item of CM consultant which has the biggest influence on the process and quality of construction project. In addition, there is a necessity to identify the weight of each service quality item and dimension. This is necessary due to the fact that each item can differently influence in the evaluation of overall service quality performance. Therefore, this research conducts survey questionnaire and interviews the owners of private construction project which has recently had more projects and has higher service quality standards. This research is specifically conducted in building construction project which has the most involvement of CM consultant.

2.12 CM Consultant's Service Quality Items based on Ten Service Quality Dimensions

This section reviews the previous research related to the service quality of consultant in construction industry. Literature review found that there were six previous researches that are closely related in exploring the service quality of consultant in construction industry. However, these previous researches mostly focus on the engineering consultant, which may have different service quality items from the CM consultant. From these six previous researches, several items were selected based on their similarity of service to the nature of CM consultant. Those six previous researches are (1) Samson and Parker (1994), (2) Tang, Lu et al. (2003), (3) Woo and Ennew (2005), (4) Cheng, Proverbs et al. (2006), (5) Yang and Peng (2006), (6) Chow and Ng (2007).

2.12.1 Reliability

Reliability is the ability to perform the promised service dependably and accurately. The nature of reliability exist in many services of CM consultant such as in completing the project on time & on budget; controlling the project to finish with the specified quality; and making reliable records with high accuracy, detail and completeness. Reliability is very important because lack of reliability can lead to the lack of quality in construction. Therefore, this research tries to explore the list of service quality items related to the nature of reliability in Indonesian construction project. The list of items in this reliability dimension were generated from the previous researches such as (1) Samson and Parker (1994), (2) Tang, Lu et al. (2003), (3) Woo and Ennew (2005), (4) Cheng, Proverbs et al. (2006), (5) Yang and Peng (2006), (6) Chow and Ng (2007). The list of service quality items of CM consultant related to the reliability can be seen in table 2.8 below.

Table 2.8 Service quality items of CM consultant in "Reliability"

Factor	Items	References
Reliability	1. The CM consultant is able to complete the project within the scheduled dates	(1), (2), (3), (5), (6)
	2. The CM consultant is able to complete the project within the agreed budget	(2), (3), (6)
	3. The CM consultant is able to complete the project under its technical requirements	(2), (3), (4), (6)
	4. The CM consultant is capable of providing good quality and reliable advice	(1), (2), (4)
	5. The CM consultant is able to provide good control for quality of materials and workmanship	(1), (2), (3)
	6. The CM consultant has high accuracy, detail and completeness of the records	(1), (2), (4)

2.12.2 Responsiveness

Responsiveness can be described as providing service as immediate as possible. Responsiveness in construction can exist in many ways such as being responsive in replying to the owner's queries; informing owner immediately of urgent situation; and identifying problems immediately. Good responsiveness can lead to the smoothness of the project. On the other hand, low responsiveness may lead to the delay of the project construction. Furthermore, it can also affect the cash flow of the project if the construction were delayed or even halted. The list of items in this

responsiveness dimension were generated from the previous researches such as (1) Samson and Parker (1994), (2) Tang, Lu et al. (2003), (3) Woo and Ennew (2005), (4) Cheng, Proverbs et al. (2006). The list of service quality items of CM consultant related to the responsiveness can be seen in table 2.9 below.

Table 2.9 Service quality items of CM consultant in factor "Responsiveness"

Factor	Items	References
Responsiveness	1. The CM consultant promptly responds to owner's requests, queries and complaints	[1], [2], [4]
	2. The CM consultant informs the owner immediately about any sudden and urgent situation related to the project	[1]
	3. The CM consultant is able to recognize, identify and define problems immediately	[1]
	4. The CM consultant proactively develops various solutions when problems occur	[3]

2.12.3 Competence

Competence of CM consultant would be the knowledge and skills to manage and lead the project. In addition, high competence can be acquired from experience. Acquiring competence in construction cannot only be obtained from literature or classroom; it must come from the real experience during a project. The main reason is that the nature of construction is very complex, difficult, dynamic and it requires good management skills and an understanding of human behavior (Al-Momani, 2000). As a result, a high skill level is generally demanded and expected by the owner. The list of items in this competence dimension were generated from the previous researches such as (1) Samson and Parker (1994), (2) Tang, Lu et al. (2003), (3) Woo and Ennew (2005), (4) Cheng, Proverbs et al. (2006). The list of service quality items of CM consultant related to the competence can be seen in table 2.10 below.

Table 2.10 Service quality items of CM consultant in factor "Competence"

Factor	Items	References
Competence	1. The staff has good academic knowledge, experience and is able to give valid contribution	[1], [2], [4]
	2. The staff has the capability to do immediate problem solving	[3], [4]

Factor	Items	References
	3. The staff are able to communicate in a non-technical way with the owner that may not be familiar with engineering discipline	[1], [2], [3], [4]

2.12.4 Access

In construction, the nature of this determinant is important especially when there is a problem in the construction project. When a problem arises then the owner has to be in immediate communication with the consultant or contractor. In addition to a case when a problem occurs, a CM consultant needs to be easily contacted by the owner in daily activities. The list of items in this access dimension were generated from the previous researches such as (1) Samson and Parker (1994), (2) Tang, Lu et al. (2003), (4) Cheng, Proverbs et al. (2006). The list of service quality items of CM consultant related to the access can be seen in table 2.11 below.

Table 2.11 Service quality items of CM consultant in factor "Access"

Factor	Items	References
Access	1. The staff are accessible and could be reached easily by owner	[1], [2], [4]

2.12.5 Courtesy

This determinant might not be as important as the other determinants. This is due to the general reputation of construction workers nowadays. However in the office, this determinant might be necessary to consider, since it can have a direct contact with the owner. The list of items in this courtesy dimension were generated from the previous researches such as (2) Tang, Lu et al. (2003), (3) Woo and Ennew (2005), (4) Cheng, Proverbs et al. (2006), (5) Yang and Peng (2006). The list of service quality items of CM consultant related to the courtesy can be seen in table 2.12 below.

Table 2.12 Service quality items of CM consultant in factor "Courtesy"

Factor	Items	References
Courtesy	1. The staff has good manner and politeness in performing the service	[2], [5]
	2. The staff has good hospitality and friendliness	[3], [4]

2.12.6 Communication

Construction project involves many parties including owner, contractors, subcontractors, suppliers and consultants (Cherns and Bryant, 1984; Laufer and L., 1988). It can be assumed there are high number of individuals and entities involved. Work combination from all of them results in the complexity of the construction. Therefore this determinant is very important. The role of communication determines the success of the project. The list of items in this communication dimension were generated from the previous researches such as (1) Samson and Parker (1994), (3) Woo and Ennew (2005), (4) Cheng, Proverbs et al. (2006), (5) Yang and Peng (2006). The list of service quality items of CM consultant related to the communication can be seen in table 2.13 below.

Table 2.13 Service quality items of CM consultant in factor "Communication"

Factor	Items	References
Communication	1. The CM consultant properly provides regular dialogue on progress of the project	[4], [5]
	2. The CM consultant is able to cooperate and coordinate with the other parties in construction (i.e. owner, contractor, sub-contractor and other consultants)	[1], [3], [4]
	3. The CM consultant explains how jobs will be administered and what the owner can expect from them	[1]

2.12.7 Credibility

This determinant is very important throughout the entire delivery service process. In addition, this determinant is very important for the company itself. This is due to the fact that consultants are commonly judged by their reputation and word of mouth (McLachlin, 2000). Owner's word-of-mouth has a big influence on the consultant's reputation and their chances of being selected for future projects, either from the same owners or from the others (Dawes, Dowling et al., 1991). The list of items in this credibility dimension were generated from the previous researches such as (2) Tang, Lu et al. (2003), (3) Woo and Ennew (2005). The list of service quality items of CM consultant related to the credibility can be seen in table 2.14 below.

Table 2.14 Service quality items of CM consultant in factor "Credibility"

Factor	Items	References
Credibility	1. The CM consultant has good and sufficient track record in similar project	[2]
	2. The CM consultant builds up trust and honesty in the working relationship	[3]

2.12.8 Security

In construction, this determinant is also important, especially in the case of high-price project, where it is essential to keep the confidentiality of financing, estimating and the bidding of the project. The list of items in this security dimension was generated from (1) Samson and Parker (1994). The list of service quality items of CM consultant related to the security can be seen in table 2.15 below.

Table 2.15 Service quality items of CM consultant in factor "Security"

Factor	Items	References
Security	1. The CM consultant supervises the security and safety management of the project	[1]
	2. The CM consultant is able to maintain their owner's project information confidentially	[1]

2.12.9 Understanding the Owner

The nature of this determinant is very important in the overall service delivery process because the main objective of the service is to do it specifically as the owner wants. Understanding the owner's expectations and objectives can determine the plans, timetables, specifications and overall service performance. The list of items in understanding the owner dimension were generated from the previous researches such as (1) Samson and Parker (1994), (2) Tang, Lu et al. (2003), (3) Woo and Ennew (2005), (4) Cheng, Proverbs et al. (2006). The list of service quality items of CM consultant related to the understanding of the owner can be seen in table 2.16 below.

Table 2.16 Service quality items of CM consultant in factor "Understanding the owner"

Factor	Items	References
Understanding the owner	1. The CM consultant is sensitive and specific at owner needs	[1]
	2. The CM consultant communicates with owner to get accurate reflection of the owner's needs	[1]
	3. The CM consultant is creative and progressive in performing the service	[1]
	4. The CM consultant shows initiative in performing the service	[1]
	5. The CM consultant provides services which are flexible and customized for each owner	[1], [3]
	6. The CM consultant has good understanding and knowledge of the current situation of the industry and their owner's circumstances (i.e. political, financial, etc).	[1], [3], [4]
	7. The CM consultant shows genuine interest and enthusiasm in performing the service	[1], [2], [3], [4]

2.12.10 Tangibles

This determinant is also important to be considered in CM consultant's service quality. This determinant can be seen as the equipment that supports the CM consultant's in performing their service. In the construction project, tangible determinant for CM consultant may be the advance computer facilities and also advance program utilization such as computer-aided design (CAD). The list of items in this tangible dimension were generated from the previous researches such as (1) Samson and Parker (1994), (2) Tang, Lu et al. (2003), (5) Yang and Peng (2006). The list of service quality items of CM consultant related to the tangibles can be seen in table 2.17 below.

Table 2.17 Service quality items of CM consultant in factor "Tangibles"

Factor	Items	References
Tangibles	1. The CM consultant uses computerized systems and software which are compatible with the owner	[1], [2], [5]

2.13 Conclusion

This chapter described the basic knowledge and information to conduct the research. It started with the description of current construction industry in Indonesia. It gave explanation why the research was conducted specifically in Jakarta. Furthermore, this chapter explained more detail about service quality. It included the differences between service quality and product quality; differences between service quality and client satisfaction; and more detailed explanation about service failure and service recovery. Finally, it explored the previous research related to service quality in construction industry and specifically in context of CM consultant‘s service. From the previous research, it was concluded there are several research gaps such as: lack of research in identifying CM consultant‘s service quality items; there is no clear distinction between service quality and owner satisfaction in construction; and previous research did not focus on owner‘s perceptions but more on engineers or architects. Therefore, this research was designed and conducted based upon these research gaps.

CHAPTER III
RESEARCH METHODOLOGY

This chapter describes the research method for exploring the service quality item of CM consultant, designing the data collection and concluding the result. This chapter begins with the explanation of research approach which consists of quantitative and qualitative approach. This is followed by the explanation of this research design and framework. Data collection method is discussed afterwards. Data collection method section explains the development process of questionnaire, target population, pilot survey and interview method. Finally, data analysis describes the method for analyzing the data which consists of relative importance index, factor analysis and weight of items and factors.

3.1 Research Approach

Based on the characteristics of the data, there are two types of research approach. Research approach can be quantitative and qualitative (Bryman, 2006). First, quantitative research approach attempts to do the research based on numerical ways. It focuses on the numerical or mathematical measurement that can be used to test research hypotheses which normally needs to collect the data from large samples. Quantitative research generates statistics through the use of large-scale survey research, using methods such as questionnaires. Quantitative research techniques are applied to gather quantitative data such as scale information. It deals with numbers and anything that is measurable. Statistics, tables and graphs, are often used to present the results of these methods. Second, qualitative research approach is more focused on behavior, personality and trying to understand why and how something can occur. Qualitative research approach is more focused on the participants‘ viewpoint to get rich information for analyzing the research hypotheses. Qualitative research approach can be conducted by doing interview. An interview can get closer observation into the situation. It can let us better understand the process and the behavior of the subject.

This research purpose was to identify the items for delivering service quality of CM consultant and explains the nature of these items in context of building construction project. The nature of this research can be categorized as exploratory and

descriptive. Therefore, this research used both quantitative and qualitative data collection.

3.2 Research Design

The purpose of this section was to help in planning how to do the research including how to collect the data and analyze the data. This research consists of several steps. The first step explored the service quality items of CM consultant from the literature review. The list of items can be seen in chapter 2 and more detail in the appendix. The second step was to conduct pilot survey to check the validity of service quality items in context of CM consultant‘s service. After pilot survey, the third step was modification of the questionnaire and conducted the large scale data collection. In addition, interview was conducted at the same time with the questionnaire survey. The fourth step was to analyze the data which consist of relative importance index and factor analysis. Finally, the last step was the conclusions for this research. More detail about this research design and framework can be seen in figure 3.1 below.

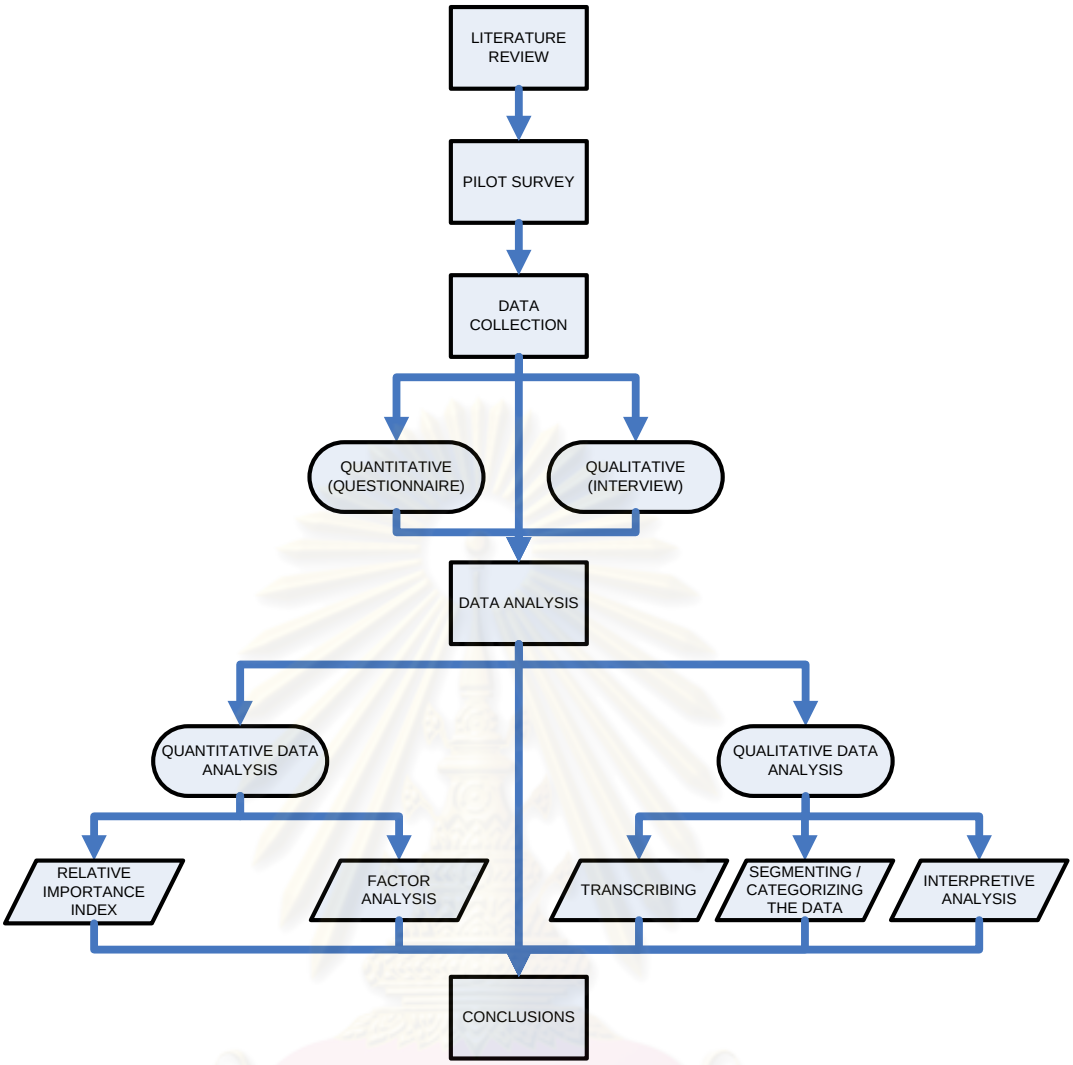


Figure 3.1 Research Framework

3.3 Data Collection Method

Choosing the right data collection method is very important in conducting research. As the nature of this research was exploratory and descriptive approach, both survey questionnaire and interview were applied. Survey questionnaire was used in collecting the data to identify important items and explore factors that influence service quality of CM consultant. In addition, interview data was used to explain the nature of service quality of CM consultant in building construction project. Respondents were asked to filling the questionnaire and provide opinions for each item based on three main questions. The reason for collecting both quantitative and qualitative data at the same moment was to save the time and cost needed for collecting data in Indonesia.

3.3.1 Quantitative Data Collection

The quantitative data is gathered by survey questionnaire. The survey was developed in attempts to identify the essential items related to service quality of CM consultant. In addition, the quantitative data can be grouped in factors which can help to develop the conceptual framework of service quality for CM consultant. Conducting the survey starts from developing the items from the previous researcher based on the ten basic dimensions of service quality. The design of the questionnaire was developed and improved from previous researchers (Samson and Parker, 1994; Tang, Lu et al., 2003; Woo and Ennew, 2005; Cheng, Proverbs et al., 2006; Yang and Peng, 2006; Chow and Ng, 2007). These 31 items of the questionnaire can be seen in section 2.12.

Before conducting the large scale data collection, it is very important to conduct pilot survey. The pilot survey was conducted as the preparation for the large scale survey. The pilot survey was conducted to evaluate and improve the quality of the questionnaire. The pilot survey was conducted to check the naming of the item and their fitness in context of CM consultant service quality. The pilot survey was used to check if there is any additional item that should be included in the questionnaire. Basically, this is necessary in order to ensure the reliability and validity of the data. Improving the quality of the questionnaire gives benefits such as being easier to understand, eliminating wrong wording and having more complete items.

The pilot survey was conducted by personal interviews. The subject of the pilot survey is the project manager who is working as an owner‘s representative at building construction projects in Jakarta. The pilot survey included twelve selected respondents. These respondents were purposively selected from the two biggest developers in Jakarta, Indonesia.

The procedure of pilot survey was asked the respondents to fill in the questionnaire. During the process of completing the questionnaire, the respondents were asked for their comment on each questionnaire item. They were asked whether there was any difficulty in understanding the items and whether the items correlated to CM consultant service. Finally, their comments assisted in the modification of the final questionnaire. The last procedure in the pilot survey is to prepare the final

questionnaire for large scale data collection. There were four new items added the final questionnaire.

The next step was to conduct the large scale data collection. The questionnaires were delivered personally to each person in order to avoid misunderstanding concept in filling in the questionnaire and to increase the rate of responding to the questionnaire. The questionnaire was translated into Indonesian language to ascertain that all questionnaire items were properly understood by the respondents.

The large scale survey questionnaire was measured on a 5-point Likert type scale. Importance scale "1" represents the owner's perception of particular item as strongly unimportant to be provided by the CM consultant performance. Importance scale "5" represents the owner's perception of particular item as strongly important to be provided by the CM consultant.

Table 3.1 Classification of importance scale
(Pongpeng and Liston, 2003; Rowlinson, 2004; Enshassi, Mohamed et al., 2009)

Rate	Importance	Explanation
1	Least Important	This service is strongly unimportant to be provided
2	Less Important	This service is not quite important to be provided
3	Moderate	This service has minor importance to be provided
4	Important	This service is quite important to be provided
5	Most Important	This service is strongly important to be provided

The large scale survey was conducted between May and June 2010 at 52 building construction projects in Indonesia, specifically in Jakarta. This research measured the importance level of service quality items of CM consultant from the owner's perception. There were two parties that were closely related to the consultant operation, i.e. project director and project manager. The owner's representative was categorized as the person who represented owner in controlling the process of the construction project and regularly made contact with the parties in construction (i.e. contractor, sub-contractor, designer, CM consultant, etc). In most cases, project manager acted as the owner's representative who was closely related to the consultant daily activities. Project manager operation had a direct contact with the consultant and

the contractor. Therefore, the respondents of the questionnaire were the owner‘s representative of building construction project in Jakarta, Indonesia. However, upon collecting data for this research, the suitable respondents were the project director or the project manager depending on their involvement in the project daily activities.

Furthermore, Indonesian Central Bureau Statistics (2008) showed the high growth of building construction projects in Indonesia due to its dominance in Indonesian construction industry. Therefore, this research identified the service quality items that should be provided by CM consultant company in building construction project. In addition, the samplings of building construction projects were selected from large size consultant company. The classification of the size of the consultant company was summarized in table 3.2 below. It shows the regulation of Indonesian government in classifying the class of consultant company. It should be noted that the result of this research was most applicable and suitable for the large size CM consultant company.

Table 3.2 Classification of consultant’s class based on Indonesian regulation

Type	Class	Personnel			Experience	Financial Capital	Limit price on each project
		PJBU	PJT	PJB/ PJL			
Indivi-dual	Grade 1	Individual PJBU with experience ≥ 6 years			Min. 6 years in construction projects	-	0 until 50.000.000 IDR
Small	Grade 2	1 person	Expe-rience ≥ 4 years	Expe-rience ≥ 4 years	Min. 6 years in construction projects	≤ 200.000.000 IDR	0 until 400.000.000 IDR
Medium	Grade 3	1 person	Expe-rience ≥ 6 years	Expe-rience ≥ 4 years	Experience on grade 2 project in the last 7 years with total ≥ 400.000.000 IDR	200.000.000 IDR until 1.000.000.000 IDR	≥ 400.000.000 IDR until 1.000.000.000 IDR
Large	Grade 4	1 person	Expe-rience ≥ 8 years	Expe-rience ≥ 6 years	Experience on grade 3 project in the last 7 years with total ≥ 1.000.000.000 IDR	≥ 1.000.000.000 IDR	≥ 400.000.000 IDR until unlimited

As the target population was the project managers that currently work in the building construction project, this research selected the purposive sampling rather than the random sampling. The purposive sampling was chosen as suitable technique

for data collection because it is difficult to get a complete list of the target population. There was also a difficulty in contacting the respondents. Some respondents may not want to respond and cooperate if there is no personal relation or no recommendation from another colleague. In addition, the research also has limitations in terms duration and budget for collecting the data.

3.3.2 Qualitative Data Collection

The qualitative data collection was conducted by interview technique. There were two objectives in conducting qualitative data collection. The first objective was to confirm the validity of the service quality item and to understand the nature of each item influencing the service quality of CM consultant.

The interview was conducted between May and June 2010 in building construction projects in Indonesia, specifically in Jakarta. The reason for collecting both quantitative and qualitative data at the same moment was to save time and cost needed for collecting data in Indonesia.

The process of the interview consisted of asking each item based on three main questions. It should be noted that the results of the interview were based on the owner perceptions. The first question identified why the service is important to be provided by the CM consultant. The second question asked what the current practice of CM consultant service quality in Indonesia was. The third was how CM consultant should perform or deliver their service.

The next step was to analyze the interview results. It started from translating the interview from Indonesian into English and transcribing it to be written. The transcribed data was summarized into a table and categorized based on the factors. The interview content was classified and grouped based on the similarity between comments from several interviewees. The result of these interviews helped to explain the relationship between service quality factors and its delivery in the process of building construction projects.

3.4. Data Analysis

There were three main purposes of conducting data analysis. First, the data analysis was to get the importance level of CM consultant‘s service quality items based on owners‘ perception. The importance level was generated from exploring the relative importance index. The explanation and details of this analysis are presented in section 3.4.1. Second, conducting data analysis was to get the list of CM consultant‘s service quality factors by conducting factor analysis. A software package such as Statistical Package for Social Sciences (SPSS) was used to help for this purpose. The explanation and details of this analysis are presented in section 3.4.2. Third, it was to get the percent proportion of each item and factor that explains the service quality of CM consultant. The explanation and details of this analysis are presented in section 3.4.3. In summary, this data analysis section consists of relative importance index, factor analysis and weight of items and factors.

3.4.1 Relative Importance Index (RII)

Relative importance index (RII) is a term that calculates the relative importance of various services within each factor (Shelton, 2000). The higher numerical value of the relative importance index means the more importance of an item from owners‘ perception (Bello and Bello, 2007). The relative importance index method (RII) was used herein to determine owners‘ perceptions of the relative importance of the identified factors (Enshassi, Mohamed et al., 2009).

The data for this analysis were gathered from the survey questionnaire. In the survey questionnaire, the owners were asked to rank on a 5-point likert scale regarding the importance of each CM consultant‘s service quality item in Indonesian building construction projects. Then, the data scores were assessed using the relative importance index (Tam, Tam et al., 2007). The equation of relative importance index (RII) is as follow:

$$RII_k = \left[\sum_{i=1}^{i=5}(r_i)(f_i)\right] \times \frac{100\%}{(a)(N)} \quad (1)$$

where RII_k is the relative importance index of service quality factor *k;* r_i is the point given to each factor *k* by the respondent, ranging from 1 to 5; *f* is the frequency of each point by all respondents; *a* is the highest point of likert scale given (i.e. 5 in

this research); and N is the total number of respondents. Based on this equation, the relative importance index (RII) is normalized within 0 to 1.

3.4.2 Factor Analysis

This research used factor analysis to identify the group factors of service quality item of CM consultant. There were several purposes of conducting factor analysis in this research. First, to group the items that has similarity or correlation into smaller set of factors. This gives benefit to understand the underlying nature between these items. Second, to explain CM consultant‘s service quality easier in smaller set of factors. This gives benefit to help the reader to be able to evaluate or measure the CM consultant‘s service quality in easier factors rather than 35 items. Third, to identify and make clear the proportion of each item and factor can explain the CM consultant‘s service quality. To support the third purpose, the weight of each items and factors were calculated to explain more clearly the proportion of each item and factor in describing CM consultant‘s service quality.

3.4.2.1 Checking the Suitability of the Data for Factor Analysis

It was considered necessary to check the strength of the inter-correlation among the items. Inspection of the correlation matrix needs to be conducted. The coefficients of the correlation matrix between each items should be greater than 0.3. If only few correlations were found then it is not suitable to use factor analysis. In addition, two statistical measures were necessary to be conducted concerning the suitability of the data. The first was Bartlett‘s test. Before conducting factor analysis, it is suggested to conduct the Barlett‘s test to check if common factors existed. The Bartlett‘s test of sphericity should be significant ($p<0.05$) for the factor analysis to be considered appropriate. The second was Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. The KMO index ranges from 0 to 1. The KMO result should be higher than 0.6 for the data considered suitable for factor analysis.

3.4.2.2 Extraction of Common Factors

Factor extraction involves determining the smallest number of factors that can be used to best represent the interrelations among the set of variables. The approach used in this research was principal components analysis.

3.4.2.3 Deciding Number of Factors

There were two techniques used in this research to make decision in retaining number of factors. The first was Kaiser‘s criterion. The method was to retain only factors with an eigenvalue of 1.0 or more for further investigation. The second was Catell‘s scree test which plots each of the eigenvalue of the factors and inspects the plot to find a point at which the shape of the curve changes direction and becomes horizontal.

3.4.2.4 Selection of Rotation Method

Rotation of the factor coordinates does not change the combination types of the variables but clearly shows the variable combination types and reduces the interpretation difficulties. There were 2 methods for factor rotation. The first was orthogonal rotation method which requires the researcher to assume that the factors were independent (not correlated). This orthogonal rotation has 3 different rotational techniques; varimax, quartimax, equamax. The second was oblique rotation method which allows for the factors to be correlated. This oblique rotation has 2 different rotational techniques; direct oblimin, promax. In practice, this research conducted both orthogonal and oblique rotations.

3.4.2.5 Interpretation of Varimax Rotation Output

There were two tables of varimax rotation output that needed to be considered and analyzed. The first table was the total variance explained table. In this table, the distribution of the variance explained was adjusted after rotation. The total variance explained does not change after rotation, just the way that it was distributed between the components. The second table was the rotated component matrix table. This table showed the loadings of each of the variables on the factors that were selected. In this table, the user needs to look for the highest loading variables on each of the component—these can be used to help identify the nature of the underlying latent variable represented by each component.

3.4.2.6 Interpretation of Oblimin Rotation Output

There were three tables of oblimin rotation output that needed to be considered and analyzed. The first table was the component correlation matrix table. This shows the strength of the relationship between the factors. This gives us information to decide whether it was reasonable to assume that the components were not related (i.e. use varimax rotation) or whether it is necessary to use the Oblimin rotation. If the components are strongly correlated (e.g. above .3), then it is necessary to use Oblimin rotation. The second table was the pattern matrix table. This table showed the loadings of each of the variables on the factors that were selected. Look for the highest loading variables on each of the component—these can be used to help identify the nature of the underlying latent variable represented by each component. The third table was the structure matrix table. This table provided information about the correlation between variables and factors.

3.4.2.7 The Internal Consistency Analysis

In addition, to ensure the reliability of each item, Cronbach‘s coefficient alpha was used to test the internal consistency among the items included in each item. The purpose of this test was to check reliability of service quality items. This process gives benefit to identify and exclude the item that has low influence to this research. Many research studies recommended that cronbach‘s alpha value should be larger than 0.6 to be considered sufficient. Factor reliability was measured by calculating Cronbach‘s alpha for all items.

3.4.2.8 Weight of Items and Factors

The last stage identified the weight of each service quality items and factors by calculating it from the factor loading and percentage of variance from the result of factor analysis. The weight shows the proportion of items and factors in explaining the service quality of CM consultant. The weight of items from the result of factor analysis represents the correlation between the items and the factors. The higher value of the item‘s weight shows the higher proportion of the item in describing the factor. The higher value of the factor‘s weight shows the higher proportion of the factor in describing the CM consultant‘s service quality. The weights of items were generated from the factor loading result from factor analysis of SPSS. The weight of each item

represented its proportion in describing its corresponding factor (Hair, Black et al., 2010). The higher value of the weight showed the higher explanation of the item in describing the factor. This weight calculation was used by Pongpeng and Liston in their research to develop the hierarchy of contractor ability item weights (Pongpeng and Liston, 2003). Later on, similar method was used to assess the architect's performance in building delivery process in Nigeria (Oyedele and Tham, 2007). The equations to determine the factors' weight are as follows:

$$W_i = \frac{v_i}{\sum_{i=1}^{n}(v_i)} \times 100\% \quad (2)$$

where W_i was the weight of service quality factor *i;* v_i was the percentage of variance from the results of factor analysis; *i* was the number of service quality factors extracted from factor analysis. Based on this equation, the weight was normalized within 0% to 100%.

Furthermore, the weight of each service quality items was generated from the percentage of factor loading from the results of factor analysis. The equations to determine the items' weight was as follows:

$$w_{ij} = \frac{F_{ij}}{\sum_{j=1}^{m}(F_{ij})} \times 100\% \quad (3)$$

where w_{ij} was the weight of service quality item *j* characterizing the service quality factor *i*; F_{ij} was the item loading from the rotated component matrix of factor analysis; *i* was the number of service quality factors extracted from factor analysis; *j* was the number of service quality item extracted from literature review and pilot survey.

3.5 Conclusion

This chapter explained the process in conducting the research. The research was conducted based on two research approaches, namely, quantitative and qualitative research approach. The quantitative research was conducted with the survey questionnaire technique. It was conducted based on two research stages, namely, pilot survey and large scale data collection. The pilot survey tested the validity and reliability of the questionnaire items. It enabled modification and improvement of the questionnaire items before conducting large scale data collection. Meanwhile, the

qualitative research approach was conducted with the interview technique. It was conducted along with the survey questionnaire to get the owner‘s perception for every questionnaire item. Furthermore, the data analysis and results of both survey questionnaire and interview were shown in chapter 4, 5, 6 and finally concluded in chapter 7.

CHAPTER IV
QUANTITATIVE DATA ANALYSIS

Chapter 4 explains the statistical analysis of collected data which were obtained from the surveys. Section 4.1 gives the overview of collected data in this research. In addition, this chapter shows three main analyses for the quantitative data. First, it shows the relative importance index and the importance ranking for each item. Second, this chapter generates the grouping of CM consultant‘s service quality items in building construction project. Finally, section 4.3 shows the weight of each CM consultant‘s service quality item and factor that can CM consultant‘s service quality.

4.1 Description of Survey Data

Data were collected in May and June 2010 in Jakarta, Indonesia. The questionnaire was sent personally and via e-mail. Upon sending the questionnaire, each respondent was interviewed in person or in group regarding their opinion about CM consultant‘s service quality. The intent of sending personally was to increase the responding rate and gather information concerning each service quality item by interviewing the respondents. There were 90 questionnaires distributed to owners of building construction project in Jakarta, which has the highest number of building construction projects than the other city in Indonesia. In the end, there were 83 questionnaires collected which mean there was a response rate of 92%.

4.1.1 Data Screening

This research aims to explore the items for delivering service quality of CM consultant from owner‘s viewpoint. The reason is that owner of the project is the party that hires CM consultant. Therefore, this questionnaire was answered from the owner‘s side by the person involved directly with everyday activities of CM consultant. From the total of 83 respondents, 12 respondents were excluded due to their unsuitable profile (i.e. architect, contractor). A total of 71 respondents were selected from many different companies and different projects located in Jakarta. Those respondents may have different job position (e.g. project director, project

manager, site manager). However, they were selected because of their direct involvement with CM consultant.

The data screening process also involved several steps to check and correcting the accuracy of data entry and missing values. The accuracy of the data file was checked by proofreading. In addition, the frequencies and descriptive statistic command in SPSS Version 16 was used to detect any out of range values which none were found.

4.1.2 Respondent's Profile

The respondents were collected from developer companies and individual owners. From the developer company, each developer might have several companies working under them. In addition, each company might have several projects depending on their capability. Furthermore, each project might have several towers or buildings which each of them were handled by one project manager. Below is the summary of respondents according to their groups and companies.

Table 4.1 Respondent's summary

No.	Group	Projects	Respondents
1*	Intiland	10	14
2*	Agung Podomoro	9	18
3*	Bakrieland	5	6
4*	Perum Perumnas	3	5
5*	Pakuwon Group	2	3
6*	Adhi Karya	2	3
7	PP Group	2	2
8	Sali Gading Bersama	2	2
9	Pakubuwono	1	1

No.	Group	Projects	Respondents
10	Duta Anggada Group	1	1
11	Lippo Group	1	1
12*	Ciputra Group	1	2
13	Gapuraperima Group	1	1
14	Individual owner	12	12
	TOTAL	52	71

(* Project were handled by more than one project manager)

4.1.3 Respondent's Working Experience

In addition, the working experience of owner in the civil engineering field can determine their standards level of quality in construction. Personal experience in the civil engineering field may enable them to identify service quality and its importance for CM consultant. In the research, respondents' working experience varies from 5 to 37 years in civil engineering field and from 3 to 15 years for project manager position, which were classified into three groups.

The respondents experience in civil engineering field range variously such as 28% of respondents having less than 10 years working experience; 52% of respondents having 10-20 years working experience; and 20% having more than 20 years experience. In addition, these respondents experience as project manager are 61%, 34% and 6%. In summary, most of the respondents have experience in civil engineering field between 10 to 20 years. Therefore, it was considered appropriate to use these samplings as most of them have enough experience in civil engineering field.

Table 4.2 Respondent's experience in civil engineering field

Experience in Civil	Frequency	Percentage (%)
Less than 10 years	20	28
Between 10 to 20 years	37	52
More than 20 years	14	20
Total	71	100.0

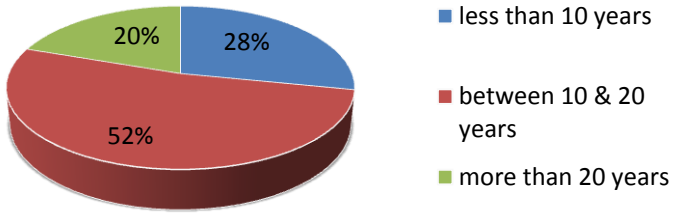


Figure 4.1 Respondent's experience in civil engineering field

Table 4.3 Respondent's experience as project manager (N=71)

Experience as Project Manager	Frequency	Percentage (%)
Less than 10 years	43	61
Between 10 to 20 years	24	34
More than 20 years	4	6
Total	71	100.0

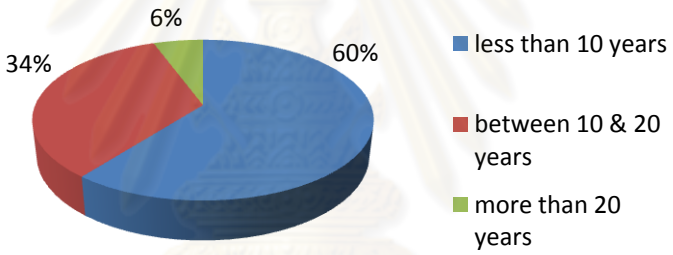


Figure 4.2 Respondent's experience as project manager

4.2 Determining the Importance Level of CM Consultant's Service Quality Items

In practice, some items of the service quality have stronger significance than the others. In order to improve the service quality efficiently, changes must be focused in the items that owners consider the most important. Therefore, this research analyzes the relative importance index within the service quality items of CM consultant. The result of RII and its ranking can be seen in section 4.2.1 below.

4.2.1 Relative Importance Index Result and Interpretation

This section shows the computed relative importance index for all CM consultant‘s service quality items. Table 4.4 shows the RII and the ranks for all items that were perceived by the owner. The ranking was based on a 5-point likert scale

with the highest value RII is 5, which signifies that the item has a great importance. Meanwhile, the lowest value of RII is 1, which indicates that the item has least importance.

Table 4.4 Summary of relative importance index and its rank for items that influence the service quality of CM consultant

No.	Items	Mean Average Importance	Relative Importance Index	Importance Ranking
1	The CM consultant is able to complete the project within the scheduled dates	4.746	0.949	13
2	The CM consultant is able to complete the project within the agreed budget	4.394	0.879	27
3	The CM consultant is able to complete the project under its technical requirements/specifications	4.746	0.949	15
4	The CM consultant is capable of providing good quality and reliable advice	4.676	0.935	22
5	The CM consultant is able to provide good control for quality of materials and workmanship	4.817	0.963	7
6	The CM consultant has high accuracy, detail and completeness of the records	4.803	0.961	10
7	The CM consultant promptly responds to owner‘s requests, queries and complaints	4.746	0.949	12
8	The CM consultant is able to recognize, identify and define problems immediately	4.803	0.961	9
9	The CM consultant informs the owner immediately about any sudden and urgent situation related to the project	4.775	0.955	11
10	The CM consultant proactively develops various solutions when problems occur	4.620	0.924	25
11	The staff has good academic knowledge, experience and is able to give valid contribution	4.831	0.966	6
12	The staff has the capability to do immediate problem solving	4.704	0.941	18
13	The staff are able to communicate in a non-technical way with the owner that may not be familiar with engineering discipline	3.887	0.777	34
14	The staff are accessible and could be reached easily by client.	4.817	0.963	8

No.	Items	Mean Average Importance	Relative Importance Index	Importance Ranking
15	The staff has good manner and politeness in performing the service	4.380	0.876	28
16	The staff has good hospitality and friendliness	4.000	0.800	33
17	The CM consultant properly provides regular dialogue on progress of the project	4.845	0.969	5
18	The CM consultant is able to cooperate and coordinate with the other parties in construction (i.e. owner, contractor, sub-contractor and other consultants)	4.873	0.975	4
19	The CM consultant explains how jobs will be administered and what the client can expect from them	4.704	0.941	16
20	The CM consultant has good and sufficient track record in similar project	4.718	0.938	21
21	The CM consultant builds up trust and honesty in the working relationship	4.704	0.941	17
22	The CM consultant supervises the security and safety management of the project	4.225	0.845	31
23	The CM consultant is able to maintain owner‘s project information confidentially	4.690	0.938	20
24	The CM consultant is sensitive and specific at owner‘s needs	4.690	0.938	19
25	The CM consultant communicates with owner to get accurate reflection of the owner‘s needs	4.620	0.927	23
26	The CM consultant is creative in performing the service	4.324	0.865	30
27	The CM consultant shows initiative in performing the service	4.535	0.907	26
28	The CM consultant provides services which are flexible and customized for each owner	4.352	0.870	29
29	The CM consultant has good understanding and knowledge of the current situation of the industry and their owner‘s circumstances (i.e. political, financial, etc).	3.394	0.679	35
30	The CM consultant shows genuine interest and enthusiasm in performing the service	4.620	0.924	24
31	The CM consultant uses computerized systems and software which are compatible with the client	4.169	0.834	32

No.	Items	Mean Average Importance	Relative Importance Index	Importance Ranking
32*	The CM consultant is able to use and understand the tools for QC, in order for them to check it properly	4.746	0.949	14
33*	The CM consultant does a job according to the SOP that has already been agreed	4.972	0.994	1
34*	The CM consultant is able to implement and maintain or watch over the contract that has already been agreed between owner and contractor	4.901	0.980	3
35*	The CM consultant is able to anticipate the problem before it happens in the project.	4.958	0.994	2

(* Additional items from pilot survey)

The summarized relative importance index (RII) and rank of items on context of reliability are shown in table 4.5. The first most important item in this factor is "The CM consultant does a job according to the SOP that has already been agreed" with RII score of 0.994. It gains high score which means it has a high importance. The reason is that because SOP is the guidance or rules for conducting the construction project which should be followed by all project participants. Second, "The CM consultant is able to implement and maintain or watch over the contract that has already been agreed between owner and contractor" with RII score of 0.980. It was considered as important item in this factor because owner is not an expert and familiar with the construction type of contract. Therefore, it is very important for CM consultant to support the owner in this matter. Third, "The CM consultant is able to provide good control for quality of materials and workmanship" with RII score of 0.963. This is important because owners care and pay attention to the quality of the result as the first priority. In addition, CM consultant needs to control the quality because famous and large contractor company does not guarantee the quality of their work. Fourth, "The CM consultant has high accuracy, detail and completeness of the records" with RII score of 0.961. The reports and records are the tools for owner to evaluate and analyze the progress of the project. In addition, these reports and records are used as prove or evidence when there is any disputes with the contractor. Fifth, "The CM consultant is able to complete the project under its technical requirements/ specifications" with RII score of 0.949. It was considered as important item in this factor because owner cannot come and control the contractor every day. Therefore,

owner needs CM consultant to supervise the contractor to finish the project with the correct specifications. Sixth, "The CM consultant is able to complete the project within the scheduled dates" was ranked by owner with RII score of 0.949. This is important because owner may need to use the building as soon as it finishes to starts their business activity. Seventh, "The CM consultant is capable of providing good quality and reliable advice" was ranked by owner with RII score of 0.935. This is important because owner may not be familiar with engineering and construction project. Lack of capability of owner in construction engineering requires the CM consultant to support the owner in terms of providing good quality and reliable advice. The last item is "The CM consultant is able to complete the project within the agreed budget" with RII score of 0.879. It was ranked as the last in this dimension because owners realize that many changes in construction comes from them. In addition, it seems very common to have several variation orders due to the lack of competence in Indonesian construction. However, it is important to be implemented correctly because owner may have limited source of budget for the project.

Table 4.5 The importance ranking of items in context of reliability dimension

No.	Items	Mean Average Importance	Relative Importance Index	Importance Ranking
1	The CM consultant is able to complete the project within the scheduled dates	4.746	0.949	6
2	The CM consultant is able to complete the project within the agreed budget	4.394	0.879	8
3	The CM consultant is able to complete the project under its technical requirements/ specifications	4.746	0.949	5
4	The CM consultant is capable of providing good quality and reliable advice	4.676	0.935	7
5	The CM consultant is able to provide good control for quality of materials and workmanship	4.817	0.963	3
6	The CM consultant has high accuracy, detail and completeness of the records	4.803	0.961	4
7*	The CM consultant does a job according to the SOP that has already been agreed	4.972	0.994	1
8*	The CM consultant is able to implement and maintain or watch over the contract that has already been agreed between owner and contractor	4.901	0.980	2

(* Additional items from pilot survey)

Table 4.6 below presents the summary of relative importance index (RII) and rank of items in the context of responsiveness. First, ―The CM consultant is able to recognize, identify and define problems immediately" was ranked by owner in the first position with RII score of 0.961. It was observed by the owner as the most important item because owner may not be expert at identifying the construction problem. Owner considered CM consultant is more expert than owner in identifying and analyzing the problem from engineering's viewpoint. Second, ―The CM consultant informs the owner immediately about any sudden and urgent situation related to the project" with RII score of 0.955. This is important to coordinate between other parties and owner to make immediate decision. Third, ―The CM consultant promptly responds to owner's requests, queries and complaints" with RII score of 0.949. It is important because if owner's queries or requests are not immediately responded, then owner cannot make a decision, which may cause the project's delay. Lastly, ―The CM consultant proactively develops various solutions when problems occur" with RII score of 0.924. The importance of this service is related to the previous item. In addition, owner needs to choose from several options to see which solution is the best and yet the cheapest solution.

Table 4.6 The importance ranking of items in context of responsiveness dimension

No.	Items	Mean Average Importance	Relative Importance Index	Importance Ranking
1	The CM consultant promptly responds to owner's requests, queries and complaints	4.746	0.949	3
2	The CM consultant is able to recognize, identify and define problems immediately	4.803	0.961	1
3	The CM consultant informs the owner immediately about any sudden and urgent situation related to the project	4.775	0.955	2
4	The CM consultant proactively develops various solutions when problems occur	4.620	0.924	4

Table 4.7 below presents the summary of relative importance index (RII) and rank of items in the context of competence dimension. First, ―The CM consultant is able to anticipate the problem before it happens in the project" with RII score of 0.994. This is because anticipating the problem before it happens gives more benefits to the owner rather than after the problem happens. Avoiding problems from

happening can reduce the cost for rework and time delay needed to rectify the mistakes. Second, "The staff has good academic knowledge, experience and is able to give valid contribution". It counted as the second rank because academic knowledge and experience play a very important role that affects the service quality of a CM consultant. In addition, it was considered important because CM consultant needs to be smarter and more expert than contractor. That is necessary in order to manage and supervise the contractor. Third, "The CM consultant is able to use and understand the tools for QC, in order for them to check it properly" was ranked by owner with RII score of 0.949. It was considered important because if CM consultant does not understand how to use the tools, then they may not be qualified enough to check the process of the QC properly. In addition, CM consultant is considered to be more familiar with the tools and equipment for the construction rather than the owner. Fourth, "The staff has the capability to do immediate problem solving". Even though it consists of only 1 item, its importance score is quite high with RII score of 0.941. This is because owner does not have enough time to be involved in every problem that occurs in construction site. Fifth, "The staff are able to communicate in a non-technical way with the owner that may not be familiar with engineering discipline". It was ranked in the last position with RII score of 0.777. The reason this competence dimension is in the last position maybe because currently most owners already have an engineering background. However, it is still important in case the owner does not have engineering background to understand the terms in construction project.

Table 4.7 The importance ranking of items on context of competence dimension

No.	Items	Mean Average Importance	Relative Importance Index	Importance Ranking
1	The staff has good academic knowledge, experience and is able to give valid contribution	4.831	0.966	2
2	The staff has the capability to do immediate problem solving	4.704	0.941	4
3	The staff are able to communicate in a non-technical way with the owner that may not be familiar with engineering discipline	3.887	0.777	5
4*	The CM consultant is able to use and understand the tools for QC, in order for them to check it properly	4.746	0.949	3

No.	Items	Mean Average Importance	Relative Importance Index	Importance Ranking
5*	The CM consultant is able to anticipate the problem before it happens in the project.	4.958	0.994	1

(* Additional items from pilot survey)

Table 4.8 below presents the summarized of relative importance index (RII) and rank of items in the context of access dimension. It was ranked with RII score of 0.963. It was considered being important in term of access because owner does not directly manage and lead the project in the construction site. In addition, the project manager of CM consultant is the right staff that should be accessible and could be reached easily by the owner. Furthermore, the staff of CM consultant should provide themselves with telecommunication devices.

Table 4.8 The importance ranking of items on context of access dimension

No.	Items	Mean Average Importance	Relative Importance Index	Importance Ranking
1	The staff are accessible and could be reached easily by owner.	4.817	0.963	1

Table 4.9 below presents the summary of relative importance index (RII) and rank of items in the context of courtesy dimension. First, "The staff has good manner and politeness in performing the service" with RII score of 0.876. In the construction practice, many construction's participants has lots of stress and tired working in the construction which makes them easily to get offended. Therefore, this item is important to avoid any conflicts with the other project participants. Second, "The staff has good hospitality and friendliness" with RII score of 0.800. This was considered to be important because of its benefit to maintain a good working environment of all participants in the project. However, it might not become the most important because the negative affect it may bring to the relationship between project participants. In practice, several CM consultants become too friendly with the contractor and make them not professional in managing the project.

Table 4.9 The importance ranking of items on context of courtesy dimension

No.	Items	Mean Average Importance	Relative Importance Index	Importance Ranking
1	The staff has good manner and politeness in performing the service	4.380	0.876	1
2	The staff has good hospitality and friendliness	4.000	0.800	2

Table 4.10 below presents the summary of relative importance index (RII) and rank of items in the context of communication dimension. First, ―TheCM consultant is able to cooperate and coordinate with the other parties in construction (i.e. owner, contractor, sub-contractor and other consultants)" with RII score of 0.975. The reason this item is the most important in this factor is because in construction involves lots of project participants such as contractors and sub-contractors which means communication between all of them is necessary. Second, ―TheCM consultant properly provides regular dialogue on progress of the project" was ranked by owner with RII score of 0.969. This is important because owner needs to monitor the progress of their project regularly to check the accurateness of the project and whether it is exactly as owner wants or not. Third, ―CMconsultant explains how jobs will be administered and what the owner can expect from them" with RII score of 0.941. Owner might perceive this is important because owner needs to check whether the method proposed by CM consultant is suitable and compatible with the owner. In addition, it also may help the owner to understand the process and avoid being tricked by the other project participants.

Table 4.10 The importance ranking of items on context of communication dimension

No.	Items	Mean Average Importance	Relative Importance Index	Importance Ranking
1	The CM consultant properly provides regular dialogue on progress of the project	4.845	0.969	2
2	The CM consultant is able to cooperate and coordinate with the other parties in construction (i.e. owner, contractor, sub-contractor and other consultants)	4.873	0.975	1
3	The CM consultant explains how jobs will be administered and what the client can expect from them	4.704	0.941	3

Table 4.11 below presents the summary of relative importance index (RII) and rank of items in the context of credibility dimension. The first most important is ―The CM consultant builds up trust and honesty in the working relationship" with RII score of 0.941. It is because owner needs to be sure that CM whom they hired can be trusted and is not taking any inappropriate advantage from owner. Second, ―The CM consultant has good and sufficient track record in similar project" with RII score of 0.938. It comes as second maybe because concerning the complexity and the coordination needed in each project are different. Sufficient track record in similar project may bring support to the CM consultant delivering better service quality.

Table 4.11 The importance ranking of items in context of credibility dimension

No.	Items	Mean Average Importance	Relative Importance Index	Importance Ranking
1	The CM consultant has good and sufficient track record in similar project	4.718	0.938	2
2	The CM consultant builds up trust and honesty in the working relationship	4.704	0.941	1

Table 4.12 below presents the summary of relative importance index (RII) and rank of item in the context of security dimension. The first item is ―TheCM consultant is able to maintain owner's project information confidentially" with RII score of 0.938. It is important because it can prevent the other competitors from copying the design or taking any illegal advantages from the information. Lastly, ―TheCM consultant supervises the security and safety management of the project". This might be the last in this factor but not the least important. It might be because the main responsibility of safety and security lies in the hand of the contractor. However, it is considered to be quite important by the owner because of the capability of CM consultant to supervise the implementation of the safety and security in the construction.

Table 4.12 The importance ranking of items on context of security dimension

No.	Items	Mean Average Importance	Relative Importance Index	Importance Ranking
1	The CM consultant supervises the security and safety management of the project	4.225	0.845	2

No.	Items	Mean Average Importance	Relative Importance Index	Importance Ranking
2	The CM consultant is able to maintain owner's project information confidentially	4.690	0.938	1

Table 4.13 below presents the summary of relative importance index (RII) and rank of item in the context of understanding the customer dimension. First, "The CM consultant is sensitive and specific at owner's needs" was ranked by owner in the first position with RII score of 0.938. It was considered to be important because CM consultant has to deliver the owner's needs to the contractor to be implemented correctly in the construction. This is important to avoid misunderstanding and wrong construction. Second rank is "The CM consultant communicates with owner to get accurate reflection of the owner's needs" with RII score of 0.927. It is important due to the nature of many modifications that might occur in the middle of the construction. Therefore, CM consultant needs to keep communication with owner to get the accurate detail of what the owner wants. This is very common because most owners would want the outcome quality of their project to be precise and accurate. Third, "The CM consultant shows genuine interest and enthusiasm in performing the service" with RII score of 0.924. This is important because owner want CM consultant as the manager of the project to work well and take care of the project as an owner would do. Fourth, "The CM consultant shows initiative in performing the service" with RII score of 0.907. This was considered to be important because initiative performance of CM consultant as the leader of the project can increase the progressiveness of the project. Fifth, "The CM consultant provides services which are flexible and customized for each owner" with RII of 0.870. It is important because owner might want to hire CM consultant in many different ways such as hiring CM consultant for supervising only, or include managing the project, or include managing the budget. The sixth rank is "The CM consultant is creative in performing the service" with RII score of 0.865. It might not be as important as the others, but it is still important because owners do not have as much experience in construction as CM consultants, who are more capable of being creative regarding construction matters. Last but not the least is "The CM consultant has good understanding and knowledge of the current situation of the industry and their owner's circumstances (i.e. political,

financial, etc)" with RII score of 0.679. Its low score might be because of the current practice which shows that CM consultant is busy and concentrates more on the project than looking into the current industry and owner's circumstances. For example, the implementation of this item might give the chance for owner to buy cheap materials before the price goes higher.

Table 4.13 The importance ranking of items in context of understanding the owner dimension

No.	Items	Mean Average Importance	Relative Importance Index	Importance Ranking
1	The CM consultant is sensitive and specific at owner's needs	4.690	0.938	1
2	The CM consultant communicates with owner to get accurate reflection of the owner's needs	4.620	0.927	2
3	The CM consultant is creative in performing the service	4.324	0.865	6
4	The CM consultant shows initiative in performing the service	4.535	0.907	4
5	The CM consultant provides services which are flexible and customized for each owner	4.352	0.870	5
6	The CM consultant has good understanding and knowledge of the current situation of the industry and their owner's circumstances (i.e. political, financial, etc).	3.394	0.679	7
7	The CM consultant shows genuine interest and enthusiasm in performing the service	4.620	0.924	3

Table 4.14 below presents the summary of relative importance index (RII) and rank of item in the context of tangible dimension. This factor only consists of 1 item which is "The CM consultant uses computerized systems and software which are compatible with the owner" is the last with RII score of 0.834. It is important because owner may not be familiar with the engineering program or software being used by CM consultant.

Table 4.14 The importance ranking of items in context of tangible dimension

No.	Items	Mean Average Importance	Relative Importance Index	Importance Ranking
1	The staff has the capability to do immediate problem solving	4.704	0.941	1

In conclusion, the value of relative importance index showed the importance of each item based on owners‘ perception. The higher numerical value of the relative importance index means the more important that item based on owners‘ perception. The lower numerical value of the relative importance index means the less important that item based on owners‘ perception. In addition, the findings of these importance ranking was also supported by the findings of owners‘ perception in chapter 5.

4.3 Factor Analysis

The aim of factor analysis is to reveal any latent items within the data (Costello and Osborne, 2005). As explained previously in section 4.1.1, all questionnaire responses were checked by proof reading to ensure the completeness of the data before using the Statistical Package for Social Sciences (SPSS) version 16. The questionnaire (Appendix A) consists of 35 service quality items of CM consultant in delivering their services in building construction project. The data were analyzed using factor analysis to examine the interrelationships among the 35 items and to reduce these items into a smaller set of factors.

Factor analysis as one of multivariate statistical technique, is commonly used to construct a smaller number of factors that can represents the original number of individual variables. This technique can reduce the data to a set of factors as replacements for the original variables. In addition, the results from this technique still retain the original characteristics (Pallant, 2004).

4.3.1 Checking the Suitability of the Data for Factor Analysis

The first step is to conduct visual inspection of the strength of the inter-correlation among the items. The coefficients of the correlation matrix table should have number of correlation greater than 0.3. If only few correlations can be found then it is probably inappropriate to use factor analysis (Hair, Black et al., 2010). Checking of correlation was conducted by using Microsoft excel to count the amount

of coefficient higher than 0.3. The result shows that there are 196 of total 630 correlations between items which were higher than 0.3 which indicates that this data set is suitable to be analyzed using factor analysis. The details of all correlations between items can be seen in appendix B.

The next step is to check the Bartlett‘s test and Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. The Bartlett‘s test of sphericity should be significant ($p<0.05$) for the factor analysis to be considered appropriate and the KMO result should be higher than 0.6 for the data considered suitable for factor analysis. The result shows that the data qualified in both requirements. Below is the result for both of them from the output of SPSS 16.

Table 4.15 KMO and Bartlett’s test result

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Bartlett's Test of Sphericity		
	Approx. Chi-Square	df	Sig.
0.708	1377	595	0.000

4.3.2 Processing Factor Analysis

In order to determine how many factors to be extracted, it is necessary to consider the information provided in the Total Variance Explained table (i.e. Table 4.16). Using Kaiser‘s criterion which are explained earlier, only the components that have an eigenvalue of 1 or more are to be extracted. To determine how many components meet this criterion we need to look in table 4.16 and check the eigenvalues for each component. In this research there are ten components recorded with eigenvalues above 1 (i.e. 9.812, 2.921, 2.168, 2.005, 1.661, 1.558, 1.419, 1.299, 1.131, 1.013). In addition, these ten components explain a total of 71.393 per cent of the variance which is a quite high number.

Table 4.16 Total variance explained before rotation

Items	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.812	28.035	28.035	9.812	28.035	28.035
2	2.921	8.344	36.379	2.921	8.344	36.379
3	2.168	6.195	42.574	2.168	6.195	42.574
4	2.005	5.729	48.303	2.005	5.729	48.303
5	1.661	4.746	53.049	1.661	4.746	53.049

Items	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
6	1.558	4.452	57.501	1.558	4.452	57.501
7	1.419	4.055	61.557	1.419	4.055	61.557
8	1.299	3.711	65.268	1.299	3.711	65.268
9	1.131	3.232	68.5	1.131	3.232	68.5
10	1.013	2.893	71.393	1.013	2.893	71.393
11	0.97	2.773	74.165			
12	0.933	2.666	76.831			
13	0.828	2.365	79.196			
14	0.776	2.216	81.412			
15	0.692	1.977	83.388			
16	0.675	1.927	85.315			
17	0.607	1.735	87.05			
18	0.571	1.632	88.683			
19	0.515	1.471	90.154			
20	0.445	1.273	91.427			
21	0.41	1.17	92.597			
22	0.339	0.969	93.566			
23	0.333	0.952	94.518			
24	0.301	0.861	95.378			
25	0.27	0.773	96.151			
26	0.24	0.687	96.838			
27	0.201	0.573	97.411			
28	0.181	0.518	97.929			
29	0.164	0.467	98.397			
30	0.134	0.382	98.779			
31	0.118	0.337	99.116			
32	0.097	0.278	99.395			
33	0.09	0.257	99.652			
34	0.071	0.204	99.856			
35	0.05	0.144	100			

Extraction Method: Principal Component Analysis

The next step is to check the screeplot diagram. This is useful to verify the result of number to be extracted from the result of Kaiser criterion. Using only Kaiser criterion may result in too many components being extracted, so it is important to also look at the screeplot provided by SPSS. In this screeplot look for a change (or elbow) in the shape of the plot. Only components above this point are retained.

This research‘s screeplot shows there is a quite clear break between the first and second component. Component 1 explained much more of the variance than the remaining components. However, there is also another little break after the third, fifth

and tenth component. Considering the research context to explain the nature of service quality in several dimensions, ten component extractions were selected.

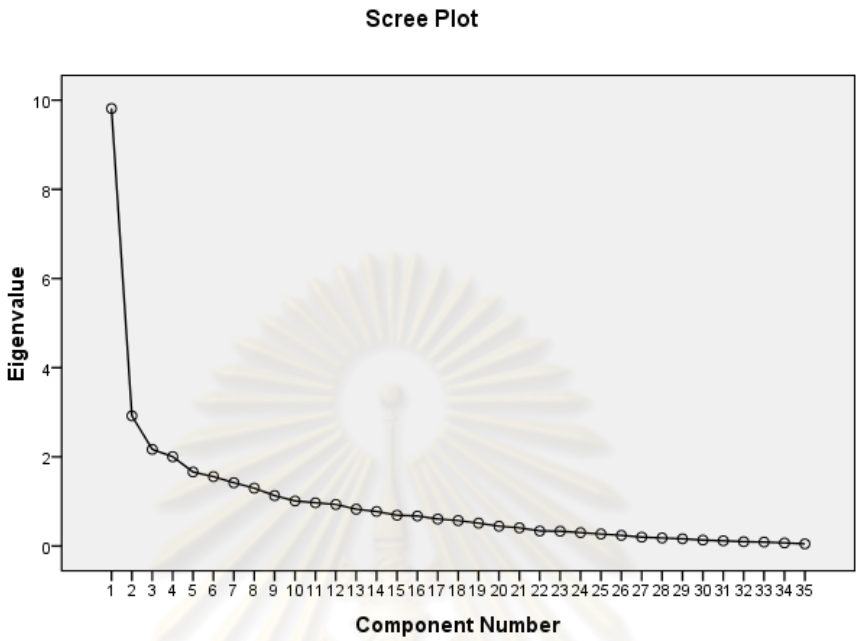


Figure 4.3 Screeplot result

The next step after deciding on number of factors was the interpretation of factor‘s name. In order to do this, these factors need to be rotated which may presents the pattern of loadings that is easier to interpret. This research use varimax rotation to minimize the number of variables that have high loadings. The adjusted distribution of the variance after rotation can be seen in table 4.17 below in the right column. The total variance explained (i.e. 71.393 per cent) does not change after rotation, just the way that it is distributed between the ten components.

Table 4.17 Total variance explained after rotation

Items	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.812	28.035	28.035	3.774	10.784	10.784
2	2.921	8.344	36.379	3.594	10.269	21.053
3	2.168	6.195	42.574	3.118	8.908	29.961
4	2.005	5.729	48.303	3.111	8.89	38.851
5	1.661	4.746	53.049	2.631	7.517	46.368
6	1.558	4.452	57.501	1.911	5.459	51.827
7	1.419	4.055	61.557	1.885	5.385	57.212
8	1.299	3.711	65.268	1.695	4.844	62.057
9	1.131	3.232	68.5	1.651	4.716	66.772
10	1.013	2.893	71.393	1.617	4.62	71.393

The rotated component matrix in table 4.18 showed the loadings of each item correlated to the factors. The loading variables on each of the component showed the nature of the underlying latent variable represented by each component.

The use of varimax rotation technique makes the result easier to interpret and identify each variable with a single factor. These ten groups of factors represent 71.393 percent of the total variance. The factors were then examined to identify the number of items that loaded on each factor. The rotated pattern matrix for the remaining 35 items is presented in table 4.18.

Table 4.18 Component matrix after factor rotation

Items	Component									
	1	2	3	4	5	6	7	8	9	10
The CM consultant is sensitive and specific at owner needs	**0.775**									
The CM consultant communicates with owner to get accurate reflection of the owner‘s needs	**0.718**									
The CM consultant is able to recognize, identifyand define problems immediately	**0.675**									
The CM consultant shows genuine interest and enthusiasm in performing the service	**0.595**				0.475					
The CM consultant explains how jobs will be administered and what the owner can expect from them	**0.580**									
The CM consultant supervises the security and safety management of the project	**0.498**									
The staff has good hospitality and friendliness		**0.842**								
The Staff has good manner and politeness in performing the service		**0.749**								
The CM consultant has good understanding and knowledge of the current situation of the industry and their owner‘s circumstances (i.e. political, financial, etc).		**0.695**								
The Staff are able to communicate in a non-technical way with the owner that may not be familiar with engineering discipline.		**0.585**								

Items	Component									
	1	2	3	4	5	6	7	8	9	10
The CM consultant provides services which are flexible and customized for each owner	0.455	**0.541**								
The CM consultant is capable of providing good quality and reliable advice		**0.486**		0.435						
The CM consultant is creative in performing the service		**0.445**								
The CM consultant proactively develops various solutions when problems occur	0.413	**0.421**		0.406						
The CM consultant is able to implement and maintain or watch over the contract that has already been agreed between owner and contractor			**0.813**							
The CM consultant is able to anticipate the problem before it happens in the project.			**0.705**							
The CM consultant is able to maintain their owner's project information confidentially			**0.620**							
The CM consultant promptly responds to owner‘s requests, queries and complaints				**0.801**						
The CM consultant is able to cooperate and coordinate with the other parties in construction (i.e. owner, contractor, sub-contractor and other consultants)				**0.695**						
The CM consultant properly provides regular dialogue on progress of the project			0.532	**0.577**						
The CM consultant is able to provide good control for quality of materials and workmanship				**0.572**		0.450				
The staff are accessible and could be reached easily by owner.				**0.503**				0.431		

Items	Component									
	1	2	3	4	5	6	7	8	9	10
The CM consultant is able to complete the project within the scheduled dates					**0.823**					
The CM consultant shows initiative in performing the service					**0.595**					
The staff has good academic knowledge, experience and is able to give valid contribution						**0.735**				
The CM consultant has high accuracy, detail and completeness of the records						**0.597**				
The CM consultant has good and sufficient track record in similar project						**0.467**				
The CM consultant informs the owner immediately about any sudden and urgent situation related to the project							**0.731**			
The CM consultant is able to use and understand the tools for QC, in order for them to check it properly							**0.598**			
The CM consultant is able to complete the project within the agreed budget							**0.584**			
The CM consultant builds up trust and honesty in the working relationship							**0.449**			
The CM consultant does a job according to the SOP that has already been agreed								**0.817**		
The CM consultant is able to complete the project under its technical requirements									**0.720**	
The CM consultant uses computerized systems and software which are compatible with the owner		0.420							**0.535**	
The staff has the capability to do immediate problem solving										**0.769**

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 13 iterations.

In addition, it is necessary to check the factor correlation matrix to see whether the rotation used earlier is correct or not. The result shows the strength of the relationship among 10 factors are not high. Between all of them only correlation between factor 1 and factor 9 is 0.266, factor 2 and factor 5 is 0.248 both of which do not exceed 0.3. Therefore, the earlier assumption underlying the use of varimax rotation rather than oblimin rotation is valid.

Table 4.19 Component correlation matrix

Factor	1	2	3	4	5	6	7	8	9	10
1	1.000									
2	.247	1.000								
3	.081	-.034	1.000							
4	.191	.216	.038	1.000						
5	.126	.026	.112	.113	1.000					
6	.071	.010	.057	-.019	.028	1.000				
7	-.263	-.199	-.167	-.242	-.088	-.115	1.000			
8	.248	.125	.088	.254	.184	.043	-.227	1.000		
9	.266	.134	-.018	.123	.131	.063	-.166	.160	1.000	
10	-.008	-.116	-.130	.007	.029	-.036	.095	-.050	-.015	1.000

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

4.3.3 Reliability Analysis

From the previous section, there were 10 factors as the result of factor extraction. These 10 factors need to be checked for its reliability of scales. This is necessary to make sure whether all items are measuring the same underlying construct which is service quality. Therefore, cronbach‘s alpha was conducted and the results ranged from 0.448 to 0.829 which means some of them are lower than the standard value of 0.6.

In addition, it is necessary to check the Item-Total Statistics Table. This table shows two important columns which are the Corrected Item-Total Correlation column and the Cronbach‘s Alpha if Item Deleted column. The corrected item-total correlation gives an indication as to which degree each item correlates with the total score. It is essential to get proper result for this column, because if the value is low

such as less than 0.3 it indicates that the item is measuring something different from the original scale as a whole. In the case of lower than 0.3, it was suggested to eliminate that item (Pallant, 2004).

Furthermore, eliminating the item may change the cronbach‘s alpha value. Before deleting or eliminating some items, it was suggested to look at the column of Cronbach‘s Alpha if Item Deleted. This column showed the impact of eliminating each item. The procedure of deleting item is to compare the value in this column with the final cronbach‘s alpha value obtained. If any of the values in this column are higher than the original final alpha value, then it is necessary to consider removing this item from the scale. Furthermore, this step was suggested only if the alpha value was low (i.e. less than 0.6).

Table 4.20 Cronbach’s alpha results table

No.	Items	Cronbach's Alpha	Cronbach's Alpha if Item Deleted
Factor 1	**Understanding & Providing Individualized Attention for The Owner**	**0.829**	
a.	The CM consultant is sensitive and specific at owner needs		0.772
b.	The CM consultant communicates with owner to get accurate reflection of the owner‘s needs		0.805
c.	The CM consultant is able to recognize, identify and define problems immediately		0.829
d.	The CM consultant shows genuine interest and enthusiasm in performing the service		0.795
e.	The CM consultant explains how jobs will be administered and what the owner can expect from them		0.783
f.	The CM consultant supervises the security and safety management of the project		0.82
Factor 2	**Service Oriented Characteristic of The Staff**	**0.824**	
a.	The staff has good hospitality and friendliness		0.795

No.	Items	Cronbach's Alpha	Cronbach's Alpha if Item Deleted
b.	The staff has good manner and politeness in performing the service		0.803
c.	The CM consultant has good understanding and knowledge of the current situation of the industry and their owner‘s circumstances (i.e. political, financial, etc).		0.795
d.	The staff are able to communicate in a non-technical way with the owner that may not be familiar with engineering discipline.		0.804
e.	The CM consultant provides services which are flexible and customized for each owner		0.8
f.	The CM consultant is capable of providing good quality and reliable advice		0.81
g.	The CM consultant is creative in performing the service		0.807
h.	The CM consultant proactively develops various solutions when problems occur		0.812
Factor 3	**Awareness of the project’s status and information**	**0.635**	
a.	The CM consultant is able to implement and maintain or watch over the contract that has already been agreed between owner and contractor		0.359
b.	The CM consultant is able to anticipate the problem before it happens in the project.		0.605
c.	The CM consultant is able to maintain their owner's project information confidentially		0.741
Factor 4	**Communication & Coordination of the project**	**0.815**	
a.	The CM consultant promptly responds to owner's requests, queries and complaints		0.785
b.	The CM consultant is able to cooperate and coordinate with the other parties in construction (i.e. owner, contractor, sub-contractor and other consultants)		0.771
c.	The CM consultant properly provides regular dialogue on progress of the project		0.756

No.	Items	Cronbach's Alpha	Cronbach's Alpha if Item Deleted
d.	The CM consultant is able to provide good control for quality of materials and workmanship		0.773
e.	The staff are accessible and could be reached easily by owner.		0.81
Factor 5	**Progressiveness**	**0.599**	
a.	The CM consultant is able to complete the project within the scheduled dates		-
b.	The CM consultant shows initiative in performing the service		-
Factor 6	**Competence**	**0.546**	
a.	The staff has good academic knowledge, experience and is able to give valid contribution		0.43
b.	The CM consultant has high accuracy, detail and completeness of the records		0.519
c.	The CM consultant has good and sufficient track record in similar project		0.37
Factor 7	**Professionalism of Service**	**0.643**	
a.	The CM consultant informs the owner immediately about any sudden and urgent situation related to the project		0.6
b.	The CM consultant is able to use and understand the tools for QC, in order for them to check it properly		0.602
c.	The CM consultant is able to complete the project within the agreed budget		0.586
d.	The CM consultant builds up trust and honesty in the working relationship		0.503

No.	Items	Cronbach's Alpha	Cronbach's Alpha if Item Deleted
Factor 8	**Procedural capability**	**-**	
a.	The CM consultant does a job according to the SOP that has already been agreed		-
Factor 9	**Technical capability**	**0.448**	
a.	The CM consultant is able to complete the project under its technical requirements/specifications		-
b.	The CM consultant uses computerized systems and software which are compatible with the owner		-
Factor 10	**Problem solving capability**	**-**	
a.	The staff has the capability to do immediate problem solving		-

4.3.4 Interpretation of Factor Analysis Result

The result of factor analysis above showed ten factors were extracted. The results in table 4.18 were classified in descending value and according to the factor groups. The loading variables on each of the items can be used to define the nature of the underlying meaning of the factor. The interpretations of 10 factors from the factor extraction result are explained in this section.

The first factor is –Understanding & providing individualized attention for the owner" which has 10.784% of the total variance. This factor consists of six items which are sensitiveness and specificity at owner needs; communication with owner to get accurate reflection of the owner's needs; ability to recognize, identify and define problem immediately; genuine interest and enthusiasm in performing the service; explaining how jobs will be administered and what the owner can expect from them; and supervising the security & safety management of the project. These six items influence the service of CM consultant from the efforts to understand the owner and conduct service with the basis of owner oriented. This factor with the nature of owner

oriented service strongly influences the service quality of CM consultant. Most of items within this factor illustrate quite high factor loading which are approximately higher than 0.6. This result is in accordance with the real practice of consultant service. In real practice, consultant is more likely to be an owner oriented due to the condition of predetermined fee for consultant. As a consequence, consultant does not have a profit oriented motive in giving their service, but focuses more on the quality of their service to the owner. The main reason is that consultant seeks to get owner's satisfaction which may increase their chance to get more projects in the future. In addition, "The CM consultant is sensitive and specific at owner's needs" has the highest loading value of 0.775. This indicates that being sensitive and specific at owner's needs is an important service in understanding and providing individualized attention to the owner. However, there is one item from this factor that has a relatively low value of loading related to the factor. That item is "The CM consultant supervises the security and safety management of the project" which only has loading of 0.498. This low value of loadings means that the CM consultant quality of service received less influence from supervising the security and safety management of the project. This is because of the real practice in construction which may not fully involve CM consultant in the security and safety of project. In the real practice, contractor is the party that provides and manages the security and safety in the project. CM consultant just needs to check, supervise and give warning if there is any situation that is out of ordinary. In summary, the finding of this factor is in accordance with some of the previous research that points out understanding the owner and provides service according to what owner needs as one of the most important service quality factors of consultant in construction project (Samson and Parker, 1994; Woo and Ennew, 2005; Wang, Chuang et al., 2009). The finding of this factor in this research proved that understanding and providing individualized attention to the owner not only influence the service quality of consultant in general but also especially of CM consultant.

The second factor is "Service oriented characteristic of the staff" which has 10.269% of the total variance and consists of eight items. Most of items in this factor are related to the characteristic of the CM consultant staff which is service oriented or service minded. In other words, this factor and its items show the influence of service oriented characteristic to the quality of CM consultant service. The first four items of this factor shows relatively high loading which are approximately higher than 0.6. The

first and second items in this factor are good hospitality & friendliness and good manner & politeness in performing the service. Both of them give the highest positive influence (i.e. 0.842 & 0.749) to the service quality of CM consultant. In service business, interactions between the service provider and owner are likely to happen from time to time. Therefore, the courtesy such as friendliness and politeness in performing the service is very important due to the direct contact with the owner. The third item is the good understanding and knowledge of the current situation of the industry and the owner‘s circumstances which has loading value of 0.695. This item shows that good understanding of current industry situation and owner‘s circumstances can give positive influence to the service quality of CM consultant. In addition, it also shows that CM consultant cares and gives attention about the condition of the owner. The fourth item is the non-technical communication ability with the owner which has a loading of 0.585. This item provides non-technical communication to the owner who may not be conversant or familiar with engineering discipline. Even though the loading may not be high enough, this item does influence the service quality of CM consultant (Tang, Lu et al., 2003). However, the loading may be low due to the current practice in Indonesia, where most owners nowadays already have an engineering background. In addition, the rest of items in this factor present relatively low factor loadings such as providing services which are flexible & customized for each owner; providing good quality and reliable advice; creativity in performing the service; and proactively develop solutions when problems occur. These four items have approximately loading value of 0.541, 0.486, 0.445 and 0.421. Although these four items are weakly associated with the factor, these items still have their influence on service quality of CM consultant.

The third factor is ―Awareness of the Project Status and Information‖ which has 8.908% of the total variance. This factor consists of three items such as the ability to implement and maintain the contract that has already been agreed between owner and contractor; the ability to anticipate the problem before it happens in the project; and the ability to maintain their owner‘s project information confidentially. These three items influence the service quality of CM consultant by being aware of the project‘s status and information. This awareness of the project‘s status and information service has strong influence on the service quality of CM consultant. The first two items in this factor shows their strong influence (i.e. 0.813 & 0.705) to the

quality of the project's status which depends on the quality of the service of CM consultant. The last item in this factor is related to the project's information which also depends on the service quality of CM consultant. It is natural for them to able maintain or keep safe the owner's project information from being exposed to unauthorized party (Samson and Parker, 1994).

The fourth factor is "Communication & Coordination of The Project" which has 8.890% of the total variance. This factor consists of five items such as promptly responds to owner's request, queries and complaints; cooperation & coordination with the other parties in construction; providing regular dialogue on progress of the project; providing good control for quality of materials and workmanship; and accessibility of staff and could be reached easily by owner. These 5 items in "Communication and coordination of the project" strongly influence the service quality of CM consultant. This factor was suggested as one of the most important influences on the quality of service of CM consultant (Cheng, Proverbs et al., 2006). Within this factor, "The CM consultant promptly responds to owner's request, queries and complaints" has the highest factor loading. This shows that the responsiveness to owner's request, queries and complaints are considered to be very important as it has a high influence on the quality of service of CM consultant. In addition, the second item which is "The CM consultant is able to cooperate and coordinate with the other parties in construction" has the second highest loading of 0.695. This also shows that cooperation and coordination with other parties can improved the quality of CM consultant service performance. However, the last 3 items have a moderate loading value ranging from 0.503 to 0.577.

The fifth factor is "Progressiveness" which has 7.517% of the total variance and consists of two items such as ability to complete the project within the scheduled dates and showing initiative in performing the service. This factor showing the progressiveness should be one of factors of CM consultant service quality. Performing service with initiative and effort to complete the project on time shows the progressive performance of CM consultant service quality. Factor loading of the first item "The CM consultant is able to complete the project within the scheduled dates" shows very high value of 0.823. This shows very clear results, pointing out that this item influences the quality of service of CM consultant. In addition, it is also very

clear that completing the project on time is surely expected by the owner and is one of the most important services to be accomplished in the project (Samson and Parker, 1994). In addition, showing initiative can also increase the progressiveness of the project. Both of them are important in order to improve the progressiveness specifically and service quality of CM consultant generally.

The sixth factor is "Competence" which has 5.459% of the total variance and consists of three items. The item that has the highest loading in this factor is the good academic knowledge, experience and is able to give valid contribution. This item was suggested as one of the most important influences by many previous researches (Samson and Parker, 1994; Tang, Lu et al., 2003; Wang, Chuang et al., 2009). It was due to the nature of a service company that always uses human as the resources and media to produce and deliver the service. Therefore, the knowledge and experience of the staff are very important. In addition, the second item which is the high accuracy, detail and completeness of the records also holds important position in this factor due to its factor loading value of 0.597. This item shows the importance of producing records as one of the services that needs to be under taken carefully. The practice in construction also confirms the importance of records for many parties. Owners may feel very satisfied if they can get the accurate, detailed complete records for all process in the project. The last item is the good and sufficient track record in similar project which has relatively low loading of 0.467. This is because of the majority of the owner nowadays are more concerned about the experience of the staff than the experience of the company. Even though these items have a low loading value, these 3 items shows their influence to the factor and to the service quality of CM consultant.

The seventh factor is "Professionalism of Service" which has 5.385% of the total variance. This factor consists of four items such as informing owner immediately about any sudden and urgent situation, ability to use and understand the tools for QC, ability to complete the project within the agreed budget and building up trust and honesty in the working relationship. The first item has the highest loading value of 0.731, combined with the second item that holds for 0.598 and the third item with 0.584 loading value. These four items can help CM consultant to be professional in performing their service.

The eighth factor is ―Procedural Capability" which has 4.844% of the total variance and consists of only one item. The item is about doing their job according to the standard operational procedure (SOP) that has already been agreed. It can be seen that this item accounted for 0.817 loading value which is considered to be quite high. Therefore, it can be assumed that this item is a reliable representative for this factor. In addition, it is also important that this item is implemented correctly in construction project. The reason is because this factor involves the regulation and procedure of conducting the construction project for each project participant.

The ninth factor is ―Technical Capability" which has 4.716% of the total variance. The item in this factor that has the highest loading is the ability to complete the project under its technical requirements with loading value of 0.720. It shows a quite high value of loading. It can be seen that this item is highly associated with factor 9. In addition, the second item is the compatibility of computerized systems and software with the owner loading value of 0.535. These two items reliably represent this factor 9.

The tenth and last factor is ―Problem-solving capability" which has 4.620% of the total variance. It consists of only one item which is the capability to do immediate problem solving. It can be seen that this item accounted for 0.769 loading value which is considered to be quite high. Therefore, it can be assumed that this item is a reliable representative for this factor.

4.3.5 Determining Weight of each Service Quality Items and Factors of CM Consultant

The weight of the factors were calculated from the percentage of variance from the result of factor analysis. However, the percentage of variance only represents 71.39% from the total of 100% variance. This is useful to show the reader that based on 71.39% of the variance we can see how much the proportion of each factor influences overall service quality of CM consultant. Eigenvalue is the sum of squared loadings for a factor. It indicates the amount or the percentage of variance in an original variable is explained by a factor (Hair, Black et al., 2010).

The weight of items from the result of factor analysis represents the correlation between the items and the factors. The weight of items shows how much

the proportion of the item is to its corresponding factor. It shows how much related the items are to the factors. It is the proportion of how much each item represents the explanation of the factor. It was generated from the value of factor loading. Factor loading is the correlation between the original variables and the factors and the key to understanding the nature of a particular factor (Hair, Black et al., 2010). In summary, the proportion of the items to each of its factor is generated from the factor loading.

The first factor (i.e. Understand & provide individualized attention to the owner) has the highest weight of 15.11% compared to the other factors. It shows that the first factor contributes 15.11% in explaining the service quality of CM consultant. In addition, the sensitiveness and specificity of owner‘s needs has the highest weight of 20.17% compared to the other items in this factor. The value of 20.17% shows that this item has the highest proportion in representing or explaining factor 1 compared to the other items.

The second factor (i.e. Service oriented characteristic of the staff) has the second highest weight of 14.28% compared to the other factors. It shows that this second factor contributes 14.28% in explaining the service quality of CM consultant. In addition, hospitality and friendliness of the staff has the highest weight of 17.67% compared to the other items in this factor. The weight 17.67% shows that this item has the highest proportion in representing or explaining factor 2 compared to the other items.

The third factor (i.e. Awareness of the project‘s status and information) has the weight of 12.48%. It shows that this third factor contributes 12.48% in explaining the service quality of CM consultant. In addition, the ability to implement and maintain or watch over the contract that has already been agreed between owner and contractor has the highest weight of 38.02% compared to the other items in this factor. The weight 38.02% shows that this item represents the highest proportion in explaining factor 3 compared to the other items.

The fourth factor (i.e. Communication & coordination of the project) has the weight of 12.45%. It shows that this factor contributes 12.45% in explaining the service quality of CM consultant. In addition, the responsiveness to owner‘s requests, queries and complaints has the highest weight of 25.45% compared to the other items

in this factor. The weight 25.45% shows that this items represent the highest proportion in explaining factor 4 compared to the other items.

The fifth factor (i.e. Progressiveness) has the weight of 10.53%. It shows this factor contributes 10.53% in explaining the service quality of CM consultant. In addition, the ability to complete the project within the scheduled dates has the highest weight of 58.03% compared to the other items in this factor. The weight 58.03% shows that this item represents the highest proportion in explaining factor 5 compared to the other items.

The sixth factor (i.e. Competence) has the weight of 7.65%. It shows that this factor contributes 7.65% in explaining the service quality of CM consultant. In addition, the good academic knowledge, experience and is able to give valid contributions of the staff has the highest weight of 40.87% compared to the other items in this factor. The weight 40.87% shows that this item represents the highest proportion in explaining factor 6 compared to the other items.

The seventh factor (i.e. Professionalism of service) has the weight of 7.54%. It shows that this factor contributes 7.54% in explaining the service quality of CM consultant. In addition, informing the owner immediately about any sudden and urgent situation related to the project has the highest weight of 30.95% compared to the other items in this factor. The weight 30.95% shows that this item represents the highest proportion in explaining factor 7 compared to the other items.

The eighth factor (i.e. Procedural capability) has the weight of 6.79%. It shows that this factor contributes 6.79% in explaining the service quality of CM consultant. In addition, this factor 8 only consists of one item. It can be seen that the ability to do the job according to the SOP that has already been agreed has 100% weight of within this factor 8. The weight 100% shows that this item represents full proportion in explaining factor 8.

The ninth factor (i.e. Technical capability) has the weight of 6.61%. It shows that the ninth factor contributes 6.61% in explaining the service quality of CM consultant. In addition, the ability to complete the project under its technical requirements/specifications has the highest weight of 57.37% compared to the other

items in this factor. The weight 57.37% shows that this item represents the highest proportion in explaining factor 9 compared to the other items.

The tenth factor (i.e. Problem solving capability) has the weight of 6.47%. It shows that this factor contributes 6.47% in explaining the service quality of CM consultant. In addition, this factor 10 only consists of one item. It can be seen that the capability to do immediate problem solving has 100% weight of in this factor. The weight 100% shows that this item represents full proportion in explaining factor 10.

Table 4.21 Weights result table

No.	Items & Factors	Factor Loading	Percentage of Variance	Weight Items (%)	Weight Factors (%)
1	**Understand & provide individualized attention to the owner (F1)**		**10.784**		**15.11**
1a	The CM consultant is sensitive and specific at owner‘s needs	0.775		20.17	
1b	The CM consultant communicates with owner to get accurate reflection of the owner‘s needs	0.718		18.70	
1c	The CM consultant is able to recognize, identify and define problems immediately	0.675		17.59	
1d	The CM consultant shows genuine interest and enthusiasm in performing the service	0.595		15.49	
1e	The CM consultant explains how jobs will be administered and what the owner can expect from them	0.580		15.10	
1f	The CM consultant supervises the security and safety management of the project	0.498		12.95	
2	**Service oriented characteristic of the staff (F2)**		**10.269**		**14.38**
2a	The staff has good hospitality and friendliness	0.842		17.67	
2b	The Staff has good manner and politeness in performing the service	0.749		15.71	
2c	The CM consultant has good understanding and knowledge of the current situation of the industry and their owner‘s circumstances (i.e. political, financial, etc).	0.695		14.59	
2d	The staff are able to communicate in a non-technical way with the owner that may not be familiar with engineering discipline	0.585		12.29	
2e	The CM consultant provides services which are flexible and customized for each owner	0.541		11.35	

No.	Items & Factors	Factor Loading	Percentage of Variance	Weight Items (%)	Weight Factors (%)
2f	The CM consultant is capable of providing good quality and reliable advice	0.486		10.21	
2g	The CM consultant is creative in performing the service	0.445		9.34	
2h	The CM consultant proactively develops various solutions when problems occur	0.421		8.84	
3	**Awareness of the project's status and information (F3)**		**8.908**		**12.48**
3a	The CM consultant is able to implement and maintain or watch over the contract that has already been agreed between owner and contractor	0.813		38.02	
3b	The CM consultant is able to anticipate the problem before it happens in the project.	0.705		32.96	
3c	The CM consultant is able to maintain owner's project information confidentially	0.620		29.02	
4	**Communication & coordination of the project (F4)**		**8.890**		**12.45**
4a	The CM consultant promptly responds to owner's requests, queries and complaints	0.801		25.45	
4b	The CM consultant is able to cooperate and coordinate with the other parties in construction (i.e. owner, contractor, sub-contractor and other consultants)	0.695		22.08	
4c	The CM consultant properly provides regular dialogue on progress of the project	0.577		18.34	
4d	The CM consultant is able to provide good control for quality of materials and workmanship	0.572		18.16	
4e	The staff are accessible and could be reached easily by owner.	0.503		15.97	
5	**Progressiveness (F5)**		**7.517**		**10.53**
5a	The CM consultant is able to complete the project within the scheduled dates	0.823		58.03	
5b	The CM consultant shows initiative in performing the service	0.595		41.97	
6	**Competence (F6)**		**5.459**		**7.65**
6a	The staff has good academic knowledge, experience and is able to give valid contributions	0.735		40.87	

No.	Items & Factors	Factor Loading	Percentage of Variance	Weight Items (%)	Weight Factors (%)
6b	The CM consultant has high accuracy, detail and completeness of the records	0.597		33.20	
6c	The CM consultant has good and sufficient track record in similar project	0.467		25.93	
7	**Professionalism of service (F7)**		**5.385**		**7.54**
7a	The CM consultant informs the owner immediately about any sudden and urgent situation related to the project	0.731		30.95	
7b	The CM consultant is able to use and understand the tools for QC, in order for them to check it properly	0.598		25.31	
7c	The CM consultant is able to complete the project within the agreed budget	0.584		24.73	
7d	The CM consultant builds up trust and honesty in the working relationship	0.449		19.01	
8	**Procedural capability (F8)**		**4.844**		**6.79**
8a	The CM consultant does a job according to the SOP that has already been agreed	0.817		100.00	
9	**Technical capability (F9)**		**4.716**		**6.61**
9a	The CM consultant is able to complete the project under its technical requirements/specifications	0.720		57.37	
9b	The CM consultant uses computerized systems and software which are compatible with the owner	0.535		42.63	
10	**Problem solving capability (F10)**		**4.620**		**6.47**
10a	The staff has the capability to do immediate problem solving	0.769		100.00	

4.4 Conclusion

This chapter explained the analysis for quantitative data in this research. The result of pilot survey generated and validated 35 items of CM consultant‘s service quality. The data for quantitative research approach was conducted by survey questionnaire on large scale data collection. Data were screened to ensure its correctness according to the research design. The large scale data collection collected quantitative data from 71 respondents. Firstly, the data was analyzed using relative importance index to determine the importance level of CM consultant‘s service quality items. The importance level shows which service is important and needs more

attention. This gives direct benefit of which service is important and essential for the consultant company to perform good service quality in the construction project. Second, the data was analyzed using factor analysis to group the items into several factors. Readers can use the outcome of this research to evaluate their companies' service quality based on the factors. Furthermore, this chapter also showed the weight of items and factors to explain the CM consultant's service quality. The weight of items showed how much each of them can explain the factors. In addition, the weight of factors showed how much each of them can explain the CM consultant's service quality. Furthermore, the outcome of measuring the weight could feed back to the future studies to measure the level of service quality of CM consultant company.

CHAPTER V
ANALYSIS RESULTS OF INTERVIEWING OWNERS IN INDONESIAN BUILDING CONSTRUCTION PROJECTS

This chapter consists of qualitative data gathered from the interview of 63 respondents. It is important to emphasize that all information was analyzed in this chapter based on owners‘ opinion. This chapter also shows the result of analyzing the qualitative data from interviewing owners in Indonesian building construction projects. The results consist of descriptions for 35 items of CM consultant‘s service quality. The results are presented into ten sections based on the 10 factors CM consultant‘s service quality from the result of chapter 4.

This research aims to give direct benefit for CM consultant to understand which item from their services is important, essential to satisfy the owners and give positive contribution to the project. Interviewees were asked about their opinion regarding each of those 35 items. The descriptions of owners‘ perception were explained on three main topics. The first topic is ―why the service is important to be provided by CM consultant”. This question is to find the importance of providing each service based on owner‘s viewpoint. The second topic is ―what is the current practice CM consultant‘s service quality”. This gives explicit knowledge about the current practice of CM consultant‘s service quality in Indonesia. Understanding the current practice of CM consultant‘s service quality from owners‘ viewpoint is very important to get full benefit of improving the service quality. The third topic is ―how CM consultant should perform the service”. In order to give explicit knowledge of how CM consultant should deliver their service, knowing only the importance of each item is not enough. Therefore, it is necessary for CM consultant to know how to do it based on owner‘s viewpoint. The summaries of descriptions for 35 items are shown in table C.2 in appendix C.

5.1 Understand & Provide Individualized Attention to the Owner (F1)

This section analyzes and summarizes the findings from the owners‘ interviews. Each section was analyzed from owners‘ interviews based on the three

main questions. In addition, each section consists of three paragraphs which were organized based on the three main questions. This factor 1 consists of six service quality items which were separated into six sections. These six items can be seen in figure 5.1 below. This factor is related to CM consultant‘s effort in understanding the owner and providing individualized attention to the owner. First, understanding the needs of owner in construction project can be seen mostly from —The CM consultant is sensitive and specific at owner‘s needs”; —The CM consultant communicates with owner to get accurate reflection of the owner‘s needs”; and —The CM consultant explains how jobs will be administered and what the client can expect from them”. Second, the effort of CM consultant in providing individualized attention to the owner can be seen clearly from —The CM consultant is able to recognize, identify and define problems immediately” which helps the owner to understand the nature of the problem. Providing individualized attention can also be seen from —The CM consultant shows genuine interest and enthusiasm in performing the service” and —The CM consultant supervises the security and safety management of the project” to avoid any accident, maintain the project and owner‘s reputation.

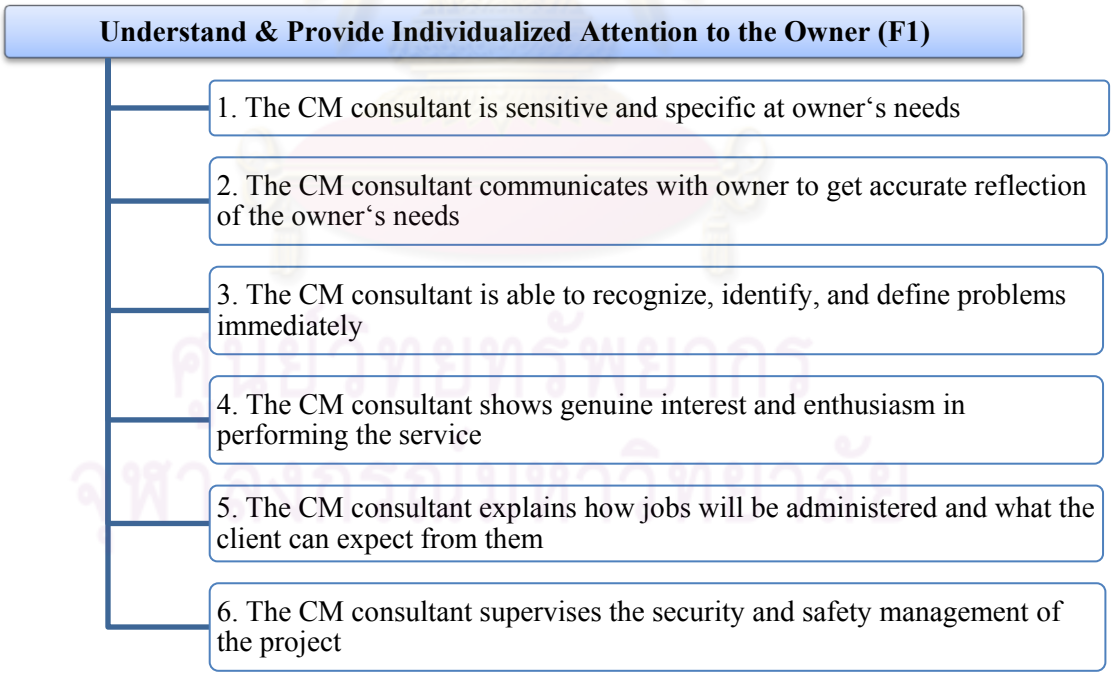


Figure 5.1 List of items in factor 1

5.1.1 The CM Consultant is Sensitive and Specific at Owner's Needs

The first service quality item from this factor is "The CM consultant is sensitive and specific at owner's needs". Based on owner's perception, this item is important because CM consultant has the responsibility to deliver owner's needs to the contractor. This is necessary so then contractor can implement tasks correctly in the construction. In addition, owner is not directly involved in the constructing process. "Owner is mostly involved in the design development, marketing, budget calculation and tender" (v0005). Meanwhile, CM consultant is mostly involved in the constructing process which is mainly supervising and inspecting the contractor's work. Therefore, CM consultant as owner's representative has to understand owner's needs. It helps CM consultant deliver it to the contractor who plans and builds the building. "CM consultant should be very specific about what owner wants, so it can be correctly implemented by the contractor" (v0060). In addition, CM consultant being sensitive and specific at owner's needs can also prevent misunderstanding and wrong construction in the project. One of the respondents mentioned that "not specific at owner's needs may lead to misunderstanding and wrong construction" (v0027). Misunderstanding between the owner needs and what has been perceived by the CM consultant can affect the information provided to the contractor. This chain of misunderstanding can lead to wrong construction. Eventually, this wrong construction needs to be repaired and it may take an additional cost for rework and repairing.

However, the implementation of CM consultant being sensitive and specific at owner's needs can still be improved. Several owners mention that it will be better if CM consultant can improve this service. It was concluded that CM consultant still needs to improve this service. "Their sensitivity and specificity affect the mistakes and problems that may occur in construction project" (v0047).

In addition, the research found that the main point of performing this service was based on owners' perception. The owners suggest that the CM consultant should be able to always follow and interpret owner's needs. Interpretation of owners' needs can be gained from the design and contract that has already been made. Owners considered this to be the best option because contract is a legal document that can be used as a reference if there is any dispute in the future. From the design and the contract, CM consultant should be perceptive, sensitive and specific to interpret

several important points of owner‘s needs. For example, quality of the project, deadline of the project and several other things that might affect the outcome of the construction.

5.1.2 The CM Consultant Communicates with Owner to Get Accurate Reflection of the Owner’s Needs

Based on owners‘ interviews, there are two main reasons this item is considered as important. The first reason is many modifications from owner might occur in the middle of the project. ―Construction project has many modification or upgrade in the middle of the construction. CM consultant has to keep communication with owner, otherwise there can be misunderstanding because of wrong information” (v0047). It was concluded that CM consultant should communicate with the owner to get owner‘s accurate needs due to the dynamic nature of the construction. Second, owner wants the outcome quality of their project to be precise and accurate. This means that the CM consultant needs to lead the contractor to work precisely as owner‘s needs. In summary, there are several benefits owner can gain from the implementation of this service such as owners can get their project finished on time and it can also reduce the problem or mistake that can occur in the process of construction.

Even though this intense communication is necessary, the current practice in Indonesia shows three main limitations in the implementation of this service. First, the current practice is sporadic which means that it looks like they understand and perform the work according to the owner‘s needs but actually it might be not. The passive service of CM consultant may result in the inaccuracy of construction outcome which owner might not accept and which needs to be repaired. Second, the difficulty to implement this service. It is because several CM consultants might feels uncomfortable to repetitively asking and disturbing the owner. ―Thisservice is considered important yet difficult to implement. The reason is CM consultant do not want to disturb owner too much” (v0039). Third, the difficulty to get intense communication with the owners because they are busy with their business.

Aside from the importance and the current practice of this service, the interview results also conclude with the suggestions for CM consultant to perform this

service. First, talk in detail and intensively with the owner. The intense communication can help CM consultant to get accurate information of owner‘s needs, especially at the time CM consultant does not understand the contract. However, it should be noted that overdoing spoken communication might have negative result. For example, in the situation of owner wants to change something which is not written in the contract. In this situation, it is very important for CM consultant to have written instruction from the owner rather than just follow their spoken instruction. One owner mentions that ~~,if~~ those unwritten changes become a problem in the future, this can resulted negatively for the CM consultant. They may be blamed for those unwritten changes” (v0050).

5.1.3 The CM Consultant Company is Able to Recognize, Identify and Define Problems Immediately

Based on the owners‘ interviews, this service is important because owner may not be expert at identifying the construction problem. The reason is that some owner may not have civil engineering background. This lack of civil engineering knowledge resulted in their unfamiliarity with the construction problem. Therefore, CM consultant is counted by owner as the right and suitable party to do this service. It is due to their better experience in the construction than the owner, which makes them more familiar at identifying problems in construction. ~~,O~~wner chose and hired CM consultant because owner needs CM consultant‘s help to handle the project and because CM consultant is more capable to do it than owner” (v0050). In addition, the owner and the project can gain several benefits if this service is implemented correctly by the CM consultant. This ability to recognize, identify and define problems immediately can help the designer to solve the problem that happens in the construction site. The reason is that designer does not see the real situation of the problem in the site. Meanwhile, CM consultant activities are mostly centered in the construction site and directly involve all the processes of construction. As a consequence, designer cannot understand the nature of the problem as quick as CM consultant. Therefore, initial identification and analysis of the problem by CM consultant can help the designer to solve the problem more accurate and saves more time for analyzing.

However, the current practice in Indonesia shows that this service can use some improvement. The owners expect that prior to sending the problem to designer CM consultant should try to recognize, identify and define the problem. In most of cases, the CM consultant informs the designer in the weekly meeting. This practice was considered still needs to be improved by several owners. ―Without help from CM consultant in identifying and defining the problem, designer needs more time to analyze and make the solution" (v0047).

Based on the interview results, there are two main key points for CM consultant to perform this service. First, CM consultant should analyze the problem from several aspects such as the source of the problem and its implication to the construction. This can help to prevent a similar problem to occur in the future. In addition, this also can help the other parties such as designer and owner to understand more of the situation and the nature of the problem. Second, CM consultant should give advice or a solution regarding the problem and send it to the designer. This is reasonable since CM consultant is the leader of the project and supposed to be more expert in the construction process rather than the designer itself. In summary, CM consultant need to analyze, evaluate and give feedback to the designer for them to analyze and give solution. In addition, if the problem is related to the work implementation or working method in the site then it is CM consultant responsibility to solve it. However, it should be noted that if the solution affects the project's cost then the decision of it should comes from the owner.

5.1.4 The CM Consultant Shows Genuine Interest and Enthusiasm in Performing the Service

The interview results found that this service is important to be provided by CM consultant. The main reason is owners want CM consultant as their representative to be responsible taking care of the project as an owner would do. Genuine interest and enthusiasm is very important in performing good service quality. ―If they have the interest in performing the service then automatically their responsibility for the project may also increase" (v0060). This interest and enthusiasm also affects CM consultant's awareness in performing their service such as awareness about the quality of the project. Lack of interest and enthusiasms may result in lack of sense or awareness regarding the condition of the project. In addition, several owners mention

that this interest and enthusiasm of CM consultant in performing the service is considered more important than several other items. ―Even though someone has experience for 10 years, but never has interest or desire to look with more detail into the problem, he/she is less valuable than a person that only 2 years experience but who has more interest and enthusiasm" (v0055).

However, the current practice in Indonesia shows some limitations in the implementation of this service. Based on owners' perception, CM consultant needs to improve their interest and enthusiasm in performing the service. In addition, CM consultant needs to improve their interest about the successful of the project. ―It seems that they need to improve their interest and responsibility in doing their work" (v0059). This interest and enthusiasm can be seen clearly such as in the process of solving the problem. ―CM consultant needs to show their interest about the project. For example, CM consultant should follow-up the designer for solution rather than just waiting for it" (v0047).

Based on the interview results, CM consultant should show the interest by being more responsible and give more care and attention to the project. For example in the context of the project is having a delay, CM consultant should analyze and find out the source of the problem. Later on, they should try to fix it by pacing up the construction process. In addition, being more careful and giving more attention to the project is important. The lack of interest and enthusiasm may lead to mistakes or problems in the project.

5.1.5 The CM Consultant Explains How Jobs will be Administered and What the Owner can Expect from Them

The interview results found two main reasons for this service to be considered important. First, owner needs to check the compatibility of the method proposed by the CM consultant. The proposed methods should be appropriate to achieve the project's goals. If there are procedures that owner might not agree with, they can modify it before the construction starts. Second, owner needs to keep track and monitor the process of the project. Therefore, owner needs to know how CM consultant will manage the project and the procedures in constructing the project. The

explanations should come from CM consultant as owner‘s representative in leading the project.

The explanation of how jobs will be administered were considered good enough and implemented correctly by many CM consultants. However, several owners mentioned that sometimes its implementation in the real practice is not the same from what was presented previously. This situation might happen because of different competency between the planner and the person that implements it in the construction. In general, the director of the CM consultant company makes the plan and presents it to the owner. However, the person that implements it in the field is not the director and might have lower competency than the director.

The research found several important points regarding the explanation to the owner in the beginning of the project. First, CM consultant should explain the schedule planning of the project. This schedule should be the master schedule which includes the composite schedule of all contractors and sub-contractors that participate in the project. Second, CM consultant should explain the standard operational procedure (SOP) that includes all the procedures in the project. ―SOP is the procedure for work implementation and supervising from drawing until the end of construction” (v0021). Based on the interview results, SOP should include the procedure of approving the drawing, the work and the material. In addition, many other activities and conditions needs a SOP such as the procedure if there is a delay; the procedure if the quality is not good; and the procedure if needing an additional worker. ―CM consultant needs to be specific about their SOP for all common activities or problems that might happen” (V0024). In summary, CM consultant should show their capability by presenting their procedure in handling the project from the beginning until finish.

5.1.6 The CM Consultant Supervises the Security and Safety Management of the Project

Based on owners‘ interviews, there are three main reasons this service is important to the owners. First, working in construction has a very high risk of accident. Accidents in construction site can occur because of falling objects accident such as falling window, falling bricks and equipment accident such as falling crane or even being hit by a bulldozer. Accidents in construction can injure the workers and

may be the neighboring citizens around the project. Second, many accidents might resulted in a bad reputation for the owner. In addition, owner also might get complain from the public or from the authorities. This bad reputation may also affects the selling capability of the project. It may decrease because of many accidents that happened in the project. Therefore, CM consultant needs to supervise and monitor the safety implementation in the site. Third, from the security's viewpoint this is important because some items in the construction are expensive and might get stolen. "Thissecurity should involve both materials and equipments from the project" (v0061).

The current practice in Indonesia shows that security and safety are provided by contractor. "Eachcontractor has his own safety and security team. CM consultant just needs to supervise them" (v0018). In addition, several owners mentioned that accidents and theft sometimes happened in their project (v0050; v0061). It can be concluded that even though contractor is the provider of both safety and security, CM consultant needs to be involved in supervising its implementation in the construction site. Another owner mentions that CM consultant should be more confidence in giving warning to the contractor. "CM consultant needs to give warning to contractor when they saw something might be wrong" (v0059). Meanwhile, the interview results also mention that the big size construction project needs CM consultant to supervise the safety and security management in the site. "Big project needs extra attention in safety and security. However, contractor has to focus in technical construction. Sometimes contractor may not aware of their labor safety standard and the security" (v0027).

Based on the interview results, there are three main points for CM consultant to perform this service. First, CM consultant gives warning and reminding contractor if something is not according to the safety regulation. This is important to prevent any accident in the construction site. Even though contractor is the provider of both security and safety, CM consultant still needs to manage and supervise them. "CM consultant should also supervise whether the laborer follows the safety procedure or not" (v0024). Second, everyday CM consultant should remind the laborer regarding the security and safety in construction. This is because laborer is not a smart person. They need to be reminded every day about the safety in construction such as the use

of glasses in welding process; and the use of helmet to avoid getting hit by falling objects from the upper level. In summary, there should be a safety talk every morning. Third, CM consultant should check the procedures for safety and security management that were proposed by the contractor. CM consultant should check the contractor‘s safety procedure, whether it is in compliance with the standards such as the technical regulation in taking fire accident. Later on CM consultant should give approval if it is written appropriately.

5.2 Service Oriented Characteristic of the Staff (F2)

This section analyzes and summarizes the findings from the owners‘ interviews. Each section was analyzed from owners‘ interviews based on previous three main questions. Each section consists of three paragraphs which were organized based on the three main questions. Factor 2 consists of eight service quality items which were presented in eight different sections. This factor is related to the characteristic of CM consultant‘s staff being service oriented. First, the characteristic of the staff to show courtesy in their service can be seen from ―The staff has good hospitality and friendliness‖; and ―The staff has good manner and politeness in performing their service‖. Second, the characteristic of the staff to show more effort in performing their service to the owner such as ―The CM consultant has good understanding and knowledge of the current situation of the industry and their owner‘s circumstances‖; ―The staff are able to communicate in a non-technical way with the owner that may not be familiar with engineering discipline‖; and ―The CM consultant provides services which are flexible and customized for each owner‖. Third, the characteristic of the staff in performing their service related to the project. It can be seen from ―The CM consultant is capable of providing good quality and reliable advice‖; ―The CM consultant is creative in performing the service‖; and ―The CM consultant proactively develops various solutions when problems occur‖. These eight items can be seen in figure 5.2 below.

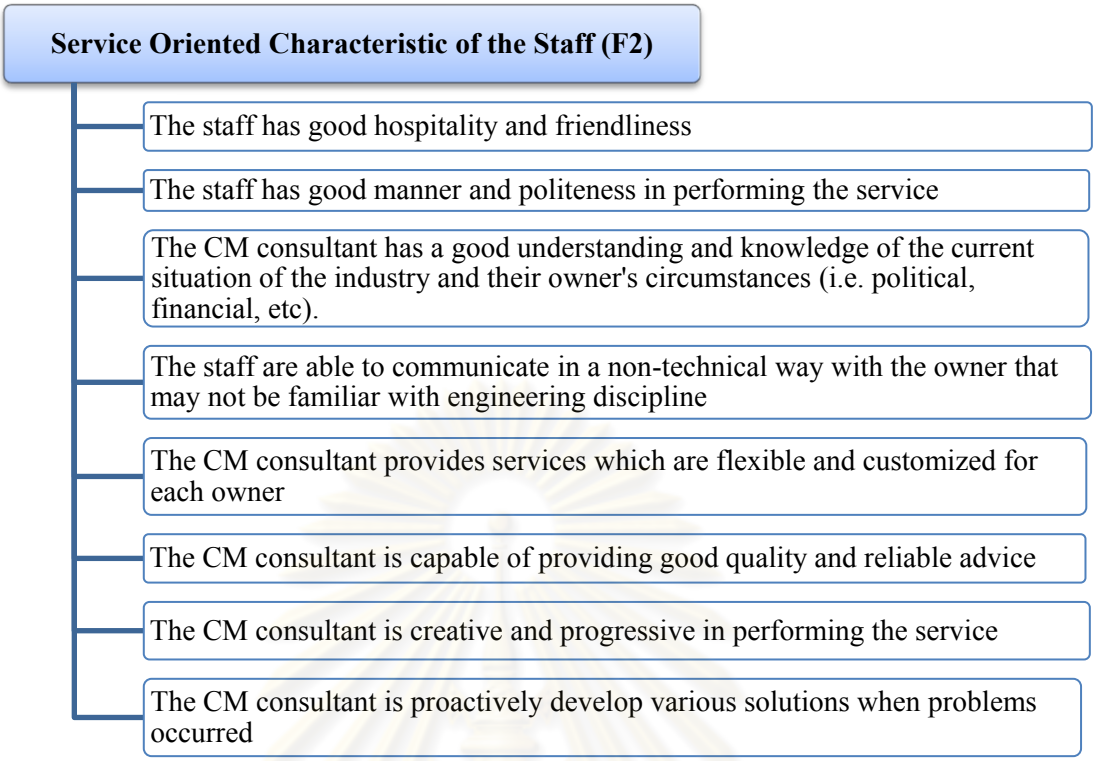


Figure 5.2 List of items in factor 2

5.2.1 The Staff has Good Hospitality and Friendliness

The research found that it is important for the staff of CM consultant to have good hospitality and friendliness. The reason is that hospitality and friendliness is necessary to maintain a good working environment for all participants in the project. Friendliness is very useful to make a good relationship between the CM consultant and the other project participants. In addition, hospitality is useful to make the working environment in the project becomes more comfortable.

The current practice of this service is considered to be good enough. The interview results show that many CM consultants in Indonesia have the nature of being friendly and perform good hospitality in their service. Their hospitality and friendliness were shown very effective when CM consultant interacts with the owner.

In addition, the results also describe owners‘ perception of CM consultant in performing this service. Based on the interview results, hospitality and friendliness is necessary in interacting with all project participants especially with the owner. However, it was also concluded that CM consultant should not over friendly with the

contractor and becomes too soft in front of them. CM consultant still needs to be strict in leading and managing the project. For example, if contractor has a decreasing work performance then CM consultant should remind and is able to push or motivate the contractor.

5.2.2 The Staff has Good Manner and Politeness in Performing the Service

The research found that this service is important to be implemented by CM consultant. The reason is that many construction‘s participants can get easily offended. It is because of the hot condition in construction site which causes them to have lots of stress and easily get tired. Consequently, their mental state can be fragile. They can be offended easily and get angry easily. ―Contractor and sub-contractor may have lots of stress and tired working in construction site because of its hot condition during daylight. This situation can make them get easily offended” (v0055). Concluding from the interviews, performing good manner and politeness may have benefit to avoid conflict and prevent any accidental offending to the other project participants such as contractor.

The results concluded that the current practice of this manner and politeness are already implemented well enough in Indonesia. However, several interviewees note that politeness might lead the working relationship in the wrong direction. Too much politeness from CM consultant might lead them to loss their leadership in front of other construction participants such as contractor.

Therefore, politeness of CM consultant should be implemented properly. There are two important points that need to be considered in implementing this service. First, good manner and politeness should be implemented in the communication with the project participants such as owner, contractor and sub-contractor. Second, CM consultant should not overdo the politeness in front of contractor. Overdoing the politeness has several negatives such decreasing the leadership quality. ―It is necessary to be straightforward, strict and bold in facing the contractor” (v0050).

5.2.3 The CM Consultant has Good Understanding and Knowledge of the Current Situation of the Industry and their Owner's Circumstances (i.e. Political, Financial, etc)

Based on the interview results, there are two main reasons for this service to be considered important. First, owners might be busy with their business and not aware of current situation of the construction industry. It is because owner does not have enough time to check it every day. Meanwhile, CM consultant may know about the price fluctuations of the materials from day to day. Therefore, the existence of CM in providing this service is important. Second, owner has their own financial or political situation that may affect the project. Therefore, CM consultant should know if owner is unable to continue the project. Otherwise, CM consultant might just continue do the works without knowing that owner cannot continue the project anymore. ―Meanwhile, if the condition is related to economic crisis then CM consultant should at least ask for confirmation whether the project can go on or should be halted" (V0050). Moreover, the owner and the project can gain several benefits if this service is implemented correctly. For example, in the situation of the price of steel might increasing in the next few days, if CM consultant informs owner immediately then owner can buy it before the price goes up.

However, the current practice shows that this service was not implemented by all CM consultants in Indonesia. This is because CM consultant concentrates more on the project rather than looking into the current industry and owner's circumstances. ―CM consultant was not involved so much in this. They were more focused on supervising and managing the construction site" (V0047).

Based on the interview results, there are three main points for CM consultant in performing this service. First, CM consultant should understand owner's situation such as when owner has a problem. CM consultant should wait for further instruction from the owner whether they can postpone the project or keep going on. ―CM consultant should not make any movement to halt the project or slowing down the project without owner's permission" (v0010). In addition, ―owners should also inform CM consultant in advance if they will halt the project" (V0005). Second, CM consultant should not gossip negatively or rant about the situation if suddenly owner delays or halts the project. Third, CM consultant needs to inform owner immediately

concerning the current industry situation. CM consultant should not be late in getting the information about the current situation of industry such as price fluctuation of the materials. This may give benefit to the owner on buying cheaper materials before the price goes up.

5.2.4 The Staff are Able to Communicate in a Non-technical Way with the Owner that may not be Familiar with Engineering Discipline

The research found that this service is considered important by the owner. The reason is that owner might not have engineering background to understand the terms in construction project. Owner that does not have engineering background may need CM consultant that can help to explain the project in a "non-technical" way to be easily understood by the owner. It is because there are many things concerning the project that owner needs to know, understand and make decision. Owner needs to monitor their project and communicate with several project participants such as CM consultant, contractor, designer and supplier. "If CM consultant cannot explain it correctly to the owner, then it may lead to the wrong decision" (v0057). Therefore, it is very important for CM consultant to explain the situation of the project correctly to the owner.

The current practice of this service is considered to be good enough. In addition, some owners these days already have at least engineering background. In addition, some owners that don't have engineering background may have their own representative with an engineering background. Even though owner usually has their own representative, sometimes owner still wants to hear directly from the CM consultant as the leader of the project. The reason is that CM consultant has direct involvement with all processes in the construction site.

Based on interview results, there are several important points of performing this service. First, CM consultant should be able give explanation with language and terms that can be easily understood by the owner. Second, the project manager from CM consultant should be the person that connecting the owner and other parties in the construction project. Therefore, the project manager should be able to communicate and explain in a non-technical way to the owner. "Owner always communicates to

CM consultant about the project" (v0015). In addition, some owners mention that this service is also necessary to be implemented by field coordinator or site manager.

5.2.5 The CM Consultant Provides Services which are Flexible and Customized for Each Owner

Based on owners' interviews, there are two main reasons for this service to be considered important. First, owner may hire CM consultant in several different ways such as hiring CM consultant for supervising only; or include managing the project; or even include managing the budget. It may happen because owner already has their own staff and only wants to hire additional staff from CM consultant company. For example, owner only hires the engineering staff or the supervisor. Therefore, CM consultant needs to be flexible with owner. Second, owner may want to change the design or the specification or even the schedule in the project. "CM consultant needs to be flexible and adjust their service performance according to the changes" (V0035). However, the flexibility of their service must not violate the contract. In addition, good implementation of this service may increase owner's satisfaction of the CM consultant company. "Owner may be very happy and satisfied if CM consultant can follow what the owner wants" (V0053). Therefore, providing flexible and customized services for each owner is important.

The research found two main conditions of the current practice in Indonesia. First, the current practice shows that it can use some improvement. Sometimes the condition may lead to the misunderstanding between owner and CM consultant. For example, in the condition that owner just want CM consultant to supervise. If CM consultant does not understand, then in the tender the CM consultant may include the coordination fee and other unnecessary fee. Second, the research found that CM consultant is too flexible regarding the price of their service. In order to compete with the other company, they try to lower the price to win the tender. If the price is lower than the standards service price then it may results negatively to the project. Lower than standards service price may affect the company to put lower quality staff in the project. As a consequence, the project does not run smoothly and later on owner is disappointed with their service quality.

Based on the interview results, CM consultant should not be too flexible regarding the price of their service. CM consultant should maintain their credibility and put the price according to their service quality standards. This is necessary in order to get good quality outcome from the project and satisfy the owner. CM consultant should not lower the price greatly just to get the job. In addition, CM consultant should provide their service depending on the owner‘s requirement. The scope of CM consultant can vary such as only the supervising team; the construction manager; and project manager, which includes managing the budget of the project.

5.2.6 The CM Consultant is Capable of Providing Good Quality and Reliable Advice

The research found that providing good quality and reliable advice is considered to be important. The reason is that owner may not be familiar with engineering and construction project. ―If owner chooses to hire CM consultant, then it means owner is not capable of handling the project by themselves” (v0050). Therefore, CM consultant has a very important role in helping the owner. CM consultant has to be able give a proper advice or suggestion. This service becomes more important especially in the high rise building projects which have more complexity (v0050).

However, the current practice in Indonesia shows that CM consultant capability in giving the advice can still be improved. ―It occurs in several projects that contractor and designer seem to be better in giving advice than the CM consultant” (v0012; v0026). It might happen because of the competence and experience from the human resources of CM consultant. ―The problem is CM consultant should put more qualified staff in the site” (v0039). In order to give proper advice, the CM consultant‘s staff should have enough experience in the construction field.

There are two key points of performing this service which are derived from the interview results. First, CM consultant can give more contribution in giving advice regarding the project‘s management. ―Advice from CM consultant should relate to improving the efficiency and effectiveness of the project. For example, the schedule that is more accurate, more real time, the format of the report that is easy to read and kind of material that is better to use” (v0036). CM consultant should give suggestion

regarding the working method whether something is wrong and needs to be improved. In addition, CM consultant‘s advices need to be properly evaluated and consider several aspects such as its effect on the design and the environmental impact. Second, CM consultant should be involved since the beginning of the project in order to give more accurate advice. Involving CM consultant from the beginning such as pre-construction phase may give CM consultant the opportunity to look at the design and the cost budget, so CM consultant can give some advice including how to separate the work into several packages and give the work to the correct sub-contractor which is expert in some particular work such as the foundation work, the land clearing work, etc. Separating the work into several packages can make the project be more efficient and effective.

5.2.7 The CM Consultant is Creative in Performing the Service

Based on owners‘ interviews, this service is important to the owner. The main reason is that owners do not have enough experience in construction compared to CM consultant. CM consultant is considered able to be creative regarding the construction process which can be gained mostly from experience. As CM consultant‘s working activities are always in construction, it can be assumed that most CM consultants are more experience than owner. Therefore, it considered they can be more creative than the owner (v0055). Thus, most of the CM consultants required experience for their personnel from the recruitment process because of this. In addition, CM consultant is counted by owner as the suitable party to do this service. It is because CM consultant is the leader that manages the process of the construction.

However, the current practice in Indonesia shows limitation in the implementation of creativity in construction. Based on owners‘ perception, CM consultants should be more creative than the contractor. This creativity can be gain mostly from the experience working in construction project. Therefore, the staff of CM consultant should have more experience to makes them smarter than contractor. It will also make them more capable in leading the project. In addition, several owners mentioned that CM consultant should be more creative to amaze and satisfy the owners.

Based on the interview results, there are three main points for CM consultant to perform this service. First, creativity can be implemented in the management of the project such as making priorities over which work should be done first. Second, creativity can also be implemented in their method for supervising the construction process such as improving the effectiveness of CM consultant's supervising. Third, CM consultant can also be creative in solving the problem in construction without changing the design and increasing the cost. Fourth, creativity is also limited in change of the design, but if they get approval from the designer then it should be fine. —Thuscreativity is allowed, but should not violate the contract and the agreement" (v0050). Fifth, creativity can be improved by sharing knowledge and experience between staff. For example, the knowledge of solving the problem or increasing the effectiveness and efficiency of the project.

5.2.8 The CM Consultant Proactively Develops Various Solutions when Problems Occur

Being proactive and trying to develop various solutions is very important service to be provided by CM consultant. The reason is that in making the decision, owner needs to choose from several options such as which one is the best and the cheapest solution. Developing various solutions is very important to help the owner analyze and make decision. In addition, it can help to expedite the construction process. The reason is that proactively developed solution can reduce the time needed in waiting for the solution from the designer. In general, the problem that was sent to designer may take time to get the solution. —If CM consultant can develop a fast solution after the problem occurs, there may be no need to wait for the solution from the designer" (v0001). In addition, it is suitable for CM consultant to be proactive and develop various solutions because CM consultant is the expert in construction. Moreover, CM consultant's experience supported them to create various solutions for owner to decide.

Owners perceived that CM consultant still needs to improve this service. —CM consultant in Indonesia should hold more responsibility and try to propose solutions" (v0047). For better service quality, CM consultant should have the courage to give solutions. The reason is that owners expect the CM consultant can help them by

giving reliable solutions. It will be better rather than just sends the problem to designer.

Meanwhile, the interview results show several key points for CM consultant when being proactive in developing various solutions. First, the solution that CM consultant tries to develop should not affect completion date of the project, low cost and has good quality. "They need to consider that the time is not delayed, the quality is still good, the cost is reasonable and it is safe to be constructed" (v0060). Second, CM consultant should at least propose two solutions because owner wants to see and choose which solution is the best for their project. "To create various solutions for each problem is much preferable" (v0007). In addition, it should be noted that the solution from CM consultant should act just as an input, needs to be evaluated and verified by the designer before can be chosen by the owner. In addition, if it is concerning the structural matters then it needs consultation with designer.

5.3 Awareness of the Project's Status and Information (F3)

This section analyzes and summarizes the owners' interviews. Each section was analyzed from interviewing the owners based on previous three main questions. Each section consists of three paragraphs which were organized based on the three main questions. This factor consists of three service quality items which are separated into three sections. This factor is related to the effort of CM consultant to be always aware of the project's status and information. The effort of being aware about the project's status can be seen from "The CM consultant is able to implement and watch over the contract between owner and contractor that has already been agreed between owner and contractor"; and "The CM consultant is able to anticipate the problem before it happens in the project". In addition, the effort of being aware about the project's information can be seen from "The CM consultant is able to maintain owner's project information confidentially". These three items can be seen in figure 5.3 below.

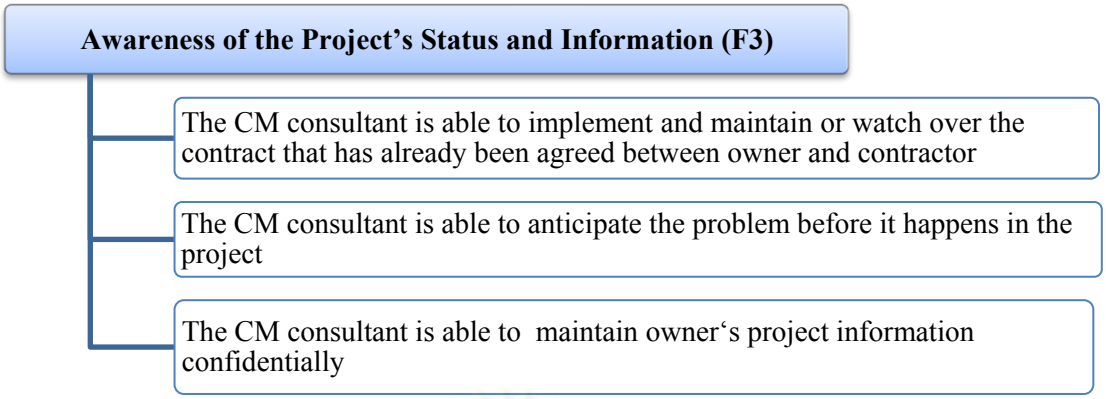


Figure 5.3 List of items in factor 3

5.3.1 The CM Consultant is Able to Implement and Maintain or Watch Over the Contract that has already been Agreed between Owner and Contractor

Based on owners' interviews, this service is important to the owner. The main reason is that owner might not be expert and familiar with the construction's type contract. Owner's lack of expertise in construction can be seen especially in the condition of the owner being in garment or food business and wanting to erect a building. CM consultant should provide the owner with the contract and explain the details of the contract. CM consultant that owner hired needs to help owner about this (v0013). Watching over the contract should starts from the drawing, specification, working method and volume bill of quantity (v0021). Thus, the owner and the project can gain several benefits for implementing this service such as owner can finished their project exactly as has been agreed in the contract.

The current practice in Indonesia is CM consultant thinks and concerns owner more than the contractor. This condition happens because contractor has a behavior of violating the contract such as late completion time, which is very common in Indonesian construction projects (v0060).Moreover, it is because CM consultant is being paid by the owner, thus most of CM consultants always defend owner and put pressure on the contractor (v0012).

Based on the interview results, there are five main points for CM consultant to perform this service. First, be professional in watching over the contract. CM consultant should not take sides with owner or contractor and should treat both of them equally as in the contract. Second, CM consultant needs to understand the

contract because CM consultant needs to implement the contract into the construction. Third, CM consultant needs to be smart in order for them to judge whether contractor is right or wrong based on the contract. Fourth, CM consultant needs to be bold and honest to admonish the contractor if they do something wrong. ―When the contractor did something wrong or there is a material that is not according to the agreed specification, then CM consultant has to admonish" (v0057). The fifth and last point, CM consultant should be accurate in collecting the data of records of the project. The reason is that this data will be used by quantity surveyor (QS) to warn the violator or to calculate the cost of violation. The responsibility of QS is just calculating the cost implication of contract's violation. However, CM consultant is responsible for the records as the evidence of contract's violation. In situation of contract being violated, CM consultant's job is to record the acts of breaking the contract that was done by the contractor or the owner.

5.3.2 The CM Consultant is Able to Anticipate the Problem Before it Happens in the Project

The research describes this service as important to be provided by CM consultant due to several reasons. First, owner and designer might make a mistake in the design. Owner and designer might make a mistake that they cannot realize until it happens or fails in the construction. Therefore, it is necessary and essential for the CM consultant to screen and evaluate the design to see whether it has some wrong drawing or it has some inapplicable design. Second, contractor might make a mistake in the construction process. Contractor might forget to check something during the construction process. Contractor might make a mistake of using the wrong material. Therefore, CM consultant should check the correctness of contractor's work before the contractor proceeds to the next work. For example, CM consultant should check the amount of steel placed in the column and the diameter of it before pouring the concrete.

The research found several shortages in the implementation of this service. Many owners claimed that CM consultant in Indonesia still needs to improve their capability in anticipating of the problem before it happens in the project. In most cases, lots of problems happened without any chance or attempt to anticipate it from the beginning. The first and most common problem is the uncovered work which does

not have any party responsible to do the work. It especially happens when the project uses the package system in dividing the works in the construction. The current practice shows often mistakes in planning several work items that eventually are not included in any work package. For example, the package system divides the work of door, window and wall into two different sub-contractors. However, between the door or window and the wall, there is also a work for sealant which connects both of them. This work of sealant is considered to be the "gray area" which needs attention by the CM consultant. The current practice shows the plan may miss to assign any sub-contractor to do the work of sealant. As a consequence, the work of sealant becomes an additional work which causes more cost. The second common problem that occurs in many projects is the inapplicable drawing from the designer. The inapplicable drawing happens because there is a mistake in the composite drawing. In most cases, there is a mistake between the structural drawing and the mechanical & electrical drawing or with the architectural drawing. For example, designer may make a mistake in the drawing of underground parking area construction. The beam has many different height specifications which might collide with the Mechanical & Electrical components (M&E). This wrong construction may need to be righted and also causes additional cost to the owner.

In addition, the research found several key points of anticipating the problem based on the owners' perception. First, properly check the drawing as to whether it has correct relation between the architecture, the structure and the mechanical & electrical components. The CM consultant should have an engineering team that is capable interpreting and checking the composite drawing. Second, CM consultant should be able to remind or give warning before contractor does something wrong in the process of construction. CM consultant should understand the sequence of the construction and think further than the contractor. That way CM consultant can realize if a problem is going to happen and be able to anticipate it.

5.3.3 The CM Consultant is Able to Maintain Owner's Project Information Confidentially

It is important to keep owner information confidentially. Based on owners' interviews, there are three main reasons for this service to be considered important. First, because owners are afraid of their competitor copying their project. For

example, the design, specification, drawing and work method can be copied by another project. Second, because owners are afraid the information can be used for bad purpose such as fraud. For example in the bank construction, it is very necessary to keep the project information confidential such as the location of safety box room. Third, because owners are afraid another party might take advantages from the information. For example, in the case if the suppliers know the budget information of the project, supplier might hold the price and make it more difficult for the owner to bargain.

However, the current practice in Indonesia shows two main limitations in the implementation of this service. First, it depends on what information owner wants to be classified and to whom it needs to be classified. Sometimes owner also wants their information to come out. For example during the tendering process, if the information of the cost bid comes out then contractors may compete with each other and try to lower their price (v0045). This is an example of benefit from spreading out project‘s information. Second, what CM consultant knows depends on the involvement of CM consultant in the project. It depends on the scope that owner hires CM consultant. If owner hires CM consultant from the beginning and involved them as a QS, then CM consultant may know the price. Therefore, it is very important for CM consultant to keep it secret. ―However, if the owner hires CM consultant only for supervision, then CM consultant may not know any information about the price. It means there is nothing to be kept secret by CM consultant” (v0027).

Based on the interview results, there are several key points for CM consultant to keep the owner‘s project information confidential. CM consultant needs to keep confidential the drawing, the design, the specification and the cost of the project which is the most important secret to be kept. The other information is the accident record which should not be exposed too much (v0015). In summary, everything which is related to the project, should not be published outside without any permission from the owner.

5.4 Communication & Coordination of the Project (F4)

This section analyzes and summarizes the findings from the owners‘ interviews. Each section was analyzed from owners‘ interviews based on previous

three main questions. Each section consists of three paragraphs which were organized based on the three main questions. This factor 4 consists of five service quality items which were separated into five sections. This factor is related to the effort of CM consultant to maintain good communication with the owner and to coordinate the project. The effort to maintain good communication can be seen from "The CM consultant promptly responds to owner's requests, queries and complaints"; "The CM consultant properly provides regular dialogue on progress of the project"; and "The staff are accessible and could be reached easily by owner". The effort to coordinate the project can be seen from "The CM consultant is able to cooperate and coordinate with the other parties in construction (i.e. owner, contractor, sub-contractor and other consultants)"; and "The CM consultant is able to provide good control for quality of materials and workmanship". These five items can be seen in figure 5.4 below.

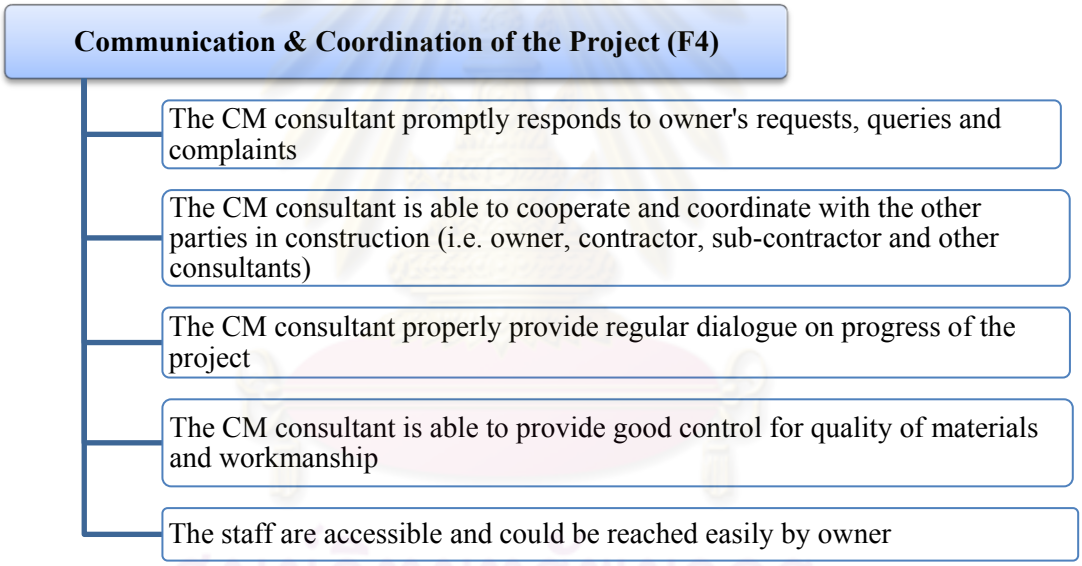


Figure 5.4 List of items in factor 4

5.4.1 The CM Consultant Promptly Responds to Owner's Requests, Queries and Complaints

The main reason that this service considered important is because if owner's queries or request is not responded immediately then owner cannot make decision. It may result in the delay of the project. Similarly in the condition of contractor have queries or questions, if CM consultant has a slow response it can cause the delay for the project. Contractor may wait for the instruction or decision to do their work. Contractor does not want to do something without explicit instruction, otherwise if

something goes wrong they may get blamed" (v0035). CM consultant should give their best service by responding to the queries, questions and complaints immediately, because time is essential in the construction project.

However in Indonesia, the responsiveness of CM consultant in handling the request, queries and complaints can still be improved. "Most of the time, CM consultant sends the queries or complaints to the designer or to the contractor" (v0009). This action resulted in waiting time for the answer which takes at least 3 days depends on the situation (v0018). This behavior of always sending letter to the designer or contractor has makes many owners disappointed with the service performance of CM consultant nowadays. Therefore, it will be better if CM consultant can improve their responsiveness.

The research also concluded two main points that need to be considered in implementing this service. First, CM consultant as the leader of the project in construction should be able to answer several questions that are not deeply related to structural or technical issues. Second, if CM consultant is unable to answer because the queries or complaints deeply concern the technical or structural issues then CM consultant should immediately send it to the corresponding party such as the designer or the contractor. In summary, CM consultant should first evaluate and give their analysis before sending the queries or complaints or problems to the other party, (v0039).

5.4.2 The CM Consultant is Able to Cooperate and Coordinate with the Other Parties in Construction (i.e. Owner, Contractor, sub-Contractor and other Consultants)

Based on owners' interviews, there are two main reasons for this service to be considered important. First, because construction involves lots of project participants such as contractors and sub-contractors. Thus, CM consultant as owner's representative needs to manage all parties in construction to work together simultaneously. "In the big size project, the project can involve up to 50 sub-contractors companies. Even in the finishing process, it takes more sub-contractor to do it" (V0033). It is CM consultant's responsibility to coordinate and manage all of them to work together simultaneously. Second, because the complexity situation of

the construction project. Some project may do both construction and operational at the same time. Building that is already finished starts to go operational while other building is still under construction. Therefore, CM consultant should be able to manage contractor to do their work without disturbing the tenants. Meanwhile, the schedule of the construction should not be delayed. Owner needs CM consultant to work really well coordinating and leading the project.

However, the current practice in Indonesia shows limitations in the implementation of this service. CM consultant still needs to improve their capability in coordinating and especially in pushing the contractor. ―CM consultant should able to give a warning and capable in pushing the contractor" (v0039). This might be difficult because contractor listens more to the owner. This situation can happen because owner is the one who pay the contractor.

Based on the interview results, there are two main points for CM consultant to perform this service. First, CM consultant should not only work together with other parties but also give guidance and lead the project. In addition, CM consultant needs to be perceptive in looking at the performance of contractor and sub-contractors whether their work is progressive or not. In case of contractor not being cooperative and not progressive, CM consultant can give advice to the owner whether it should change them or not. Second, this cooperation and coordination should be implemented in the professional way. ―Because it sometimes happens that CM consultant asking money from contractor" (v0070).

5.4.3 The CM Consultant Properly Provides Regular Dialogue on Progress of the Project

There are two main reasons why properly providing regular dialogue on progress of the project is important. First, owner needs to monitor the progress of their project regularly to check the accurateness of the project whether it is exactly as owner wants or not. Since owner cannot monitor the project every day due to their business activity, dialogue regarding progress of the project needs to be conducted regularly. Second, it can avoid missing communication between owner and CM consultant. CM consultant need to constantly inform owner about situation of the project especially if there is a problem because owner has to look into it and make a

decision. —Without proper dialogue communication, there can be a misunderstanding and misleading information" (v0032). Lack of dialogue communication can gives negative effect to the progressiveness of the project.

The current practice is if owner asks and tries to communicate, then CM consultant reacts and gives information. However, if owner does not ask anything then CM consultant may not give any information or try to communicate. Another practice is that owner knows more about the condition and situation of the project than the CM consultant. It is because owners nowadays have their own small team or staff that helps owner to monitor the situation and condition of the project. This condition is up-side down; CM consultant needs to know the condition of the project more than the owner.

To cover the lack of communication, the research found the first thing to do is that meeting for all staff needs to be conducted every week. —This meeting that involves all parties in the construction needs to be at least once per week" (v0024). In addition, regular dialogue or communication between owner and CM consultant should not be limited only in the weekly meeting. In some project, owner has their own staff that works in the construction site. In that case, the second point is to communicate with the owner in the daily activity every day. —CM consultant at least has to inform about something that might be important related to the project, which can be done by informal dialogue when passing by owner in the site" (v0018). In addition, the third point is to keep everyone inside the CM consultant updated with all information and current conditions of the project. —Within CM consultant, it is necessary to have at least two times internal meetings per week" (v0060). It can reduce the possibility of missing information within the consultant itself.

5.4.4 The CM Consultant is Able to Provide Good Control for Quality of Material and Workmanship

The research found two main reasons why providing good control of quality of material and workmanship is important. First, owners always have their interest in having a good quality workmanship from the result of their project as the first priority. —Owner really cares and pays attention about the quality of the result. The most important thing and the first priority is quality." (v0004). Second, famous and

big contractor company does not guarantee the result of their work will always be good quality. Sometimes the personnel might be new recruits that may not have enough experience and skills. Therefore, CM consultant role is to check and guide the contractor to do it correctly.

In many cases in Indonesia, CM consultant needs to improve their accuracy in controlling the quality of workmanship. ―The performance of this service is still not optimal" (v0067). Lack of workmanship quality can be seen in some cases such as wavy wall, not straight column and uneven painting. This is happens because the lack of competence from the contractor's labor. However, this lack of competence from labor is common in Indonesia. In developing country, most laborer lacks education and training, which may affect their performance. Therefore, CM consultant owner need CM consultant to really control the quality of the construction.

The first important point to consider in implementing this service is to supervise and check the project accordingly with the standard operational procedure (SOP) that the company proposed to owner previously in the beginning of the project. ―CM consultant already has their own SOP which they can do based on that" (v0067). The second point for CM consultant is to have a checklist form in supervising and checking the project. ―CM consultant needs to supervise the quality and amount of the material" (v0026). For example, CM consultant needs to supervise the quality of the material such as the steel, the amount of the steel and the condition of the steel. In checking the quality of work, not all of them can be done just by visual inspection. In some cases such as the strength of the concrete, it needs to be checked in the special lab that can properly check it.

5.4.5 The Staff are Accessible and Could be Reached Easily by the Owner

Based on the interview results, the research found that this service is important because owner does not directly manage and lead the project in the construction. CM consultant is the party that was appointed by the owner to manage and lead the project in the construction site. In addition, owner as the party that owned the project might have some queries or questions related to the current project's condition. Owner might also have some instruction or information that need to be discussed with the CM consultant immediately such as some modification to the materials; or

modification to the design; or instruction to halt the project. All of these situations lead to the necessity for the staff of CM consultant for being accessible and could be reached easily by the owner of the project.

Based on the owners‘ perception from the interviews, this service of CM consultant is considered already well implemented. It is because several staff of CM consultant always stay and sleep every day on the construction site. However, this satisfying condition cannot be counted generally to all CM consultants in Indonesia. Some of the owners claimed that some staff from CM consultant are often absent from their duty, some of them come late to the construction site and some of them even arrive in the afternoon.

Furthermore, based on the owner‘s perception, the research found how CM consultant should perform this service. First, the project manager of CM consultant is the right staff that should be accessible and could be reached easily by the owner. Second, the staff of CM consultant should provide themselves with telecommunication devices. Most owners claimed that it is really essential for all staff to have at least a cell phone. Some of them even recommends for the project manager to have a blackberry. Blackberry was considered to be necessary because of its capability in modifying the e-mail into phone message and sending it directly to the phone. It can be very useful to communicate with the owner using e-mail because many times owner might have some business overseas.

5.5 Progressiveness (F5)

This section analyzes and summarizes the findings from the owners‘ interviews. Each section was analyzed from owners‘ interviews based on previous three main questions. Each section consists of three paragraphs which were organized based on the three main questions. This factor 5 consists of two service quality items which are separated into two sections. This factor is related to the effort of CM consultant to be progressive in performing the service. This progressiveness can be seen from CM consultant‘s effort in completing the project within the scheduled dates and showing initiative in performing the service. These two items can be seen in figure 5.5 below.

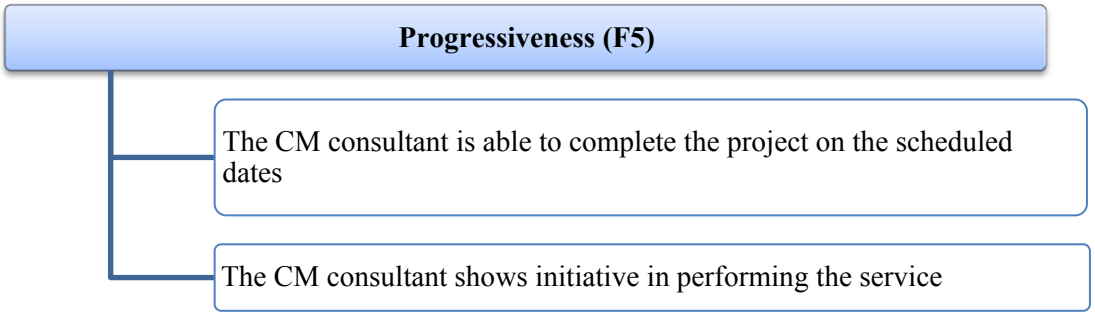


Figure 5.5 List of items in factor 5

5.5.1 The CM Consultant is Able to Complete the Project Within the Scheduled Dates

Completing the project within the scheduled dates is very important. The reason is that owner may needs to use the building as soon as it is finished. "Owners of the building already have their business plans according to the completion date of the building" (v0060). For example, the owner of the shopping mall demands the project finishes exactly on time. The reason is that the owner needs to sell their goods and needs to stock the shop as soon as possible. If the project completion date was delayed, owner of the shop has to stock goods in another place. "Stocking the goods in another place such as warehouse may make extra cost for them, which later on they can sue the project's owner due to violating the contract" (v0024). Similar reason can be applied if the project is an office tower. The owner of the office tower needs to use their office because they need the office to start their business activity as soon as possible. Finishing the project within the scheduled dates is one of the most important things to be done by CM consultant. The project need to be finished based on which dates was written in the contract. CM consultant as the party that lead and manage the project should be able to do it. "It is the responsibility of CM consultant as the party that leading and managing the project to finish it on the scheduled dates" (v0005).

However, the interview results showed that to finish the project within the scheduled dates does not entirely depend on CM consultant, but it also depends on the owner. If owner makes any modification or increases an additional work, it may increase the time needed to complete the work and make it more difficult to complete the project within the scheduled dates. "There are lots of changes from the owner itself in the middle of the construction" (v0012). In that case, CM consultant needs to

make adjustment to the project‘s schedule. Therefore, owners themselves need to be aware that they also have participation in the succession of the project finish on the scheduled dates.

In order to finish the project within the scheduled dates, the first important thing for CM consultant to do is to make a good plan and schedule that covers the entire work package and is reasonable to be done. ―CM consultant needs to make really good composite master schedule” (V0018). The second point is in case of any delays in the middle of construction, CM consultant was expected to be able to push the contractor to speed up their progress and make their work more efficient. ―CM consultant needs to supervise and give guidance to the contractor during the construction to make the project run quickly and smoothly” (v0009). Guidance from the CM consultant company gives benefit in accelerating the progress of the project‘s construction. Furthermore the third point, CM consultant is able to see the symptoms if the project seems to be late or may have a delay. ―If they can foresee the future progress of the project, it can help them to modify and adjust the current progress to pace up with the schedule” (v0013). In addition, they can also give an early warning to the contractor to speed up their working performance. Another effort that CM can add to finish the project within the scheduled dates is to make value engineering regarding the working method or the management procedure that can make the work more effective and efficient.

5.5.2 The CM Consultant Shows Initiative in Performing the Service

The interview results demonstrate the importance of showing initiative in performing the service. The main reason is that initiative affects the progressiveness of the project. As it was claimed by several owners, initiative performance of CM consultant as the leader of the project can increase the progressiveness of the project. In addition, progressiveness affects the duration needed to finish the project. ―Initiative performance of CM consultant affects the smoothness of the process of constructing the project” (v0009).

The research found that the implementation of initiative in performing the service is still need to be improved. The improvement should be conducted in several forms such as initiative in anticipating the problem; initiative in developing a solution;

and initiative in making a decision. First, initiative in anticipating the problem. It occurred such as in the condition of CM consultant see something in the project is not right and should give warning to prevent it become a bigger problem. Second, initiative in developing a solution. It occurred such as in the condition there is a problem and CM consultant should show any initiative to develop any solution. Instead of just send the problem directly to the designer. Third, initiative in making the decision. The current practice shows CM consultant needs to show initiative in making immediate decision especially if the condition is a small problem that does not involve the design or any additional cost. "If CM consultant cannot show any initiative to make decision without owner then their attendance and involvement in the project become useless" (v0059). In summary, CM consultant needs to improve their initiative in performing their service. The improvement may have several positive affects to the project such as lower cost and no time delay.

In addition, the interview results show several guidelines for initiative in performing the service. It should not be conducted without referring to the standard operational procedure. For example, initiative solving the problem depends on the type of the problem. If the problem is related to the design and structure then the problem should be handled by the designer. As a another example, initiative making decision depend on whether the issue it is related to cost or design. If related to the cost then it needs the involvement of owner in making the decision and if related to the design then it needs the involvement of designer.

5.6 Competence (F6)

This section analyzes and summarizes the findings from the owners' interviews. Each section was analyzed from owners' interviews based on previous three main questions. Each section consists of three paragraphs which were organized based on the three main questions. This factor 6 consists of three service quality items which were separated into three sections. This factor is related to the competence of CM consultant in performing their service. It is related mostly to "The staff has good academic knowledge, is experience and is able to give valid contribution". In addition, the competence of CM consultant should also be supported with "The CM consultant has high accuracy, detail and completeness of the records" and "The CM

consultant has good and sufficient track record in similar project". These three items can be seen in figure 5.6 below.

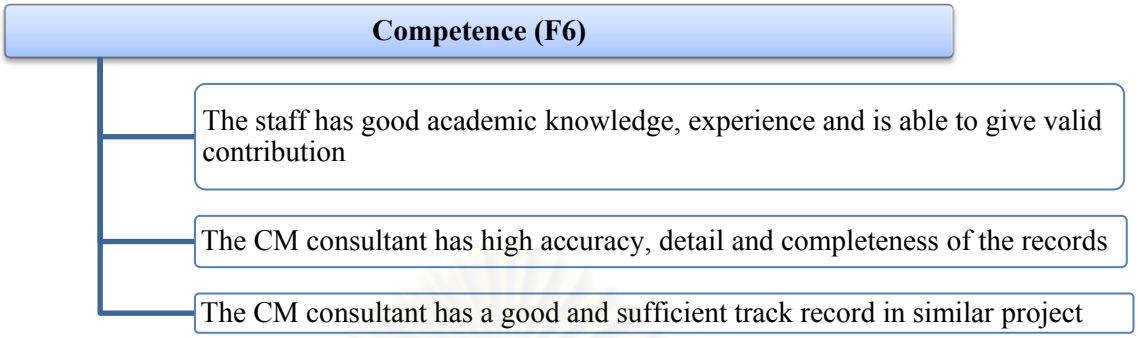


Figure 5.6 List of items in factor 6

5.6.1 The Staff has Good Academic Knowledge, Experience and is Able to Give Valid Contributions

There are several reasons for this service to be considered important. First, academic knowledge and experience play a very important role that affects the service quality of a CM consultant. To be a CM consultant is not as easy as in another discipline1 which new staff can do the job just by following the standard operational procedure (SOP). ―To be a good CM consultant needs specific individual skills in construction management discipline and supported by good knowledge and experience. It is not enough for some staff to just follow SOP and be a CM consultant" (v0012). Knowledge and experience affects the service quality performed by the staff. For example, the capability to manage the project and be able to solve the problem depends on the experience of the staff. Second, CM consultant needs to be smarter and more expert than contractor in order to manage and supervise the contractor. ―If the knowledge and experience of CM consultant is lower than contractor, then CM consultant may not be capable of controlling the contractor" (v0045). Therefore, owner perceived that choosing the staff of CM consultant based on their knowledge and experience is very important.

The current practice shows that this knowledge and experience of CM consultant's staff is still need to be improved. For example, even though the CM consultant is a big and famous company, not all of their staff are good and have the same level of quality. The current practice shows that some staff may be good and

others may be not. This means that the quality between the staff is not on the same level. In other words, there is an imbalance quality level among the CM consultant‘s staff. The academic knowledge level among the staff can be different. For example, some staff can be a university graduates but the others only college graduates. In addition, most of them were fresh graduates which mean they still need to improve their experience. It can be concluded that CM consultant‘s staff may not be more expert than the contractor. This becomes a limitation in CM consultant‘s staff being able to manage and supervise the contractor. In addition, most CM consultants just rely on the quality of their project manager. However, it is not enough if only the project manager has good quality and the other staffs are not. Because project manager also has some limitations such as he or she cannot control everything by him or herself without help from the staff.

Based on the interview results, knowledge of a CM consultant‘s staff should cover the understanding of material, drawing, work method and basic calculation. In addition, understanding the construction regulation and everything about working permit that is related to the government‘s permit is also considered to be important. Furthermore, the experience of a CM consultant‘s staff should cover the knowledge of common problems in construction and capability to solve it. It is necessary for a CM consultant to have an experience in the same field of building construction rather than in another type of project. In addition, the experience needed to be a good CM consultant are varies depending on the position. For a project manager, it is suggested to have experience 7 to 12 years and for a supervisor 2 to 6 years.

5.6.2 The CM Consultant has High Accuracy, Detail and Completeness of the Records

According to the interview results, this service is important to be provided by CM consultant. The reason is that reports and records are the tools for owner to evaluate and analyze the process of the project. Owner can use the reports and records from CM consultant to check the progress of the project. In addition, owner may also use it to analyze the problem in the construction. Second, these reports and records can act as proof or evidence when there is any dispute with the contractor. All activities, changes and additional works should be recorded in the report documents. Therefore, later on if something happens then owner can track back and cross check

it. At the time dispute occurs, QS may check these reports and records to identify the source of problem. They try to analyze whether the problem comes from the owner or from the contractor. ―The records that are provided by the CM consultant should be very high quality. When there is a change about the project whether in the drawing or in the site it needs to be recorded" (v0007). Third, these records can be used as their reference to check the as-built drawing. This as-built drawing needs to be exactly the same as the real specification and the design applied in the construction.

From the result of interview, it can be concluded that most CM consultant companies did very well in performing this service. ―CM consultant is already expert in documenting, reporting and recording the progress of the construction" (v0024). Their documentation, reporting and recording of the construction process are well organized and quite accurate. ―Average CM in Indonesia is already good enough in this one" (v0056).

The research found several key points in performing this service. First, CM consultant should has to record the project's activity using the checklist form and later on make the report of all activities each day. The format of the checklist should consists of the detail of the work and its progress. Second, CM consultant should make daily report, monthly report and photo recording. In summary, CM consultant need to record all processes and every modification including the specification changes and other activities related to the construction project. ―CM consultant should record the history of the activity within the project every day" (v0012).

5.6.3 The CM consultant has Good and Sufficient Track Record in Similar Project

Interpretation of the interview results can offer several reasons as to how important this service be provided by CM consultant is. Good and sufficient track record in similar project is considered to be important because the complexity and the coordination needed are different. For example, the complexity of the housing project surely is different from the building project in many aspects. In housing project, it focuses more on the land development rather than the complexity of constructing the building. Second, track record in similar project may support the CM consultant to deliver better service quality. It is relevant because CM consultant does not have the

experience in the similar project. Therefore, it means their service performance may as a trial and error. This trial and error service performance may not be a good method and it may lead to the occurrence of several problems.

In addition, the results also show the current practice of this service in Indonesia. It shows that currently, many CM consultants may already have experience in the building construction project. However, the staff of the CM consultant often changes from time to time. These staff may not have the same experience as the company track record shows. In addition, one of respondents also supports the previous statement. ―Currently, lots of CM consultant company staff are fresh graduate" (v0037).

Furthermore, the interview results show several key points in performing this service. It was concluded that the level of experience or track record of the CM consultant should be in accordance with the current project. In addition, the level of experience or track record in building construction project can be separated into four different levels. First, the most difficult building construction project is the hospital construction project. It is the most difficult because it requires rooms for many different purposes and has many different specifications. Next, hotel is the second most difficult construction project. It is considered as the second because its required high quality workmanship. Furthermore, apartment is the third most difficult construction project. Finally, shopping mall or office tower are the fourth and the less difficult construction project. It is considered the last because of its simpler building structure and many typical rooms.

5.7 Professionalism of Service (F7)

This section analyzes and summarizes the findings from the owners' interviews. Each section was analyzed from owners' interviews based on previous three main questions. Each section consists of three paragraphs which were organized based on the three main questions. This factor 7 consists of four service quality items which are separated into four sections. This factor is related to the CM consultant in their effort to perform service professionally to the owner. It is related to ―The CM consultant builds up trust and honesty in the working relationship" and ―The CM consultant is able to use and understand the tools for QC, in order for them to check it

properly". In addition, this professionalism of CM consultant is also related to the CM consultant performing service professionally for the project. It is related to "The CM consultant informs the owner immediately about any sudden and urgent situation related to the project" and "The CM consultant is able to complete the project within the agreed budget". These four items can be seen in figure 5.7 below.

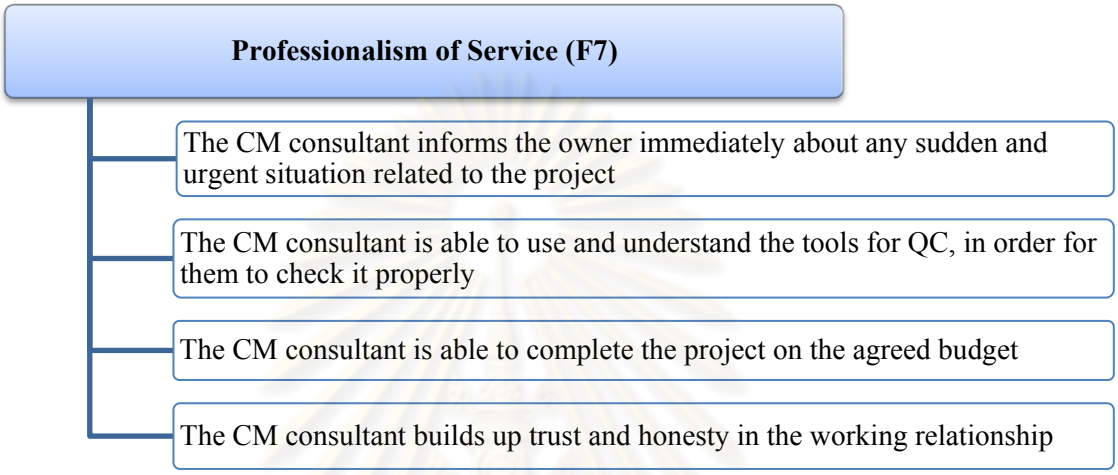


Figure 5.7 List of items in factor 7

5.7.1 The CM Consultant Informs the Owner Immediately About Any Sudden and Urgent Situation Related to the Project

Sudden and urgent situation can happen unexpectedly in the project. Informing owner immediately is the main priority in the case of sudden and urgent situation. The reason is that owner needs to make immediate decision regarding the situation. "If CM consultant is late in informing the owner then at the time owner knows it may be too late to handle the situation properly" (v0070). Informing owner as soon as possible may give owner more time to choose the best solution to handle it properly. In addition, one of respondents mention that this service is important because it is related to work coordination of the construction project (v0055). Aside from the importance in informing the owner immediately, the emergence of sudden and urgent situation means that the planning conducted by CM consultant was not properly planned. "CM consultant needs to be more careful in planning the project to avoid any of this sudden and urgent situation" (v0047).

The current practice of informing owner immediately about sudden and urgent situation still has some limitations. First, CM consultant initiative and response to

immediately inform the owner still needs to be improved. The owners mention that sometimes they can know the situation even before CM consultant informs the owner. In addition, CM consultant often knows the problem after its get really worse and difficult to handle. Second, CM consultant informs the project‘s situation in the weekly meeting. The owners mentioned that this may consume more time to handle the situation. The reason is that CM consultant did not inform it immediately (v0067).

In fact, informing owner immediately should be very easy. Technology these days gives the advantage to communicate whenever we need it. ―Many types of technology can be used to inform owner immediately such as cell phone and email” (v0050). However, in many cases owner can know it the same time when CM consultant knows. Therefore, only informing the owner is not enough. It may be better if CM consultant can try to solve the problem without affecting the cost and reducing the quality. In addition, if the problem is affecting the cost then CM consultant should not make any decision and wait for the owner to make decision. Depending on each case of the problem, if the problem concerns the structural strength, then the solution should comes from the designer. Apart from giving the problem to designer to solve, CM consultant should do initial analysis and evaluation to help designer make the best solution. In summary, CM consultant needs to evaluate and react according to the condition of each problem.

5.7.2 The CM Consultant is Able to Use and Understand the Tools for QC, In Order for Them to Check It Properly

The research found two main reasons for this service to be considered important from owners‘ perception. First, CM consultant is more familiar with the tools and equipment for the construction rather than the owner. CM consultant was considered to be more familiar and has more information with the latest technology of the equipment or tools for quality control (QC). Second, if CM consultant does not understand how to use the tools then they may not qualify enough to check the process of the QC. ―CM consultant should know how to use it so they can know whether the QC was correctly applied or not” (v0047).

The research found the current practice of this service is that CM consultant understands the tools for QC but limited to the traditional tools. It was mentioned by

several owners that CM consultant understands the concept of tools for QC such as theodolite, ruler, meter and water pass. However, CM consultant may needs to improve their knowledge about the latest technology of tools and methods for QC such as the laser level, the digital concrete test hammer, x-rays and ultrasonic testing. Laser level is an advanced tool that allows for checking the leveling of the construction project by projecting a laser line onto a surface. Another example is the digital concrete test hammer which is an automated system for estimating concrete compressive strength. It works based on the rebound impact of the hammer against the surface of the concrete; the greater resistance of the concrete, the greater the rebound impact. In addition, there are also X-rays and ultrasonic testing to check the inside of a sample by penetrating electromagnetic radiation.

In accordance with the previous paragraph, the interview results show main suggestion for performing this service. First, CM consultant should have more knowledge about the modern tools for QC. Second, CM consultant should understand the concept of the tools and how to use them in the project. This is very important because tools for QC may be developed from time to time with more advanced technology which allows the QC process to become quicker, easier and give more accurate test results.

5.7.3 The CM consultant is Able to Complete the Project Within the Agreed Budget

The research found that this service is important to be provided by CM consultant. The reason is that owner may have limited source of budget for the project (v0050). Furthermore, in the middle of the project owner may have several modifications and upgrades. Therefore, it is considered beneficial to reduce any unnecessary cost which can be allocated to improve the project‘s quality. Reducing unnecessary cost can be conducted starts from preventing the re-work and repair. ―Therefore, owner can save the money and use it for upgrading the project rather than for additional cost of re-work or repair” (v0039). In addition, role of CM consultant as the party that leads and manages the project is very suitable to prevent the project from any mistake or wrong construction. ―CM consultant is considered to be partly responsible in completing the project within the agreed budget with notes if there‘s no modification from the owner” (v0005).

Current practice in Indonesia shows that several owners did not include the CM consultant in managing the budget or cost of the project. Whether CM consultant is involved in managing the budget or cost of the project depends entirely on the owner's decision. "Some owners manage the project's budget by themselves or hire another party such as quantity surveyor" (v0036). However, it does not mean CM consultant does not have any responsibility for completing the project on budget. In addition, the current practice shows that owner may have several modifications or upgrades in the middle of the project. "There can be changes such as additional work or reduction work which can change the budget" (v0012).

Based on the interview results, there are several ways for CM consultant to finish the project within budget. First, CM consultant should be more aware and extra careful in evaluating the distribution of the work package for the project. The reason is that sometimes there are works that still not covered. "Works that are not covered by any party in the contract becomes an additional work which may cost more than it should" (v0050). Second, CM consultant should do value engineering of the design or the working method in order to improve the process of the project to be more efficient. "Even though CM consultant does not have the authority to change the design or budget, but CM consultant can give suggestion or advice. They are suitable to do it because of their direct involvement in managing the project on site" (v0005). In addition, owners may make several modifications or material changes. Therefore, CM consultant should evaluate and help owner to make the best decision in terms of quality and cost. Third, CM consultant may also contribute in finishing the project within budget by being more careful and detailed in managing and supervising the project. The intention of being more careful and detailed is to prevent any problem from happening in the project. Anticipating problem before it happens can help to reduce the additional work.

5.7.4 The CM Consultant Builds Up Trust and Honesty in the Working Relationship

Based on owners' interviews, there are two main reasons for this service to be considered important. First, owner needs to be sure that CM consultant that they hired can be trusted and does not take any inappropriate advantage from owner. In order to be sure, owner may interview the project director of CM consultant. One respondents

mention that he directly interviews the project director of CM consultant. It is necessary to see the willingness of the project director in preventing his staff from cheating. In addition, if the project director‘s answer is biased or unsure then it may be better to not choose his company. If the project director can show his assertiveness and make us believe in him then it is fine (v0030). Second, owner cannot fully monitor the project for 24 hours a day. Therefore, owner needs to give the trust of supervising the project to CM consultant. This is reasonable because CM consultant leads the project as owner‘s representative. The good implementation of this service may help to avoid corruption between parties in the construction project.

However, the current practice in Indonesia shows three main limitations. First, Indonesian working culture does not support this service to be implemented correctly. ―Some of CM consultants in Indonesia still need to improve their honesty. However, it is difficult to control this situation” (v0047). Sometimes there are inappropriate cooperation between CM consultants and both contractor and supplier. For example, the suppliers offered the deal to CM consultant. If CM consultant can persuade the owner to choose their company then CM consultant may get additional bonus. ―That is why nowadays many owners choose and search for the supplier by themselves” (v0039). Based on owners‘ perception, it was concluded that it will be better if CM consultant can improve their honesty in performing the service.

In addition, there are three main key points for CM consultant to perform this service. First, CM consultant has to be honest and not accepting any bribe money. ―It is difficult to control honesty from the CM consultant. However, owner still hopes that all of them are honest” (v0057). Second, CM consultant should have high integrity. Third, CM consultant should not provoke the other parties to be corrupt or do illegal things.

5.8 Procedural Capability

This section analyzes and summarizes the findings from the owners‘ interviews. This factor 8 consists of one service quality item. This factor is related to the capability of CM consultant to perform service according to the procedure. This item can be seen in figure 5.8 below.

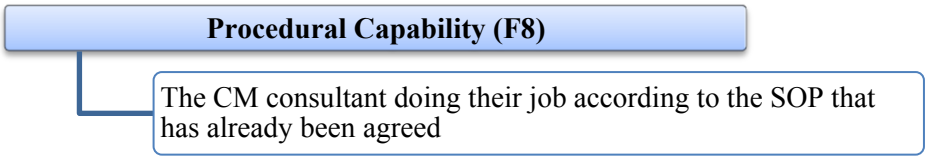


Figure 5.8 List of items in factor 8

5.8.1 The CM Consultant Does A Job According to the SOP that has already been Agreed

The interview results show the reason for CM consultant to does a job according to the standard operation procedure (SOP) that has already been agreed. It is because SOP is the guidance or rules for conducting the construction project which should has been agreed by all project participants. ―SOP is part of the system, is a procedure how the system should work" (v0042). In addition, the content of the SOP needs to be evaluated and agreed by all project participants. In summary, it is very important for all participants including CM consultant to follow the SOP and carry on their work based on it.

The current practice of this service is quite relative. The research found there are several CM consultants that doing their job exactly in line with the SOP and some of them did not. The current practice also shows several CM consultants have their SOP certified with ISO. The CM consultants that already have ISO may have more comprehensive SOP which has been tested by the surveying institution. The differences can be seen such as from the checklist form and SOP that are more complete and comprehensive. In addition, several CM consultants still need to improve their SOP. For example, sometimes they forgot to bring the checklist form when inspecting the construction and sometimes make changes without approval from the designer.

The research found several key points for performing this service. These suggestions were related to several other items such as the initiative. For example, in the situation of speed up the contractor's performance. CM consultant should show some initiative such as talking directly to them rather than just following SOP which is only sending letter. ―Written letter or notes is important as for legal things to prove later on, but in construction not enough just sending letters" (v0009). It can be

concluded that CM consultant should be strict and straightforward in leading the project. In addition, there are several crucial situations that CM consultant needs to follow the SOP directly. For example, CM consultant should discuss and get approval from the designer before trying to change the specifications or the materials.

5.9 Technical Capability

This section analyzes and summarizes the findings from the owners' interviews. Each section was analyzed from owners' interviews based on previous three main questions. Each section consists of three paragraphs which were organized based on the three main questions. This factor 9 consists of two service quality items which are separated into two sections. This factor is related to "The CM consultant is able to complete the project under its technical requirements/specification". Therefore, CM consultant may needs to have technical knowledge in case there is a material shortage. In addition, it needs to be supported with "The CM consultant uses computerized systems and software which are compatible with the owner". These two items can be seen in figure 5.9 below.

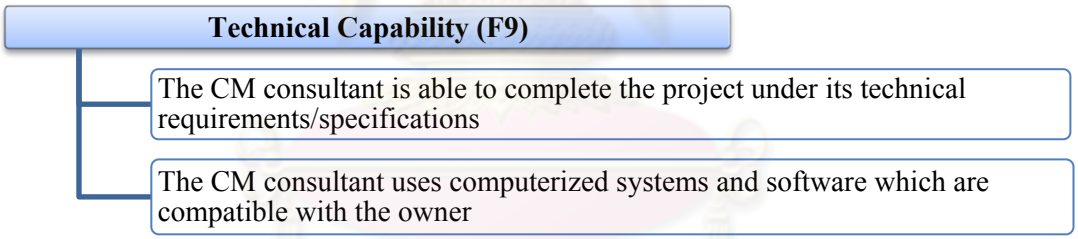


Figure 5.9 List of items in factor 9

5.9.1 The CM Consultant is Able to Complete the Project Under Its Technical Requirements/ Specifications

The main reason for owner hiring CM consultant is because owner cannot come and control the contractor every day. Therefore, owner trusts CM consultant as their representative in the construction site. "One of the most important things for owner hiring a CM consultant is for them to supervise the contractor to finish the project with the correct specifications" (v0010). CM consultant as owner's representative needs to protect owner's interest in the construction site. The reason is that many wrong things can happen in the construction. CM consultant need to does a

job professionally in terms of managing and supervising the project to finish with correct specification as in the contract.

In Indonesia, project specification may be changed because of owner's decision. "Many modifications whether it is an upgrade or reduction of the material quality or quantity can comes from owner" (v0015). The main reason is related to owner's financial condition or the material's condition. Owner financial condition can affect the modification of specification of the project. For example in case of owner have money problem, owner may try to reduce the quality of the project. The modification may not related to the structural design since it may affect the building's structural strength, but is mostly focused on the quality of finishing material such as ceramic, paint, lamp, etc. In addition, there are also some cases that the materials are unavailable. "Sometimes the material designed by the consultant is not available" (v0003). In that case CM consultant should evaluates and suggests another material with nearly or the same quality and price.

CM consultant has to check and supervise materials that are used in the construction. They should check whether the contractor is really using the correct material and whether the contractor is really installing the correct material. "There can be some cases when contractor tries to cheat by using different material which can be cheaper. In addition, contractor may try to reduce the quantity of the material" (v0012). For example, steel for reinforced concrete which is difficult to check. Contractor might try to reduce the size of the steel to get profit. It can also occur in the lamp installation. Normally, in the residential house each lamp needs two cables. However, on the high rise building or shopping center needs 3 cables for each lamp (i.e. positive, neutral and ground). The problem that occurs is sometimes contractor did not put in the ground cable. CM consultant should be able to control this and check it properly.

5.9.2 The CM Consultant Uses Computerized Systems and Software Both of Which are Compatible With the Owner

The research found that this service is important to be provided by CM consultant. The reason is that owner may not be familiar with the engineering program or software that is being used by CM consultant (v0042). It can cause

miscommunication with the owner. In addition, owner needs to know about their project‘s progress and status. Therefore, it is very important to use the program or software that owner can easy understand and does not make any miscommunication or misunderstanding.

The current practice of this item shows it was implemented well enough by the CM consultant. CM consultant uses common programs such as Microsoft project and Primavera for managing the project. It was considered to be useful because many owners are familiar with these programs (v0057). In addition, the research found that owner does not care very much or show concern about this service. It is because owner may have their own representative or engineer that can explain to them. Owner perceived that CM consultant able to carry out the project properly is more important to be considered rather than focusing on the compatibility of the program.

The research found several suggestions from owner for performing this service. It was concluded that based on owners‘ perception that it is very useful if CM consultant is able to put the data or progress of the project in the online database (v0042). Therefore, every project participants can open it anytime, anywhere and it is always up-to-date. In addition, it is necessary for the database can only be accessed by the project participants. Therefore, it may needs to be supported by a login system.

5.10 Problem Solving Capability

This section analyzes and summarizes the findings from the owners‘ interviews. Each section was analyzed from owners‘ interviews based on previous three main questions. Each section consists of three paragraphs which were organized based on the three main questions. This factor 10 consists of one service quality item. This problem solving capability is related to the capability of the staff in solving the problem in construction. Especially if the problem is small and not related to the cost or design of the construction (v0024). This item can be seen in figure 5.10 below.

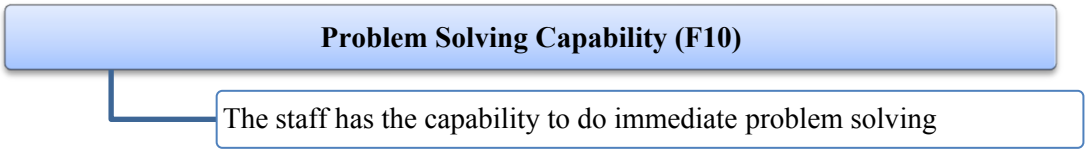


Figure 5.10 List of items in factor 10

5.10.1 The Staff has the Capability to do Immediate Problem Solving

The research found the implementation of this service is important. The reason is that owner does not have enough time to be involved in every problem that occurs in construction site (v0040). Owner does not want to be involved in every small problem that occurs. If the problem is not related to the cost and design then CM consultant should able to handle it by themselves. In addition, CM consultant should do it because they have more competence or knowledge to make immediate problem solving.

The current practice of this service shows that CM consultant needs to improve this service. Based on owners‘ perception, it will be better if CM consultant can improve their capability to do immediate problem solving (v0009). The current practice shows that some CM consultants send the problem to the designer whether the problem is easy or difficult. In addition, if the problem is related to design then it need to be discussed with the designer. And if the problem is concerning the cost then it need to be discussed with the owner. However, when the problem is insignificant and is related to the process of the constructing, then it can be handled directly by CM consultant.

Being able to do immediate problem solving should be provided by the project manager and not by the normal staff (v0017). Normal staff such as supervisor and coordinator might not have enough knowledge. If project manager cannot solve it then it should be forwarded to the project director and its engineering team in the office. In addition, CM consultant should be responsible for each of their decision or act. The way that CM consultant solves the problem should make sense and can be explained properly to the owner. In summary, owner want CM consultant to help the owner and reduce the owner‘s burden as much as they can.

5.11 Conclusion

This chapter described the owner‘s perception on CM consultant‘s service quality. It is concluded from the interview that was conducted with 63 owners of building construction projects in Indonesia. The results are the owners‘ perception for all 35 items of CM consultant‘s service quality. First, the results showed the importance of each item to be provided by CM consultant. It described the reason for

each item and whether it needs to be provided by CM consultant in Indonesian building construction project. Second, the results showed the owner‘s perception of CM consultant‘s service quality current practice in Indonesian building construction projects. It gives brief information of each item‘s current practice based on owner‘s viewpoint. Third, the results gave the suggestion or advice for performing this service based on owner‘s perception. It gives brief explanation of improving each CM consultant‘s service quality item based on owner‘s viewpoint.

CHAPTER VI
DISCUSSIONS

This chapter discusses the findings of quantitative data analysis in chapter 4 and qualitative data analysis in chapter 5. This research found three main findings from both quantitative and qualitative data related to the research objectives. This chapter begins with discussing the importance level of CM consultant‘s service quality items in Indonesian building construction projects. Furthermore, it continues with discussing the factors and its weight of CM consultant‘s service quality in Indonesian building construction projects.

6.1 The importance ranking of CM consultant’s service quality items in Indonesian building construction projects

From the findings of 35 service quality items, there are four new items that were not included in the previous six research studies of consultant‘s service quality in construction. These new items were added based on comments and perception of owners from the pilot survey. The first item is ―CM consultant is able to use and understand the tools for QC, in order for them to check it properly. The finding of this first item is in accordance with the interview results. Several owners considered this item is necessary to be provided by CM consultant because CM consultant is more familiar with the tools more than the owner (v0036). The finding of this item is consistent with previous research from Maloney (2002). It is necessary for the service providers to understand the tools that support them in performing their service. The second item is ―CM consultant does a job according to the SOP that has already been agreed”. Several owners considered this item important to be provided by CM consultant is important because standard operational procedure (SOP) is the rules that helps and guides CM consultant to perform their service in construction project (v0045). The finding of this item is consistent with previous research conducted by Jang and Lee (1997). It also considers that following the standard procedure is related and important for a service company in performing their service. The third item is ―CM consultant is able to implement and maintain or watch over the contract that has already been agreed between owner and contractor”. Several owners considered this

item is important to be provided by CM consultant because owner might not be familiar with the construction‘s type of contract (v0013). In addition, the finding of this item is consistent with previous research conducted by Karna, Junnonen et al. (2004). It was considered by the previous research that watching over the contract is important especially when it is related to the quality of the construction. The fourth item is ―The CM consultant is able to anticipate the problem before it happens in the project”. The finding of this fourth item is in accordance with the interview results. Owners may perceive this service is important because there may be some technical problems that can happens in the future (v0070). The finding of this item is consistent with previous research conducted by Calisir (2007). Owners agree that this item is important for delivery of service quality because it can reduce the error or mistake in construction.

In summary, the findings of these new items are supported by several previous researches related to consultant‘s service in general. It can be concluded that these new items correctly related to consultant‘s service, but had not yet been included in the CM consultant‘s service in construction industry research. Therefore, this research includes these four new items in the list of CM consultant‘s service quality. The list of these new items and its supporting reference can be seen in table 6.1 below.

Table 6.1 New findings of CM consultant’s service quality items

No.	CM consultant’s service quality items	Supporting reference
1	The CM consultant is able to use and understand the tools for QC, in order for them to check it properly	Demonstrate knowledge of technologies (Maloney, 2002)
2	The CM consultant does a job according to the SOP that has already been agreed	The consulting team formalized and followed the standard operating procedures (Jang and Lee, 1997)
3	The CM consultant is able to implement and maintain or watch over the contract that has already been agreed between owner and contractor	Conformity to contract (Karna, Junnonen et al., 2004)

No.	CM consultant's service quality items	Supporting reference
4	The CM consultant is able to anticipate the problem before it happens in the project	Anticipate issues that may concern the client (Samson and Parker, 1994) and reducing error rate in service (Calisir, 2007)

Furthermore to answer the first research objective, the research conducted relative importance index for each item and shows the ranking for all of them. The purpose of relative importance index is to show the importance level of each item based on owners' perception. First, it shows which item that owner values the most and is more important concern for the CM consultant in building construction projects. Second, this section also shows the five least important items based on owners' perception. In addition, this section also uses the result of interview to support the finding of these important levels.

Table 6.2 illustrates the five most important items of CM consultant's service quality in building construction projects. It can be seen from the table that the five most important items of CM consultant's service quality according to the owners are "The CM consultant does a job according to the SOP that has already been agreed"; "The CM consultant is able to anticipate the problem before it happens in the project"; "The CM consultant is able to implement and maintain or watch over the contract that has already been agreed"; "The CM consultant is able to cooperate and coordinate with the other parties in construction (i.e. owner, contractor, sub-contractor and other consultants)"; and "The CM consultant properly provides regular dialogue on progress of the project".

Table 6.2 Five most important items of CM consultant's service quality

No.	Items	Average importance	Relative importance index	Importance ranking
1*	The CM consultant does a job according to the SOP that has already been agreed	4.972	0.994	1
2*	The CM consultant is able to anticipate the problem before it happens in the project.	4.958	0.994	2

No.	Items	Average importance	Relative importance index	Importance ranking
3*	The CM consultant is able to implement and maintain or watch over the contract that has already been agreed between owner and contractor	4.901	0.980	3
4	The CM consultant is able to cooperate and coordinate with the other parties in construction (i.e. owner, contractor, sub-contractor and other consultants)	4.873	0.975	4
5	The CM consultant properly provides regular dialogue on progress of the project	4.845	0.969	5

(* Additional items from pilot survey)

The owner ranked –The CM consultant does a job according to the SOP that has already been agreed" and –The CM consultant is able to anticipate the problem before it happens in the project" as the first and second with the same relative importance index of 0.994. This indicates that both of them are playing a very important role in CM consultant's service quality. –The CM consultant does a job according to the SOP that has already been agreed" is important because it is related to the rules for CM consultant in performing their service in the construction project (v0045). It establishes a set of rules and procedures for all project participants including the CM consultant to perform their service in the construction projects. It can increase the efficiency of construction performance which has lots of repetitive tasks and includes many project participants. In addition, it is not surprising to observe that –The CM consultant is able to anticipate the problem before it happens in the project" is the second most important item. The reason is that there are lots of problems which might occur in construction projects from owner, designer and contractor. Anticipating the problem before it happens can reduce the cost for rework and repairing the construction mistakes (v0001). Therefore, it is more beneficial to prevent the problem from happening. The third most important item is –The CM consultant is able to implement and maintain or watch over the contract that has already been agreed" with score of 0.980. This item is the third most important because owners remarked that they might not be expert and familiar with the construction's type contract (v0013). In addition, owner needs CM consultant to protect what already been agreed in the contract to be implemented correctly in the

construction (v0021). The fourth most important item is ―The CM consultant is able to cooperate and coordinate with the other parties in construction (i.e. owner, contractor, sub-contractor and other consultants)" with score of 0.975. It was considered to be important because the nature of construction project involves lots of project participants such as contractors and sub-contractors (v0003). The more complex and bigger the project, then the more participants involved in the project. It shows that the capability of CM consultant to cooperate and coordinate with other parties as very important. Furthermore, the fifth most important item is ―The CM consultant properly provides regular dialogue about progress of the project" with score of 0.969. This is important because owner needs to monitor the progress of the project regularly. It gives owner an opportunity to check the accurateness of the project whether it is exactly as what owner wants or not. It gives benefit of avoiding missing communication between owner and CM consultant (v0060).

Table 6.3 illustrates the five lowest important items of CM consultant's service quality in building construction projects. It can be seen from the table that five lowest important items of CM consultant's service quality according to the owners are ―The CM consultant has good understanding and knowledge of the current situation of the industry and their owner's circumstances (i.e. political, financial, etc).‖; ―The staff are able to communicate in a non-technical way with the owner that may not be familiar with engineering discipline"; ―The staff has good hospitality and friendliness"; ―The CM consultant uses computerized systems and software which are compatible with the client"; and ―The CM consultant supervises the security and safety management of the project".

Table 6.3 Five lowest important items of CM consultant's service quality

No.	Items	Average importance	Relative importance index	Importance ranking
1	The CM consultant has good understanding and knowledge of the current situation of the industry and their owner's circumstances (i.e. political, financial, etc).	3.394	0.679	35
2	The staff are able to communicate in a non-technical way with the owner that may not be familiar with engineering discipline	3.887	0.777	34

No.	Items	Average importance	Relative importance index	Importance ranking
3	The staff has good hospitality and friendliness	4.000	0.800	33
4	The CM consultant uses computerized systems and software which are compatible with the client	4.169	0.834	32
5	The CM consultant supervises the security and safety management of the project	4.225	0.845	31

The owner ranked "The CM consultant has good understanding and knowledge of the current situation of the industry and their owner's circumstances (i.e. political, financial, etc)" as the least important within 35 items with score of 0.679. It was considered as the least important because owner thinks CM consultant should just be concerned about the project. Let owner handle their own company and situation outside the project (v0009). If there is any situation that might affect the project, CM consultant should just wait for information from the owner (v0055). The second least important, "The staff are able to communicate in a non-technical way with the owner that may not be familiar with engineering discipline" with score of 0.777. This item was considered to be unimportant because currently many owners at least already have engineering background (v0032). In addition, owners think that CM consultant should be concerned more about the other service quality items that are more crucial rather than this item (v0040). The third least important item is "The staff has good hospitality and friendliness" with score of 0.800. This item is the third least important because owner considered it has a high chance of leading to being over friendly. Being over friendly can make CM consultant less strict in performing their service (0068). The fourth least important item is "the CM consultant uses computerized systems and software which are compatible with the client" with score of 0.834. Owner thinks this item is not important because most of programs that CM consultant uses are compatible with them (v0047). For example, Microsoft project and Primavera are two most common program that CM consultants use and owners claimed that they familiar with them (). Furthermore, the fifth least important item is "the CM consultant supervises the security and safety management of the project" with score of 0.845. It was considered being unimportant because actually both

security and safety are provided by the contractor (v0018). However, owner still requires CM consultant to supervise and check if there is anything not according to the regulation and give warning to the contractor (v0021).

6.2 The factors of CM consultant service quality in Indonesian building construction projects

To answer the second research objective, the research conducted quantitative data collection and analysis from survey questionnaire. The results show 10 service quality factors that were grouped from 35 service quality items. These ten factors were extracted from the factor analysis of SPSS. These factors explained 71.4% of the total variance which was considered to be satisfying results. The summary of ten CM consultant‘s service quality factors can be seen in figure 6.1 below.

These ten factors were confirmed by several previous researches related to service quality of consultant. The finding of the first factor (i.e. understand & provide individualized attention to the owner) is supported by the research from Samson and Parker (1994). It also considers understanding and focusing on owners as one of the important factors for consultant to provide in their service quality. The finding of the second factor (i.e. service oriented characteristic of the staff) is supported by the research from Cheng, Proverbs et al. (2006). It also focuses on the service oriented characteristic of the staff from CM consultant. It consist of several items that are the same with the finding in this research such as the friendliness and several items related to the quality of the staff. The finding of the third factor (i.e. awareness of the project‘s status and information) is similar with Deakins and Dillon (2005) that focuses on local government consultant. It also considers that consultant needs to be aware in performing their service. This awareness need to be focused on watching over the contract, anticipating the problem and maintaining secure owner‘s project information confidential. The finding of the fourth factor (i.e. communication and coordination of the project) is in accordance with the research conducted by Samson and Parker (1994) and Cheng, Proverbs et al. (2006). There are several items in this factor that are similar with the previous research such as providing regular dialogue and other items that are related to the responsiveness of the consultant in establishing communication with the owner. The finding of the fifth factor (i.e. progressiveness) is also consistent with research conducted by Poulfelt and Payne (2004). It considers

that progressiveness of the consultant may increase the chance to complete the project within the scheduled dates. In addition, progressiveness also can be seen from showing initiative in performing the service. The finding of the sixth factor (i.e. competence) is also consistent with previous research that focuses on consultant‘s service quality in general. Previous research also considers this competence as a factor of consultant‘s service and is important because the owner always expects the consultant to be more expert than them (Jang and Lee, 1997). The consultant‘s role as an expert is important in the consulting process and it needs to be supported primarily by the knowledge and experience of the staff. This knowledge and experience are expected to be gained in working with other clients on similar projects.

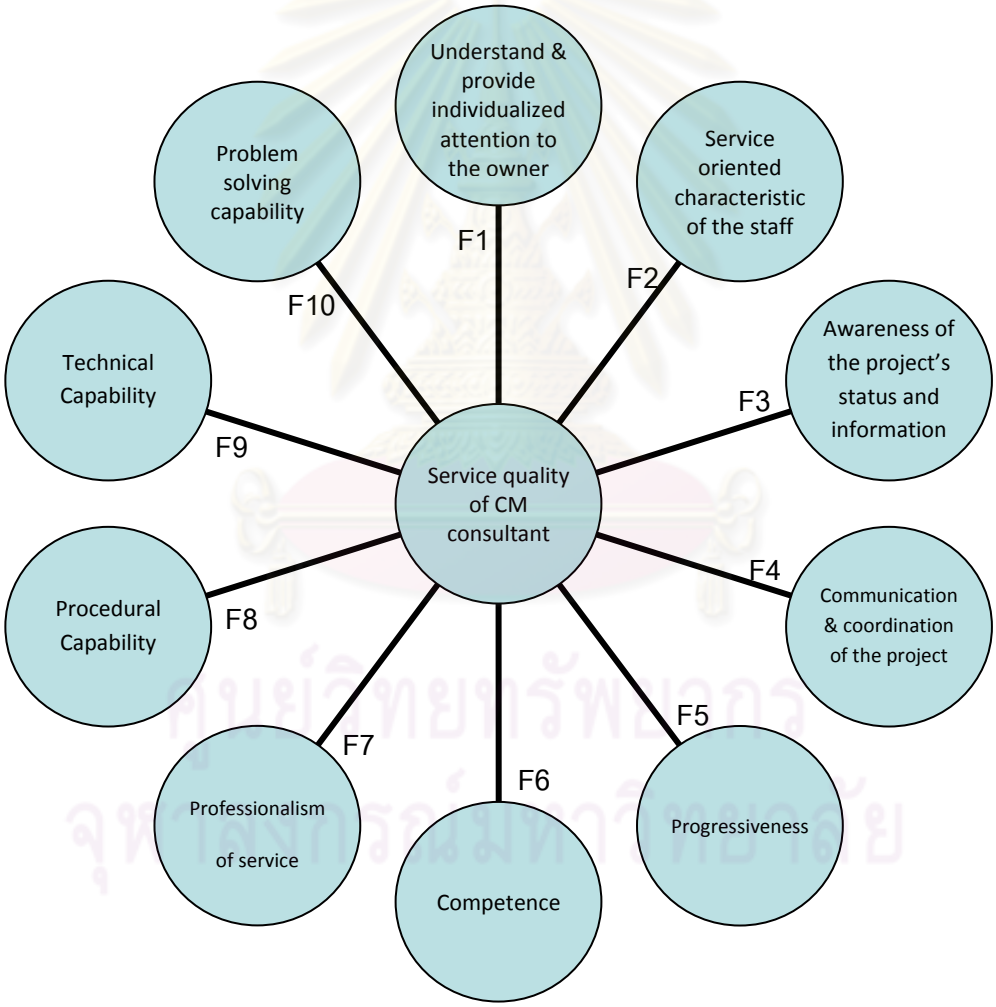


Figure 6.1 Ten factors of CM consultant's service quality

The finding of the seventh factor (i.e. professionalism of service) is also consistent with previous research that focuses on consultant‘s service quality in

general. It is also considered to be important to be provided by consultant because owner needs to have confidence in hiring the consultant. Owner needs consultant to be committed doing their job to serve the best of owner‘s interest (Poulfelt and Payne, 1994). Furthermore, the finding of the eighth factor (i.e. procedural capability) is consistent with previous research that focuses on consultant‘s service quality in general. Previous research also considers this procedural capability as a factor of consultant‘s service and is important because it can guide and help the consultant to do their work (Jang and Lee, 1997). In addition, previous research also considers this factor to be primarily supported by the standard operational procedure. This SOP is a set of rules and procedures that guides the consultant to do their work efficiently (Jang and Lee, 1997). It can increase efficiency especially when there are several repetitive tasks such as inspecting the construction, reporting the progressand solving the problem. Therefore, consultant should at least set their own standard operational procedure that would facilitate their work. The finding of the ninth factor (i.e. technical capability) is also consistent with previous research that was conducted by Ng and Chow (2004). It also considers that technical capability is one of the factors of consultant‘s service quality. It is important for CM consultant to be able to manage the project properly. CM consultant should have the standard knowledge regarding the specification and equipment that are related to their job responsibility. The finding of the tenth factor (i.e. problem solving capability) is also consistent with previous research that focuses on consultant‘s service quality in general. Previous research also considers this problem solving capability as a factor of consultant‘s service and is important because of owner‘s incapability (Poulfelt and Payne, 1994). Therefore, owner requires consultant to support them in solving the problems. In summary, the findings of these ten factors are supported by several previous researches related to consultant‘s service in general. The list of factors and its supporting references can be seen in table 6.4 below.

Table 6.4 Ten factors of CM consultant's service quality

No.	CM consultant's service quality factors	Supporting reference
1	Understand & provide individualized attention to the owner	Client focus (Samson and Parker, 1994)
2	Service oriented characteristic of the staff	People (of consultants) (Cheng, Proverbs et al., 2006)
3	Awareness of the project's status and information	Disclose sensitive and confidential information (Deakins and Dillon, 2005)
4	Communication & coordination of the project	Communication (Samson and Parker, 1994; Cheng, Proverbs et al., 2006)
5	Progressiveness	Be progressive in delivering services available to existing clients (Poulfelt and Payne, 1994)
6	Competence	Competence of consultants (Jang and Lee, 1997)
7	Professionalism of service	Professional conduct (Poulfelt and Payne, 1994) and Professionalism of service (Tang, Lu et al., 2003)
8	Procedural capability	Standardization of procedures (Jang and Lee, 1997)
9	Technical capability	Technical capabilites (Ng and Chow, 2004)
10	Problem solving capability	Problem solving (Poulfelt and Payne, 1994)

In addition, the research also conducted weight calculation for each item and factor of CM consultant's service quality in Indonesian building construction projects. The weight of each item represents its proportion in describing its corresponding factor (Hair, Black et al., 2010). The weight percentage for each item and factor can be seen in figure 6.2 below.

The higher the value of the weight shows the higher explanation of the item in describing the factor. The weights of items were derived from factor loading which generated from results of factor analysis. It shows the proportion of each item in explaining each factor of CM consultant‘s service quality. In addition, the weights of factors were derived from percentage of variance which generated from results of factor analysis. It shows the proportion of each factor in explaining the overall service quality of CM consultant.

The first factor (i.e. Understand & provide individualized attention to the owner) has the highest weight of 15.11% compared to the other factors. It shows that the first factor contributes 15.11% in explaining the service quality of CM consultant. The second factor (i.e. Service oriented characteristic of the staff) has the second highest weight of 14.28% compared to the other factors. It shows that this second factor contributes 14.28% in explaining the service quality of CM consultant. The third factor (i.e. Awareness of the project‘s status and information) has the weight of 12.48%. It shows that this third factor contributes 12.48% in explaining the service quality of CM consultant. The fourth factor (i.e. Communication & coordination of the project) has the weight of 12.45%. It shows that this factor contributes 12.45% in explaining the service quality of CM consultant. The fifth factor (i.e. Progressiveness) has the weight of 10.53%. It shows this factor contributes 10.53% in explaining the service quality of CM consultant. The sixth factor (i.e. Competence) has the weight of 7.65%. It shows that this factor contributes 7.65% in explaining the service quality of CM consultant. The seventh factor (i.e. Professionalism of service) has the weight of 7.54%. It shows that this factor contributes 7.54% in explaining the service quality of CM consultant. The eighth factor (i.e. Procedural capability) has the weight of 6.79%. It shows that this factor contributes 6.79% in explaining the service quality of CM consultant. The ninth factor (i.e. Technical capability) has the weight of 6.61%. It shows that the ninth factor contributes 6.61% in explaining the service quality of CM consultant. The tenth factor (i.e. Problem solving capability) has the weight of 6.47%. It shows that this factor contributes 6.47% in explaining the service quality of CM consultant.

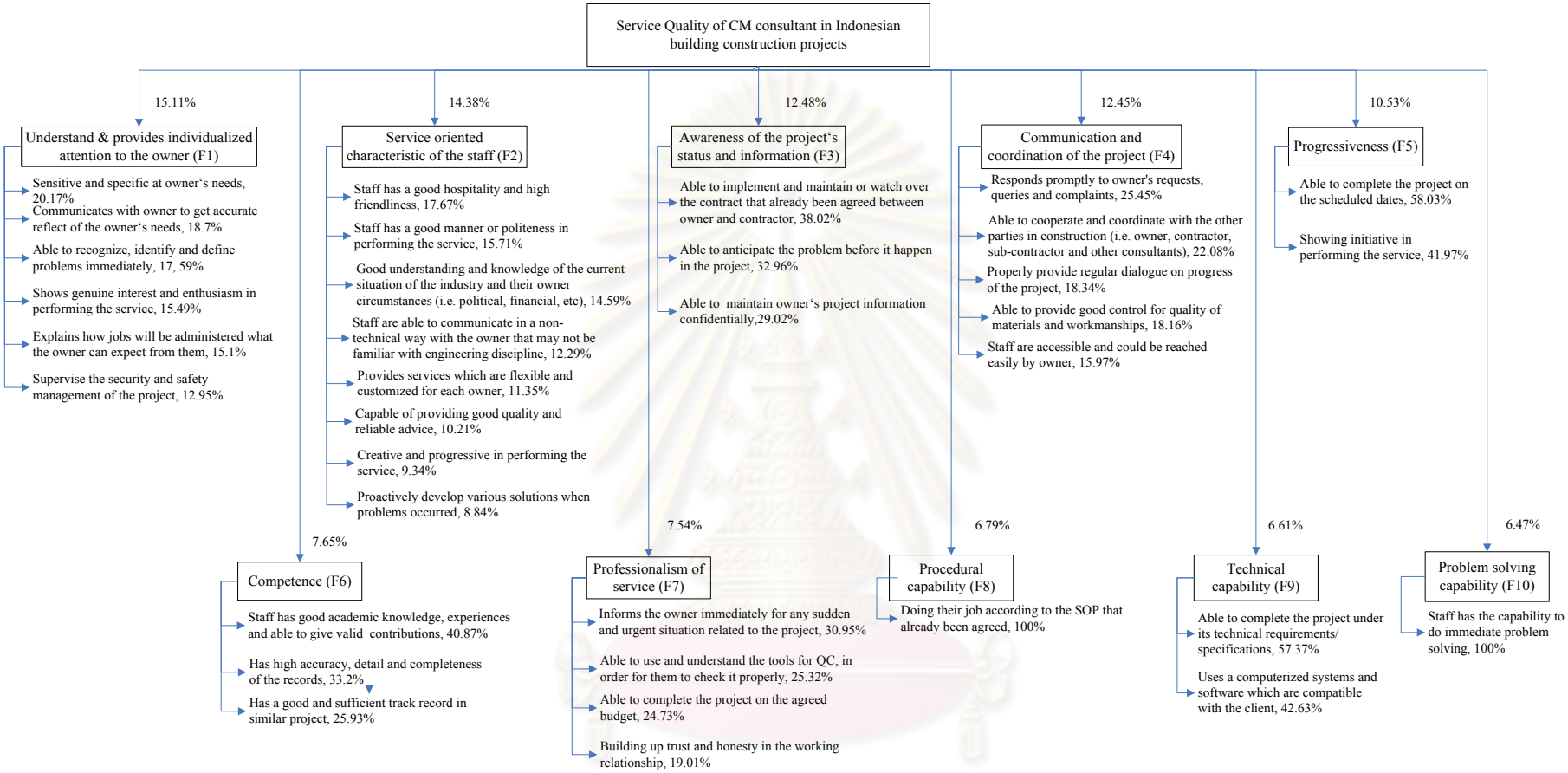


Figure 6.2 Summary weight of items and factors of CM consultant's service quality

6.3 Conclusion

This chapter mainly discussed the results of CM consultant‘s service quality items, relative importance index and factor analysis. The items of CM consultant‘s service quality were generated from literature review and pilot survey. In addition, pilot survey found four new items based on owners‘ perception. Furthermore, several references related to consultant‘s service in general were explored to support the findings of these four new items. It can be concluded that these new items correctly related to consultant‘s service, but were yet to be included in the CM consultant‘s service in construction industry research. The relative importance index showed the five most important and five lowest important items of CM consultant‘s service quality. The results were supported by the interview of 63 owners in Indonesian building construction projects. Finally, the factor analysis developed ten factors that can explain and represent the service quality of CM consultant in Indonesian building construction projects. These results were supported by several references that show these factors are parts of consultant‘s service quality.

CHAPTER VII
CONCLUSIONS

This chapter develops conclusion to the thesis from the research findings. This chapter begins with conclusion from the research findings of the first research objective in section 7.1. Next, section 7.2 explains the conclusion based upon the second research objective. Furthermore, section 7.3 describes the conclusion from the third research objective. Then in section 7.4, it shows the benefits of this research to the construction management discipline in Indonesian construction project. Finally, section 7.5 discusses the limitations of this research and suggestions for future research.

7.1 The importance level of CM consultant's service quality items in Indonesian building construction projects

The research conducted survey questionnaire to get the scores of owners' perception regarding the importance of each service quality item. The importance level was calculated by relative importance index technique. The purpose of conducting this technique is to identify the importance rank of CM consultant's service quality items based on owner's perception. The value of relative importance index ranging from 0 to 1. The higher numerical value of the relative importance index means the more important that item based on owners' perception. The results can be seen in chapter 4, which showed the importance ranking of 35 CM consultant's service quality items. This gives benefit for CM consultant to recognize what is important and essential for CM consultant company in performing good service quality in Indonesian building construction project. However, these 35 items showed possibility of correlation between them. In addition, the relative importance index only ranks the items independently without considering the correlation between each item. Therefore, the research conducted factor analysis to group the items that have high correlation into a smaller set of factors.

7.2 The factors of CM consultant's service quality in Indonesian building construction project

The research conducted factor analysis to group the 35 items of CM consultant's service quality. It was conducted based on owners' perception on factors explaining CM consultant's service quality in Indonesian building construction projects. The application of this technique can reduce the data to a representative subset of variables or even create new variables as replacements for the original variables, while still retaining their original characteristics. The result of factor analysis showed ten factors were extracted. These ten factors represent 35 items of CM consultants' service quality. The first factor is "Understanding & providing individualized attention for the owner" and it consists of six items. The second factor is "Service oriented characteristic of the staff" and it consists of eight items. The third factor is "Awareness of the project status and information" and it consists of three items. The fourth factor is "Communication & Coordination of the project" and it consists of five items. The fifth factor is "Progressiveness" and it consists of two items. The sixth factor is "Competence" and it consists of three items. The seventh factor is "Professionalism of service" and it consists of four items. The eighth factor is "Procedural capability" and it only consists of one item. The ninth factor is "Technical cpability" and it consists of two items. The tenth and last factor is "Problem solving capability" and it only consists of one item.

In addition, the weight of each items and factors were calculated to explain more clearly the proportion of each item and factor in describing CM consultant's service quality. The weight shows the proportion of items and factors in explaining the service quality of CM consultant. The weight of items from the result of factor analysis represents the correlation between the items and the factors. The higher value of the item's weight shows the higher proportion of the item in describing the factor. The higher value of the factor's weight shows the higher proportion of the factor in describing the CM consultant's service quality. The results gives benefit to show the reader that based on 71.39% of the variance, it can be seen the proportion of each factor can explains the service quality of CM consultant. The first factor (i.e. Understand & provide individualized attention to the owner) has the highest weight of 15.11% compared to the other factors. The second factor (i.e. Service oriented

characteristic of the staff) has the second highest weight of 14.28% compared to the other factors. The third factor (i.e. Awareness of the project‘s status and information) has the weight of 12.48%. The results show that these three items have high contribution in explaining the service quality of CM consultant.

7.3 The owner’s perception of CM consultant’s service quality in Indonesian building construction projects

The research conducted interview of 35 CM consultant‘s service quality items to 63 owners of building construction projects in Indonesia. The purpose of conducting interview is to get the owners‘ perception regarding CM consultant‘s service quality in Indonesian building construction projects. The interview was conducted based on three main questions, namely, why it is important for each item is important to be provided, what is the current practice of each item and how to improve the quality of each service. The results of the first question are used to support the findings of important ranking and the factors. It described the reason for each item, whether it is necessary or not to be provided by CM consultant in Indonesian building construction projects. The results of the second can be used by the CM consultant company to improve their service quality. It gives brief information of each item‘s current practice based on owner‘s viewpoint. Finally, the result of the third question gives brief explanation of improving each CM consultant‘s service quality item based on owner‘s viewpoint. More detail explanation of these interview results can be seen in chapter 5 and in appendix C.

7.4 Contribution of the Research

This research gives contributes in two main aspects. The first contribution is to the construction management discipline and future research by describing the service quality of CM consultant in building construction projects. It focused on exploring the list of items and factors that influence the service quality of CM consultant. From the result of factor analysis, there are ten factors influencing the service quality of CM consultant in building construction projects. Furthermore, these ten factors can be used in the future as a foundation for measuring service quality level of CM consultant.

The second contribution is to the construction industry by illustrating the importance of CM consultant‘s service quality based on owners‘ perception. It helps to understand the nature of items and factors influencing CM consultant‘s service quality in building construction projects. The explanation was gained from three different techniques (i.e. RII, weight and interview). First, RII describes the importance of each item from the result of relative importance index. It gives benefit to understand which item that owner values the most and needs to get more attention from the CM consultant. The value of relative importance index shows the level of importance based on owner‘s perception. Second, the weight of items and factors shows their proportion in explaining service quality of CM consultant in building construction projects. The weight of items which were derived from factor loading show its proportion in explaining each factor of CM consultant‘s service quality. The weight of factors which were derived from percentage of variance shows its proportion in explaining the overall service quality of CM consultant. Third, interviews explain the importance of each item from the result of interviewing owners of building construction projects in Indonesia. It gives benefit to understand the importance of each item and how to implement it based on owners‘ perception. In addition, it also reveals the owner‘s perception of each service quality item‘s current practice in Indonesian building construction project.

7.5 Limitations and Suggestions for Future Research

This research has limitations on the sample size of the research. The sample used in this study was conducted from sending questionnaire to owners‘ representative that are located only in Jakarta. The result from this research may not fully represent the owners‘ perception of service quality in Indonesian building construction projects. The lack of sampling from owners‘ representative in other city may affect the results. Furthermore, it is highly recommended for the future research to use larger sample from other city to explore the CM consultant‘s service quality in Indonesian building construction projects. Based on the Indonesian Central Bureau of Statistics (2008), it shows that Jakarta and West Java as two provinces that have the highest number of construction projects, while the others are far below them. Therefore, it is suggested to conduct the sample size of future research from the owners‘ representative in these two provinces.

This research is focused on exploring the items and factors of CM consultant‘s service quality in building construction projects. It also explores the importance of each item based on owners‘ perception. Thus, it may be useful and interesting to measure the current performance level of CM consultant‘s service quality in Indonesian building construction projects. This future research can be useful to understand in detail the current practice of CM consultant‘s service quality. It can find the gaps between owner‘s standards and the current performance level of CM consultant‘s service quality. Finally, it shows which items are implemented below owner‘s standards and therefore needs to be improved. Furthermore, future research may also try to compare the CM consultant‘s service quality between public and private projects. It is interesting to test whether there are any differences of owner‘s perception and the current practice of CM consultant‘s service quality in public and private projects.

REFERENCES

Ahmed, S. M. and R. Kangari (1995). Analysis of client satisfaction factors in construction industry. Journal of Management in Engineering-Asce 11(2): 36-44.

Akbaba, A. (2006). Measuring Service Quality in the Hotel Industry: A Study in a Business Hotel in Turkey. International Journal of Hospitality Management 25: 170-192.

Al-hawari, M. (2008). The Influence of Traditional Service Quality Factors on Customer Satisfaction: A Practical Study within the Context of Australian Banking. The Business Review 11(2): 114-119.

Al-Momani, A. H. (2000). Examining Service Quality Within Construction Processes. Technovation 20: 643-651.

Alexander, E. C. (2002). Consumer Reactions to Unethical Service Recovery. Journal of Business Ethics 36: 223-237.

Ali, K. A. M., D. Talib, et al. (2009). Mathematical Modeling of Service Quality Towards Organizational Performance: Case Study on Malaysian Local Authorities. International Review of Business Research Papers 5(3): 44-57.

Alshawi, M. and B. Ingirige (2003). Web-enabled project management: an emerging paradigm in construction. Automation in Construction 12: 349-364.

Arditi, D. and H. M. Gunaydin (1997). Total quality management in the construction process. International Journal of Project Management 15(4): 235-243.

Arditi, D. and D.-E. Lee (2002). Assessing the corporate service quality performance of design-build contractors using quality function deployment. Construction Management and Economics 21: 175-185.

ASCC, A. S. o. C. C. and A. C. I. ACI (2005). The contractor's guide to quality concrete construction, American Concrete Institute.

Bebko, C. P. (2000). Service intangibility and its impact on consumer expectations of service quality. Journal of Services Marketing 14(1): 9-26.

Bello, M. O. and V. A. Bello (2007). The Influence of Consumers Behavior on the Variables Determining Residential Property Values in Lagos, Nigeria. American Journal of Applied Sciences 4(10): 774-778.

Bertelsen, S. (2002). Complexity - Construction in A New Perspective. Proceedings of the 10th Conference of the International Group for Lean Construction.

Brady, M. K. and C. J. Robertson (2001). Searching for a consensus on the antecedent role of service quality and satisfaction: an exploratory cross-national study. Journal of Business Research 51(1): 53-60.

Broh, R. A. (1982). Managing quality for higher profits: a guide for business executives and quality managers, McGraw-Hill.

Bryman, A. (2006). Integrating quantitative and qualitative research: how is it done? Qualitative Research 6(1): 97-113.

Calisir, F. (2007). Factors affecting service companies' satisfaction with ISO 9000. Managing Service Quality 17(5): 579-593.

Casadesus, M., F. M. Viadiu, et al. (2002). Quality Service of ISO 9000 Consultants. International Journal of Quality & Reliability Management 19(8/9): 998-1013.

Cheng, J., D. G. Proverbs, et al. (2006). The satisfaction levels of UK construction clients based on the performance of consultants. Engineering Construction and Architectural Management, 13(6): 567-583.

Cherns, A. B. and D. T. Bryant (1984). Studying The Client's Role in Construction Management. Journal of Construction Management and Economics 2: 177-184.

Choi, T. Y. and R. Chu (2001). Determinants of Hotel Guests' Satisfaction and Repeat Patronage in the Hong Kong Hotel Industry. International Journal of Hospitality Management 20: 277-297.

Chow, L. K. and S. T. Ng (2007). A fuzzy gap analysis model for evaluating the performance of engineering consultants. Automation in Construction 16(4): 425-435.

Clow, K. and D. Vorhies (1993). Building a competitive advantage for service firms. journal of Services Marketing 7(1): 22-32.

Costello, A. B. and J. W. Osborne (2005). Best Practices in Exploratory Factor Analysis: Four Recommendations for Getting the Most From Your Analysis. Practical Assessment, Research & Evaluation 10(7).

Dawes, P. L., G. R. Dowling, et al. (1991). Information Sourced Used to Select Different Types of Management Consultancy Services. Asia Pacific Journal of Management 8(2): 185-199.

Deakins, E. and S. Dillon (2005). Local government consultant performance measures: an empirical study. International Journal of Public Sector Management 18(6): 546-562.

Enshassi, A., S. Mohamed, et al. (2009). Factors Affecting The Performance of Construction Projects in The Gaza Strip. Journal of Civil Engineering and Management 15(3): 269-280.

Fisher, A. B. (1989). The Ever-Bigger Boom In Consulting. Fortune 119: 59-68.

Forsythe, P. J. (2008). Modelling customer perceived service quality in housing construction. Engineering Construction and Architectural Management, 15(5): 485-496.

Gan, C., D. Cohen, et al. (2006). A Survey of Customer Retention in The New Zealand Banking Industry. Banks and Banks Systems 1(4): 83-99.

Gerhard P. Muenchmeyer, P. E. (2005). Construction Quality Assurance, Quality Control For Trenchless Technologies. Underground Construction May.

Gowan, M., J. Seymour, et al. (2001). Service quality in a public agency: same expectations but different perceptions by emplyees, managers, and customers. Journal of quality management 6(2): 275-291.

Hair, J. F., W. C. Black, et al. (2010). Multivariate Data Analysis, Pearson Prentice Hall.

Harris, F., R. McCaffer, et al. (2006). Modern Construction management, Blackwell Publishing.

Hennig-Thurau, T., K. P. Gwinner, et al. (2004). Electronic Word-of-Mouth Via Consumer-Opinion Platforms: What Motivates Consumers to Articulate Themselves on The Internet? Journal of Interactive Marketing 18(1): 38-52.

Hensher, D., P. Stopher, et al. (2003). Service quality - developing a service quality index in the provision of commercial bus contracts. Transportation Research Part A Vol 37: 499-517.

Heskett, J. L., T. O. Jones, et al. (1994). Putting the Service-Profit Chain to Work. Harvard Business Review: 164-174.

Hoffman, K. D., S. W. Kelley, et al. (1995). Tracking service failures and employee recovery efforts. Journal of Service Marketing 9(2): 49-61.

Hsieh, L.-F., L.-H. Lin, et al. (2007). A service quality measurement architecture for hot spring hotels in Taiwan. Tourism Management 29: 429-438.

Hume, M. and J. R. McColl-Kennedy (1999). Episodic, Extended and Continuous Service Encounters: A Theoritical Framework. ANZMAC.

Iacobucci, D., A. Ostrom, et al. (1995). Distinguishing Service Quality and Customer Satisfaction: The Voice of the Consumer. Journal of Consumer Psychology 4(3): 277-303.

J. Joseph Cronin, J. and S. A. Taylor (1992). Measuring Service Quality: A Reexamination and Extension. Journal of Marketing 56: 55-68.

Jang, Y. and J. Lee (1997). Factors influencing the success of management consulting projects. International Journal of Project Management 16(2): 67-72.

Juran, J. M. (1988). Quality Control Handbook, McGraw-Hill.

Karna, S. (2004). Analysing customer satisfaction and quality in construction – the case of public and private customers. Nordic Journal of Surveying and Real Estate Research - Special Series 2.

Karna, S., J.-M. Junnonen, et al. (2004). Customer Satisfaction in Construction. 12th Annual COnference on Lean Construction. Copenhagen, Denmark.

Karna, S., J.-M. Junnonen, et al. (2009). Modelling structure of customer satisfaction with construction. Journal of Facilities Management 7(2): 111-127.

Karna, S., V.-M. Sorvala, et al. (2009). Classifying and clustering construction projects by customer satisfaction. Journal of Facilities Management 27(9/10): 387-398.

Khan, M. (2003). ECOSERV: Ecotourists‘ Quality Expectations. Annals of Tourism Research 90(1): 109-124.

Landrum, H., V. Prybutok, et al. (2009). Measuring IS System Service Quality with SERVQUAL: Users' Perceptions of Relative Importance of the Five SERVPERF Dimensions. The International Journal of an Emerging Transdiscipline 12: 17-35.

Laufer, A. and T. R. L. (1988). Competence and Timing Dilemma in Construction Planning. Construction Management and Economics 6: 339-355.

Lin, C.-H., C.-T. Lin, et al. (2007). How to Make Your Customers Satisfy. International Conference on Business and Information. Tokyo, Japan.

Ling, F. Y. Y., C. W. Ibbs, et al. (2006). Determinants of International Architectural, Engineering, and Construction Firms‘ Project Success in China. Journal of Construction Engineering and Management-Asce: 206-214.

Maloney, W. F. (2002). Construction Product/Service and Customer Satisfaction. Journal of Construction Engineering and Management-Asce 128(6): 522-529.

McLachlin, R. (2000). Service quality in consulting: what is engagement success? Managing Service Quality 10(3): 141-150.

Miller, J. L., C. W. Craighead, et al. (2000). Service recovery: a framework and empirical investigation. Journal of Operations Management 18: 387-400.

Monteson, P. and J. Singer (1992). Turn Your Spa into a Winner. Cornell Hotel and Motel Restaurant Administration Quarterly 33(3): 37-44.

Ng, S. T. and L.-K. Chow (2004). Evaluating engineering consultants' general capabilityes during the pre-selection process - a Hong Kong study. Engineering Construction and Architectural Management 11(3): 150-158.

Oliver, R. L. (1993). Cognitive, Affective, and Attribute Bases of the Satisfaction Responses. Journal of Consumer Research 20(3): 418-430.

Oyedele, L. O. and K. W. Tham (2007). Clients' assessment of architects' performance in building delivery process: Evidence from Nigeria. Building and Environment 42: 2090-2099.

Pallant, J. F. (2004). SPSS Survival Manual: a step by step guide to data analysis using SPSS, Allen & Unwin.

Parasuraman, A., V. A. Zeithaml, et al. (1985). A Conceptual Model of Service Quality and Its Implication for Future Research. Journal of Marketing Research 49: 41-50.

Parasuraman, A., V. A. Zeithaml, et al. (1988). SERVQUAL: A Multiple Item Scale for Measuring Consumer Perceptions of Service Quality. Journal of Retailing 64(1): 13-40.

Peters, S. C. and E. Mazdarani (2008). The impact of employee empowerment on service quality and customer satisfaction in service organizations. Bachelor Thesis in Business Administration.

Pongpeng, J. and J. Liston (2003). Contractor ability criteria: a view from the Thai construction industry. Construction Management and Economics 21: 267-282.

Poulfelt, F. and A. Payne (1994). Management Consultants: Client and Consultant Perspectives. Scandinavian Journal of Management 10(4): 421-436.

Rowlinson, S., Ed. (2004). Construction Safety Management Systems, Spon Press.

Ruyter, K. d., J. Bloemer, et al. (1997). Merging service quality and service satisfaction: An empirical test of an integrative model. Journal of Economic Psychology 18: 387-406.

Samson, D. and R. Parker (1994). Service Quality: The Gap in the Australian Consulting Engineering Industry. International Journal of Quality & Reliability Management 11(7): 60-75.

Santosa, B. (2002). Keberadaan Profesi Manajemen Konstruksi di Indonesia. Jurnal Desain & Konstruksi 1(1): 21-28.

Segura, C. (1991). Customer Service Quality in The Construction Industry.

Shelton, P. J. (2000). Measuring and Improving Patient Satisfaction. United States of America, Aspen Publishers, Inc.

Siu, G. K. W., A. bridge, et al. (2001). Assessing the service quality of building maintenance providers: mechanical and engineering services. Construction Management and Economics 19: 719-726.

Spreng, R. A. and R. D. Mackoy (1996). An Empirical Examination of a Model of Perceived Service Quality and Satisfaction. Journal of Retailing 72(2): 201-214.

Sudarto, A. Veronika, et al. (2006). Kinerja Perusahaan Jasa Konstruksi di Indonesia. Pengembangan Industri Konstruksi 1(1).

Suraji, A. and D. Krisnandar (2008). Indonesia Country Report. The 14th Asia Construct Conference. Tokyo, Japan.

Sureschandar, G. S., C. Rajendran, et al. (2002). The Relationship between service quality and customer satisfaction - a factor specific approach. Journal of Services Marketing 16(4): 363-379.

Tam, J. (2000). The effects of service quality, perceived value and customer satisfaction on behavioral intentions. Journal of Hospitality & Leisure Marketing 6(4): 31-43.

Tam, V. W. Y., C. M. Tam, et al. (2007). On prefabrication implementation for different project types and procurement methods in Hong Kong. Journal of Engineering Design and Technology 5(1): 68-80.

Tang, S. L., M. Lu, et al. (2003). Achieving Client Satisfaction for Engineering Consulting Firms. Journal of Management in Engineering-Asce 19(4): 166-172.

Tax, S. S., S. W. Brown, et al. (1998). Customer Evaluations of Service Complain Experiences: Implications for Relationship Marketing. Journal of Marketing 62(2): 60-76.

Theodorakis, N., C. Kambitsis, et al. (2001). Relationship between measures of service quality and satisfaction of spectators in professional sports. Managing Service Quality 11(6): 431-438.

Vargo, S. L. and R. F. Lusch (2004). The Four Service Marketing Myths. Journal of Service Research 6(4): 324-335.

Veronika, A., Sugiarto, et al. (2006). Identifikasi Faktor-Faktor Manajemen SDM yang Meningkatkan Kinerja Perusahaan Jasa Konstruksi di Indonesia. Pengembangan Industri Konstruksi 1(1).

Viadiu, F. M. and E. C. b. Fransi (2005). A study of the ISO 9000 certification process: consultant profiles and company behaviour. Managing Service Quality 15(3): 290-305.

Wang, C.-H., C.-C. Chuang, et al. (2009). A fuzzy DEA–Neural approach to measuring design service performance in PCM projects. Automation in Construction 18: 702-713.

Wang, E. T. G. and J. H. F. Chen (2003). The Effects of Internal Support and Consultant Quality on Consulting Effectiveness and ERP System Quality. Proceedings of the First Workshop on Knowledge Economy and Electronic Commerce.

Wolak, R., S. Kalafatis, et al. (1998). An Investigation Into Four Characteristics of Services. Journal of Empirical Generalisations in Marketing Science 3: 22-44.

Woo, K.-s. and C. T. Ennew (2005). Measuring business-to-business professional service quality and its consequences. Journal of Business Research 58: 1178-1185.

Yang, J.-B. and S.-C. Peng (2006). Development of a customer satisfaction evaluation model for construction project management. Building and Environment 43: 458-468.

Yasamis, F., D. Arditi, et al. (2002). Assessing Contractor Quality Performance. Construction Management and Economics 20: 211-223.

Zeithaml, V. A., P. A., et al. (1990). Delivering Quality Service: Balancing Customer Perceptions anwait2d Expectations. Journal of The Academy of Marketing Science 21: 1-12.

Zeithaml, V. A., M. J. Bitner, et al. (2009). Services Marketing: Integrating Customer Focus Across The Firm, McGraw-Hill.

Zeithaml, V. A., B. M. Jo, et al. (2008). Services Marketing. New Delhi, The McGraw-Hill Companies. 4th Edition.

APPENDICES

APPENDIX A
SURVEY QUESTIONNAIRE FORM AND DATA

Appendix A.1 Survey Questionnaire Form

A. Please fill the following questions.

1 Respondent's Information

Company Name : _____

Position: _____

Experience: _____ years _____ months

Number of Projects: _____ projects

Type of Project: _____ office _____ apartment _____ mall _____ condominium

2 Current Project Information

Project Name : _____

Project Location : _____

Project Duration : _____ years _____ months _____ days

Project Size: _____ rupiah

CM Consultant Company Name: _____

3 Concerning the service quality criteria

Do you have any suggestions to improve the lists of this survey questionnaire?

If yes, please specify below.

_____

_____

_____

_____

Do you have any suggestions to delete some item from the lists of this survey questionnaire?

If yes, please specify below.

_____

_____

_____

_____

B. Survey Information

Please rank the items in questionnaire based on the importance rate.

Rate	Importance Rate	Explanation
1	Least Important	this service is strongly unimportant to be provided
2	Less Important	this service is not quite important to be provided
3	Moderate Importance	this service is important enough to be provided
4	More Important	this service is quite important to be provided
5	Most Important	this service is strongly important to be provided

1. Explanation of service quality dimensions

1	Reliability	= The ability to perform the promised service dependably and accurately
2	Responsiveness	= The willingness to help customer and provide immediate service
3	Competence	= The required skills and knowledge to perform the service
4	Access	= Easy approachability, easy to contact, and easy to obtain service
5	Courtesy	= Politeness, respect, consideration, and friendliness of personnel
6	Communication	= Communicate with the customer in understandable language, and listen to them
7	Credibility	= Trustworthiness, believability, honesty
8	Security	= Physical, financial or confidential danger, risk, or doubt
9	Understanding the customer	= The effort to understand the customer‘s needs
10	Tangibles	= The tools, the physical facilities, equipment & appearance of personnel

2. Survey Questions

For each of the items below, please indicate your perception of the importance of each item to be provided.
You may cross or tick the box on the importance column to indicate the importance of each item to be provided
by the company. There is no right or wrong answers.

No.	Service Quality Dimensions	Items	Importance				
			1	2	3	4	5
1	Reliability	The CM consultant is able to complete the project within the scheduled dates					
		The CM consultant is able to complete the project within the agreed budget					
		The CM consultant is able to complete the project under its technical requirements/specifications					
		The CM consultant is able to provide good quality and reliable advice					
		The CM consultant is able to provide good control for quality of materials and workmanship					
		The CM consultant has high accuracy, detail and completeness of the records					

No.	Service Quality Dimensions	Items	Importance				
			1	2	3	4	5
2	Responsiveness	The CM consultant promptly responds to owner's requests, queries and complaints					
		The CM consultant informs the owner immediately about any sudden and urgent situation related to the project					
		The CM consultant is able to recognize, identify and define problems immediately					
		The CM consultant proactively develops various solutions when problems occur					
3	Competence	The staff has good academic knowledge, experience and is able to give valid contribution					
		The staff has the capability to do immediate problem solving					
		The staff are able to communicate in a ―non-technical" way with the owner that may not be familiar with engineering discipline					
4	Access	The staff are accessible and could be reached easily by owner					
5	Courtesy	The staff has good manner and politeness in performing the service					
		The staff has good hospitality and friendliness					
6	Communication	The CM consultant properly provides regular dialogue on progress of the project					
		The CM consultant is able to cooperate and coordinate with the other parties in construction (i.e. owner, contractor, sub-contractor and other consultants)					
		The CM consultant explains how jobs will be administered and what the owner can expect from them					

No.	Service Quality Dimensions	Items	Importance				
			1	2	3	4	5
7	Credibility	The CM consultant has good and sufficient track record in similar project					
		The CM consultant builds up trust and honesty in the working relationship					
8	Security	The CM consultant supervises the security and safety management of the project					
		The CM consultant is able to maintain owner's project information confidentially					
9	Understanding the Customer	The CM consultant is sensitive, and specific at owner's needs					
		The CM consultant communicates with owner to get accurate reflection of the owner's needs					
		The CM consultant is creative in performing the service					
		The CM consultant shows initiative in performing the service					
		The CM consultant provides services which are flexible and customized for each owner					
		The CM consultant has good understanding and knowledge of the current situation of the industry and their owner circumstances (political, financial, etc)					
		The CM consultant shows genuine interest and enthusiasm in performing the service					
10	Tangibles	The CM consultant uses computerized systems and software which are compatible with the owner					

No.	Service Quality Dimensions	Items	Importance				
			1	2	3	4	5
*	Additional Items	The CM consultant company is able to use and understand the tools for QC, in order for them to check it properly					
		The CM consultant does a job according to the SOP that has already been agreed					
		The CM consultant is able to implement and maintain or watch over the value of contract that has already been agreed between owner and contractor					
		The CM consultant is able to anticipate the problem before it happens in the project.					

Appendix A.2 Raw data from survey questionnaire

Name	1a	1b	1c	1d	1e	1f	2a	2b	2c	2d	3a	3b	3c	4a	5a	5b	6a	6b	6c	7a	7b	8a	8b	9a	9b	9c	9d	9e	9f	9g	10	A1	A2	A3	A4
Mr. Reuben Suryamega	3	3	4	3	4	3	3	5	5	3	5	5	3	4	3	2	4	4	2	4	4	2	5	4	4	4	4	4	2	2	2	5	5	5	5
Mr. Doddy Damas	5	4	5	4	4	4	4	4	5	3	4	4	4	4	4	4	5	4	4	4	4	4	5	4	5	4	4	4	3	4	4	5	5	5	5
Mr. Permadi Indra Yoga	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	4	5	5	5	5	5	5	5	5	5	3	4	5	5	5	5
Ms. Fianti Gosal	5	5	5	5	5	5	5	5	5	5	5	5	3	5	5	3	4	5	5	5	5	3	5	5	5	5	5	5	3	5	5	5	5	5	5
Mr. Utama Gondokusumo	5	5	4	4	5	5	5	5	3	3	4	3	3	5	3	4	5	5	3	4	5	2	5	2	3	4	4	2	2	3	2	4	5	5	5
Mr. July Mangaratua	5	5	3	5	4	4	5	4	5	4	5	5	4	4	2	2	5	5	5	5	5	4	5	5	5	5	5	5	2	5	2	5	5	5	5
Mr. Felix Yap	5	5	5	3	5	5	5	5	5	3	5	4	2	5	3	2	5	5	5	5	5	4	5	4	5	3	5	3	1	5	4	5	5	5	5
Mr. Didik Riyanto	5	4	5	5	5	5	4	5	4	5	4	5	4	5	5	4	5	5	4	5	4	3	5	4	3	5	5	4	4	4	5	5	5	5	5
Mr. Suhendro Prabowo	5	5	5	5	5	5	5	5	5	4	5	4	5	5	4	4	5	5	5	5	5	4	5	4	5	3	5	4	2	5	4	5	5	5	5
Mr. Irwan Gunawan	5	5	5	5	5	5	5	5	5	5	5	3	4	5	4	4	5	4	3	5	4	4	4	4	4	4	3	4	3	4	4	5	5	5	5
Mr. Sugianto Darmawan	5	4	5	5	5	4	5	5	4	4	5	5	4	5	4	4	5	5	5	4	5	4	5	5	5	4	5	4	4	5	4	5	5	5	5
Mr. Ivan	5	3	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4	5	5	5	5	5	4	3	4	4	5	5	5	5

Name	1a	1b	1c	1d	1e	1f	2a	2b	2c	2d	3a	3b	3c	4a	5a	5b	6a	6b	6c	7a	7b	8a	8b	9a	9b	9c	9d	9e	9f	9g	10	A1	A2	A3	A4
Mr. Sigit Rachmat Purwanto	5	5	5	5	5	5	5	5	4	5	5	4	4	4	5	4	5	5	5	5	5	4	5	5	5	5	5	4	5	5	5	5	5	5	5
Mr. July Harnawan	4	4	5	5	5	5	4	4	4	4	5	5	4	4	5	5	5	5	5	5	5	5	5	4	5	4	5	5	4	5	5	5	5	5	5
Mr. Djendra Muljono	5	4	5	4	5	5	5	4	4	4	5	5	4	5	5	5	5	5	5	4	4	5	5	5	5	4	3	4	3	4	4	5	5	5	5
Mr. Anies Heriyanto	5	5	5	5	5	5	5	5	5	4	5	5	4	5	4	4	5	5	5	5	5	4	4	5	4	4	5	4	3	5	4	5	5	5	5
Mr. Agustinus Hartanto	5	3	5	5	5	4	5	5	5	5	5	5	5	5	5	3	5	5	5	5	5	5	4	5	5	5	5	4	3	5	4	5	5	5	5
Mr. Eko Budhy Permana	4	5	5	5	5	5	5	5	5	5	5	3	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	5	5	5	5
Mr. Anang Triyono	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mr. Windoko	5	3	5	5	5	5	5	5	5	5	5	5	5	5	4	3	5	5	5	5	4	5	5	5	5	4	5	4	3	5	4	3	5	5	5
Mr. Wiyoko Ariyanto	5	3	5	5	5	5	5	4	5	5	5	4	3	4	5	4	5	5	5	5	3	3	5	5	5	5	5	4	3	5	4	4	5	5	5
Mr. Yustinus Iwan K	5	3	5	5	5	5	5	5	5	5	5	5	4	5	3	3	5	5	5	5	5	5	4	5	5	5	5	4	4	5	4	4	5	5	5
Ms. Renny Soviahani	5	5	5	5	5	5	5	5	5	5	5	5	2	5	3	3	5	5	5	5	5	5	5	5	2	3	5	3	3	5	3	5	5	5	5
Mr. Annas Zamroni	5	3	3	5	5	5	5	4	5	5	4	5	3	5	2	2	5	5	4	5	5	4	5	4	4	4	5	5	4	5	3	5	5	5	5
Mr. Andre Legoh	4	5	5	4	5	4	5	4	4	4	5	5	4	4	4	4	5	5	4	5	5	3	4	4	3	3	4	5	5	4	4	4	4	5	5

Name	1a	1b	1c	1d	1e	1f	2a	2b	2c	2d	3a	3b	3c	4a	5a	5b	6a	6b	6c	7a	7b	8a	8b	9a	9b	9c	9d	9e	9f	9g	10	A1	A2	A3	A4
Mr. Pulung Prahasto	5	5	4	5	4	4	4	5	5	5	4	5	3	5	5	3	4	4	4	4	5	5	4	4	4	3	4	4	2	4	5	5	5	4	5
Mr. Imam Purwono	5	4	4	3	4	5	4	4	4	4	5	4	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	3	3	4	4	4	5	4	5
Mr. Yadi	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	5	4	5	5	4	5	5	3	5	5	5
Mr. Jimmy	5	5	4	5	5	4	5	5	5	5	4	5	4	5	4	4	5	5	5	5	5	4	5	5	4	5	5	5	3	5	5	5	5	5	5
Mr. Gatot Suroso	5	4	4	4	4	5	3	4	4	3	5	4	2	4	4	4	3	4	4	4	4	2	4	3	3	3	3	3	2	3	2	3	5	4	4
Mr. Nagib Sahab	3	3	5	3	5	5	5	5	5	5	5	5	3	4	5	5	5	5	5	5	5	5	5	5	5	3	3	5	3	4	3	4	5	5	5
Mr. Eddy Sunaryo	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	5	5	5	5	5	5	5	5	5	5	5	3	3	5	5	5	5	5	5
Mr. Bambang Triono	5	4	5	5	5	5	5	4	5	5	5	5	2	5	5	5	5	5	4	5	5	4	4	5	5	4	4	4	3	5	2	5	5	5	5
Mr. Liong Dicky Satria	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	5	5	5	5	5	5
Mr. Albertus W Simadibrata	5	5	5	5	5	5	5	5	5	5	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	5	5
Mr. Rumpoko Adi	5	3	5	5	5	5	4	4	5	5	5	5	4	5	5	5	5	5	3	4	4	4	3	4	3	4	4	4	3	4	5	4	5	4	5
Mr. Teby Suripto	5	5	5	4	5	4	5	5	5	5	5	4	3	5	5	3	5	5	5	5	5	3	5	5	5	5	4	3	3	5	3	5	5	5	5
Mr. Djafarullah	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Name	1a	1b	1c	1d	1e	1f	2a	2b	2c	2d	3a	3b	3c	4a	5a	5b	6a	6b	6c	7a	7b	8a	8b	9a	9b	9c	9d	9e	9f	9g	10	A1	A2	A3	A4
Mr. Manalsal Toruan	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	4	5	5	5	5	5	5
Mr. Yekti Nugraheni	4	4	5	5	5	4	4	5	4	4	5	4	4	5	4	4	4	4	5	5	4	4	5	4	4	4	5	4	4	5	5	5	5	5	5
Mr. Harjanto	5	4	5	5	5	5	5	5	5	5	5	5	4	5	4	4	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5
Mr. Kiky Rahardjo	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mr. Hero Djoni	4	4	5	5	4	5	4	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	3	5	5	5	5	5	5
Mr. Dani	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	1	5	5	5	5	5	5
Mr. Leonard	5	5	3	5	5	5	4	4	5	5	5	5	4	5	4	4	5	5	5	4	5	4	5	5	5	5	4	5	4	4	4	5	5	5	5
Mr. Arief Asyanto	5	3	5	4	5	5	5	5	5	5	5	5	1	5	4	4	5	5	5	5	5	3	5	5	5	4	5	5	2	5	5	5	5	4	5
Mr. Dian Takdir	3	4	4	4	5	5	5	5	5	3	5	5	3	4	4	2	4	5	3	4	5	3	3	5	5	4	3	4	2	5	4	5	5	5	5
Mr Joko Riyanto	4	5	4	5	4	5	5	5	5	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Mr. Samsu Atmadji	5	5	5	3	5	5	5	5	5	5	5	5	2	5	3	2	5	5	5	5	5	4	4	5	5	4	5	4	1	5	3	5	5	5	5
Ms. Nelly Kurniawan	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mr. Andi Setiawan	5	5	5	5	5	5	5	5	5	5	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	3	5	4	4	5	5	5	5	5

Name	1a	1b	1c	1d	1e	1f	2a	2b	2c	2d	3a	3b	3c	4a	5a	5b	6a	6b	6c	7a	7b	8a	8b	9a	9b	9c	9d	9e	9f	9g	10	A1	A2	A3	A4
Mr. Djajadi Salim	5	4	4	5	5	5	4	4	5	5	5	4	3	5	4	4	5	4	5	5	5	4	5	5	5	4	5	4	3	5	5	5	5	5	5
Mr. Harris Amin Singgih	4	4	5	4	4	5	4	5	4	5	5	4	2	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	3	5	5	5	5	5	5
Mr. Anto Sudaryanto	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5
Mr. F.X.Aryadi Limansagita	5	5	5	4	4	5	4	4	5	4	4	4	3	4	4	3	4	5	5	5	4	4	4	5	5	4	4	3	3	4	4	5	5	5	5
Mr. Satrio Pambayun	5	5	5	5	5	5	5	5	5	5	5	5	2	5	5	3	5	5	5	5	5	5	5	5	5	5	5	5	3	5	3	5	5	5	5
Mr. Tjakra D. Puteh	5	4	5	4	5	4	5	5	5	5	4	5	5	5	5	5	5	5	5	4	5	4	5	5	4	4	4	5	2	4	5	5	5	5	5
Mr. Cyper John Mbatemooy	4	4	4	5	4	4	5	4	5	5	4	5	5	5	5	5	5	5	5	4	4	4	5	5	5	4	5	5	5	5	5	4	5	5	5
Mr. Henrikus Henry	5	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	3	5	5	5	5	5	5	5	5	5	5
Mr. Agung Tristianto	5	4	5	5	5	4	5	5	5	5	5	5	5	5	4	4	5	5	5	4	5	5	5	5	5	5	5	4	3	5	5	4	5	5	5
Mr. Edy Chandra	5	4	4	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	3	5	5	5	5	5	5	4	5	3	5	5	5	5
Mr. Heryanto	5	5	5	5	5	5	5	5	4	4	5	5	3	5	4	4	5	5	5	5	4	3	4	4	4	4	4	4	3	4	4	5	5	5	5
Mr. Budiman Kurniawan	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	4	5	5	4	5	4	5	5	5	5
Mr. Yusak Sabdono	5	4	5	5	5	5	5	5	5	4	5	5	4	5	4	4	5	5	5	5	5	5	5	4	5	5	5	5	3	5	5	5	5	5	5

Name	1a	1b	1c	1d	1e	1f	2a	2b	2c	2d	3a	3b	3c	4a	5a	5b	6a	6b	6c	7a	7b	8a	8b	9a	9b	9c	9d	9e	9f	9g	10	A1	A2	A3	A4
Ms. Tresani	5	5	5	4	5	5	5	5	5	4	5	5	5	5	4	2	5	5	5	5	5	5	5	5	5	3	3	5	5	5	5	5	5	5	5
Mr. Patricius Renaldi	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mr. Antony	3	3	5	5	4	5	5	4	5	4	4	4	3	5	4	4	4	5	4	3	3	3	3	4	4	4	3	4	2	4	4	4	5	4	4
Mr. Andi Patria Nusantara	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	5	5	5	5	5	3	5	5	5	5	5	4	4	5	5	5	5	5	5
Mr. Denny Sulaiman	3	3	5	5	5	5	5	5	4	5	5	5	1	5	5	3	5	5	5	5	3	5	3	5	5	3	3	3	1	3	3	5	5	5	5
Mr. Dwi Kokoh	5	5	5	4	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	3	3	5	4	5	5	4	5	5	5
Mr. Willy Premadi	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

APPENDIX B
ANALYSIS OF SURVEY QUESTIONNAIRE

Appendix B.1 Variable Description

Variable	Variable Description
1a	The CM consultant is able to complete the project within the scheduled dates
1b	The CM consultant is able to complete the project within the agreed budget
1c	The CM consultant is able to complete the project under its technical requirements/specifications
1d	The CM consultant is capable of providing good quality and reliable advice
1e	The CM consultant is able to provide good control for quality of materials and workmanship
1f	The CM consultant has high accuracy, detail and completeness of the records
2a	The CM consultant promptly responds to owner‘s requests, queries and complaints
2b	The CM consultant is able to recognize, identify and define problems immediately
2c	The CM consultant informs the owner immediately about any sudden and urgent situation related to the project
2d	The CM consultant proactively develops various solutions when problems occur
3a	The staff has good academic knowledge, experience and is able to give valid contribution
3b	The staff has the capability to do immediate problem solving
3c	The staff are able to communicate in a non-technical way with the owner that may not be familiar with engineering discipline
4a	The staff are accessible and could be reached easily by client.
5a	The staff has good manner and politeness in performing the service
5b	The staff has good hospitality and friendliness
6a	The CM consultant properly provides regular dialogue on progress of the project
6b	The CM consultant is able to cooperate and coordinate with the other parties in construction (i.e. owner, contractor, sub-contractor and other consultants)
6c	The CM consultant explains how jobs will be administered and what the client can expect from them
7a	The CM consultant has good and sufficient track record in similar project
7b	The CM consultant builds up trust and honesty in the working relationship

Variable	Variable Description
8a	The CM consultant supervises the security and safety management of the project
8b	The CM consultant is able to maintain owner‘s project information confidentially
9a	The CM consultant is sensitive and specific at owner‘s needs
9b	The CM consultant communicates with owner to get accurate reflection of the owner‘s needs
9c	The CM consultant is creative in performing the service
9d	The CM consultant shows initiative in performing the service
9e	The CM consultant provides services which are flexible and customized for each owner
9f	The CM consultant has good understanding and knowledge of the current situation of the industry and their owner‘s circumstances (i.e. political, financial, etc).
9g	The CM consultant shows genuine interest and enthusiasm in performing the service
10a	The CM consultant uses computerized systems and software which are compatible with the client
A1	The CM consultant is able to use and understand the tools for QC, in order for them to check it properly
A2	The CM consultant does a job according to the SOP that has already been agreed
A3	The CM consultant is able to implement and maintain or watch over the contract that has already been agreed between owner and contractor
A4	The CM consultant is able to anticipate the problem before it happens in the project.

Appendix B.2 Descriptive Statistics

Descriptive Statistics			
	Mean	**Std. Deviation**	**Analysis N**
1a	4.75	0.579	71
1b	4.39	0.765	71
1c	4.75	0.527	71
1d	4.68	0.604	71
1e	4.82	0.39	71
1f	4.8	0.435	71
2a	4.75	0.499	71
2b	4.77	0.421	71
2c	4.8	0.435	71
2d	4.62	0.641	71
3a	4.83	0.377	71
3b	4.7	0.571	71
3c	3.89	1.115	71
4a	4.82	0.39	71
5a	4.38	0.781	71
5b	4	0.956	71
6a	4.85	0.402	71
6b	4.87	0.335	71
6c	4.7	0.641	71
7a	4.72	0.484	71
7b	4.7	0.545	71
8a	4.23	0.865	71
8b	4.69	0.6	71
9a	4.69	0.575	71
9b	4.62	0.704	71
9c	4.32	0.732	71
9d	4.54	0.714	71
9e	4.35	0.739	71
9f	3.39	1.14	71
9g	4.62	0.663	71
10a	4.17	0.956	71
A1	4.75	0.527	71
A2	4.97	0.167	71
A3	4.9	0.3	71
A4	4.96	0.203	71

Appendix B.3 Correlation Matrix

Correlation Matrix

		1a	1b	1c	1d	1e	1f	2a
Correlation	1a	1.000	0.390	0.067	0.252	0.298	0.196	0.170
	1b	0.390	1.000	0.110	0.126	0.102	0.151	0.191
	1c	0.067	0.110	1.000	0.052	0.327	0.215	0.241
	1d	0.252	0.126	0.052	1.000	0.230	0.188	0.292
	1e	0.298	0.102	0.327	0.230	1.000	0.290	0.493
	1f	0.196	0.151	0.215	0.188	0.290	1.000	0.227
	2a	0.170	0.191	0.241	0.292	0.493	0.227	1.000
	2b	0.055	0.280	0.383	0.102	0.355	0.066	0.336
	2c	0.139	0.065	0.028	0.188	0.037	0.018	0.227
	2d	0.276	0.048	0.218	0.489	0.347	0.240	0.320
	3a	0.128	0.086	0.284	0.007	0.467	0.229	0.148
	3b	0.116	-0.089	0.080	0.174	0.267	-0.066	0.134
	3c	0.265	0.237	0.097	0.369	0.116	-0.046	0.153
	4a	0.362	0.150	0.258	0.412	0.435	0.205	0.346
	5a	-0.005	0.080	0.446	0.265	0.138	0.182	0.031
	5b	0.103	0.117	0.312	0.321	0.115	0.240	0.030
	6a	0.320	0.109	0.284	0.261	0.547	0.150	0.514
	6b	0.127	0.086	0.301	0.218	0.476	0.316	0.574
	6c	0.334	0.241	0.325	0.302	0.295	0.249	0.387
	7a	0.252	0.266	0.332	0.172	0.481	0.276	0.233
	7b	0.348	0.421	-0.016	0.052	0.347	0.052	0.246
	8a	0.144	0.166	0.346	0.333	0.167	0.234	0.300
	8b	0.347	0.270	0.064	0.153	0.243	-0.073	0.116
	9a	0.104	0.087	0.255	0.241	0.253	0.095	0.369
	9b	0.040	0.017	0.160	0.076	0.211	0.125	0.250
	9c	0.264	0.100	0.031	0.434	0.111	0.069	0.228
	9d	0.437	0.184	0.100	0.441	0.255	0.023	0.266
	9e	0.011	0.130	0.049	0.291	0.128	0.041	0.168
	9f	0.175	0.294	0.145	0.396	0.165	0.130	0.153
	9g	0.341	0.244	0.252	0.366	0.335	0.232	0.439
	10a	0.182	0.142	0.342	0.294	0.123	0.116	0.061
	A1	0.114	0.287	0.074	0.142	0.188	-0.034	0.132
	A2	0.221	-0.136	0.080	0.050	0.140	0.119	-0.087
	A3	0.101	0.234	0.201	0.136	0.454	-0.042	0.307
	A4	0.273	0.109	0.166	0.003	0.444	-0.096	0.175

Correlation Matrix

		2b	2c	2d	3a	3b	3c	4a
Correlation	1a	0.055	0.139	0.276	0.128	0.116	0.265	0.362
	1b	0.280	0.065	0.048	0.086	-0.089	0.237	0.150
	1c	0.383	0.028	0.218	0.284	0.080	0.097	0.258
	1d	0.102	0.188	0.489	0.007	0.174	0.369	0.412
	1e	0.355	0.037	0.347	0.467	0.267	0.116	0.435
	1f	0.066	0.018	0.240	0.229	-0.066	-0.046	0.205
	2a	0.336	0.227	0.320	0.148	0.134	0.153	0.346
	2b	1.000	0.144	0.260	0.207	0.135	0.189	0.442
	2c	0.144	1.000	0.394	0.055	0.280	0.248	0.205
	2d	0.260	0.394	1.000	0.144	0.352	0.239	0.518
	3a	0.207	0.055	0.144	1.000	0.229	0.022	0.078
	3b	0.135	0.280	0.352	0.229	1.000	0.216	0.267
	3c	0.189	0.248	0.239	0.022	0.216	1.000	0.182
	4a	0.442	0.205	0.518	0.078	0.267	0.182	1.000
	5a	0.177	0.056	0.464	0.124	0.160	0.279	0.185
	5b	0.000	-0.034	0.350	0.040	0.052	0.429	0.192
	6a	0.213	0.150	0.489	0.202	0.296	0.279	0.455
	6b	0.200	0.120	0.371	0.167	0.474	0.152	0.367
	6c	0.226	0.198	0.487	0.263	0.304	0.232	0.352
	7a	0.315	0.140	0.387	0.362	0.160	-0.007	0.177
	7b	0.390	0.233	0.246	0.240	0.312	0.226	0.280
	8a	0.259	0.310	0.492	0.206	0.311	0.338	0.336
	8b	0.285	0.146	0.247	0.081	0.146	0.331	0.243
	9a	0.238	0.551	0.644	0.347	0.500	0.234	0.253
	9b	0.141	0.358	0.245	0.292	0.178	0.199	0.107
	9c	0.194	0.203	0.419	0.098	0.130	0.395	0.211
	9d	0.265	0.207	0.389	0.181	0.219	0.256	0.306
	9e	0.121	0.397	0.438	0.114	0.454	0.413	0.178
	9f	0.069	0.073	0.345	0.124	0.138	0.530	0.101
	9g	0.201	0.381	0.428	0.253	0.227	0.250	0.335
	10a	0.203	0.150	0.340	-0.038	0.224	0.487	0.276
	A1	0.254	0.153	0.134	0.069	0.175	-0.025	0.258
	A2	0.112	0.119	0.166	0.150	0.212	-0.017	0.360
	A3	0.274	0.068	0.174	0.229	0.244	0.265	0.210
	A4	0.222	0.066	0.315	0.279	0.385	0.168	0.263

Correlation Matrix

		8a	8b	9a	9b	9c	9d	9e
Correlation	1a	0.144	0.347	0.104	0.040	0.264	0.437	0.011
	1b	0.166	0.270	0.087	0.017	0.100	0.184	0.130
	1c	0.346	0.064	0.255	0.160	0.031	0.100	0.049
	1d	0.333	0.153	0.241	0.076	0.434	0.441	0.291
	1e	0.167	0.243	0.253	0.211	0.111	0.255	0.128
	1f	0.234	-0.073	0.095	0.125	0.069	0.023	0.041
	2a	0.300	0.116	0.369	0.250	0.228	0.266	0.168
	2b	0.259	0.285	0.238	0.141	0.194	0.265	0.121
	2c	0.310	0.146	0.551	0.358	0.203	0.207	0.397
	2d	0.492	0.247	0.644	0.245	0.419	0.389	0.438
	3a	0.206	0.081	0.347	0.292	0.098	0.181	0.114
	3b	0.311	0.146	0.500	0.178	0.130	0.219	0.454
	3c	0.338	0.331	0.234	0.199	0.395	0.256	0.413
	4a	0.336	0.243	0.253	0.107	0.211	0.306	0.178
	5a	0.315	0.103	0.361	0.267	0.231	0.014	0.383
	5b	0.276	0.224	0.130	0.064	0.224	0.105	0.384
	6a	0.431	0.450	0.407	0.294	0.270	0.393	0.331
	6b	0.248	0.228	0.460	0.277	0.286	0.288	0.298
	6c	0.534	0.464	0.638	0.506	0.268	0.476	0.344
	7a	0.291	0.335	0.349	0.310	0.140	0.402	0.242
	7b	0.295	0.459	0.296	0.224	0.208	0.413	0.369
	8a	1.000	0.219	0.515	0.377	0.199	0.288	0.388
	8b	0.219	1.000	0.256	0.292	0.329	0.526	0.411
	9a	0.515	0.256	1.000	0.586	0.377	0.305	0.462
	9b	0.377	0.292	0.586	1.000	0.325	0.212	0.343
	9c	0.199	0.329	0.377	0.325	1.000	0.538	0.367
	9d	0.288	0.526	0.305	0.212	0.538	1.000	0.288
	9e	0.388	0.411	0.462	0.343	0.367	0.288	1.000
	9f	0.329	0.348	0.276	0.100	0.341	0.299	0.494
	9g	0.426	0.346	0.548	0.420	0.316	0.557	0.394
	10a	0.368	0.192	0.278	0.182	0.206	0.263	0.360
	A1	0.190	0.245	0.303	0.237	0.290	0.252	0.196
	A2	0.144	0.197	0.206	0.273	0.193	0.129	-0.034
	A3	0.252	0.542	0.399	0.361	0.277	0.316	0.223
	A4	0.300	0.361	0.376	0.286	0.190	0.356	0.196

Correlation Matrix

		9f	9g	10a	A1	A2	A3	A4
Correlation	1a	0.175	0.341	0.182	0.114	0.221	0.101	0.273
	1b	0.294	0.244	0.142	0.287	-0.136	0.234	0.109
	1c	0.145	0.252	0.342	0.074	0.080	0.201	0.166
	1d	0.396	0.366	0.294	0.142	0.050	0.136	0.003
	1e	0.165	0.335	0.123	0.188	0.140	0.454	0.444
	1f	0.130	0.232	0.116	-0.034	0.119	-0.042	-0.096
	2a	0.153	0.439	0.061	0.132	-0.087	0.307	0.175
	2b	0.069	0.201	0.203	0.254	0.112	0.274	0.222
	2c	0.073	0.381	0.150	0.153	0.119	0.068	0.066
	2d	0.345	0.428	0.340	0.134	0.166	0.174	0.315
	3a	0.124	0.253	-0.038	0.069	0.150	0.229	0.279
	3b	0.138	0.227	0.224	0.175	0.212	0.244	0.385
	3c	0.530	0.250	0.487	-0.025	-0.017	0.265	0.168
	4a	0.101	0.335	0.276	0.258	0.360	0.210	0.263
	5a	0.359	0.118	0.372	0.064	0.083	0.040	0.103
	5b	0.446	0.113	0.344	-0.028	0.000	0.000	0.000
	6a	0.260	0.420	0.181	0.284	0.147	0.582	0.621
	6b	0.170	0.423	0.112	0.139	0.191	0.442	0.341
	6c	0.260	0.606	0.339	0.198	0.188	0.366	0.232
	7a	0.179	0.553	0.104	0.276	0.077	0.495	0.460
	7b	0.236	0.475	0.125	0.332	0.064	0.343	0.403
	8a	0.329	0.426	0.368	0.190	0.144	0.252	0.300
	8b	0.348	0.346	0.192	0.245	0.197	0.542	0.361
	9a	0.276	0.548	0.278	0.303	0.206	0.399	0.376
	9b	0.100	0.420	0.182	0.237	0.273	0.361	0.286
	9c	0.341	0.316	0.206	0.290	0.193	0.277	0.190
	9d	0.299	0.557	0.263	0.252	0.129	0.316	0.356
	9e	0.494	0.394	0.360	0.196	-0.034	0.223	0.196
	9f	1.000	0.296	0.305	0.050	-0.166	0.240	0.135
	9g	0.296	1.000	0.396	0.211	0.160	0.312	0.304
	10a	0.305	0.396	1.000	0.115	0.030	0.009	0.185
	A1	0.050	0.211	0.115	1.000	0.243	0.382	0.433
	A2	-0.166	0.160	0.030	0.243	1.000	0.229	0.387
	A3	0.240	0.312	0.009	0.382	0.229	1.000	0.635
	A4	0.135	0.304	0.185	0.433	0.387	0.635	1.000

APPENDIX C
INTERVIEW DATA

Appendix C.1 Interviewee Profile Data

No.	Name	Position	Project	Company Name	Group Name
v0001	Mr. July Mangaratua	project manager	Thamrin Nine	PT.Wisma Kartika	Individual owner
v0002	Mr. Permadi Indra Yoga	project manager	Tamarind Land	PT.Graha Adikarsa	Intiland
v0003	Mr. Doddy Damas	site manager	Kalibata City	PT.Pradani Sukses Abadi	Agung Podomoro group
v0004	Mr. Reuben Suryamega	executive director	Plaza Simatupang	PT.Selaras Propertindo	Individual owner
v0005	Ms. Fianti Gosal	project director	Festival City	PT.Pradani Sukses Abadi	Agung Podomoro group
v0006	Mr. Utama Gondokusumo	project director	Pinang residence	PT.Intiland Development Tbk	Intiland
v0007	Mr. Felix Yap	project director	Archipelago Arena	PT.Archipelago Sapta Pesona	Agung Podomoro group
v0008	Mr. Didik Riyanto	project manager	Taman Semanan Indah	PT.Taman Harapan Indah	Intiland
v0009	Mr. Suhendro Prabowo	executive director	Regatta apartment	PT.Intiland Development Tbk	Intiland
v0010	Mr. Ivan	site manager	Gading Nias	PT.Tiara Metropolitan Jaya	Agung Podomoro group
v0011	Mr. Irwan Gunawan	project manager	KTM square	PT.Maju Sentosa Cemerlang	Individual owner
v0012	Mr. Agustinus Hartanto	site manager	Thamrin residence	PT.Jakarta Reality	Agung Podomoro group
v0013	Mr. Sugianto Darmawan	site manager	Kalibata City	PT.Pradani Sukses Abadi	Agung Podomoro group

No.	Name	Position	Project	Company Name	Group Name
v0014	Mr. Djendra Muljono	project manager	Kemang Village	PT.Karya Utama Inti Perkasa	Individual owner
v0015	Mr. Sigit Rachmat Purwanto	project manager	Gading Nias	PT.Tiara Metropolitan Jaya	Agung Podomoro group
v0016	Mr. Dwi Kokoh	site manager	St. Moritz	PT. SBIP	Group Lippo
v0017	Ms. Tresani	director	MT Haryono apartment	PT.Berkat Berlian International	Intiland
v0018	Mr. Budiman Kurniawan	project manager	1 Park Residence	PT.Gandaria Permai	Intiland
v0019	Mr. Yusak Sabdono	project manager	Rusunami	PT.Bahama	Individual owner
v0020	Mr. Agung Tristianto	director	The Park Residence	PT.Artha Karya Manunggal Jaya	Intiland
v0021	Mr. Harjanto	project manager	Ciputra world	PT.Ciputra Adigraha	Ciputra
v0022	Mr. Djajadi Salim	project manager	Kalibata City	PT.Pradani Sukses Abadi	Agung Podomoro group
v0023	Mr. Cyper John Mbatemooy	site manager	RS.Graha Kedoya	PT.Kedoya Adyaraya	Individual owner
v0024	Mr. Tjakra D. Puteh	project manager	Patria Park	PT.Pembangunan Perumahan <Persero> Tbk	PP group
v0025	Mr. Henrikus Henry	project manager	MT Haryono apartment	PT.Bersaudara Kagum Sejahtera	Sali Gading Bersama
v0026	Mr. Dani	site manager	Nifarro @ Kalibata	PT.Putera Indonesia Bersama	Sali Gading Bersama
v0027	Mr. Andi Setiawan	site manager	Kalibata City	PT.Pradani Sukses Abadi	Agung Podomoro group

No.	Name	Position	Project	Company Name	Group Name
v0028	Ms. Nelly Kurniawan	project manager	The Bellezza-Permata Hijau	PT.Sumber Daya Nusaphala	Individual owner
v0029	Mr. Anies Heriyanto	executive director	Hotel Wish	PT.Intiland Infinita	Intiland
v0030	Mr. Arief Asyanto	site manager	Ciputra world	PT.Ciputra Adigraha	Ciputra
v0031	Mr. Dian Takdir	project manager	Central park	PT.Tiara Metropolitan Jaya	Agung Podomoro group
v0032	Mr. Kiky Rahardjo	project manager	The Peak	PT.Graha Tunasmekar	Intiland
v0033	Mr. Manalsal Toruan	project manager	Seruni1-4	Perum Perumnas	Perum Perumnas
v0034	Mr. Hero Djoni	project manager	Gandaria City	PT.Artisan Wahyu	Pakuwon Group
v0035	Mr. Anang Triyono	site manager	Rasuna Epicentrum	PT.Bakrie Swasakti Utama	Bakrieland
v0036	Mr. Albertus W Simadibrata	deputy project manager	Royal Mediterania Garden Residences	PT.Tiara Metropolitan Jaya	Agung Podomoro group
v0037	Mr. Liong Dicky Satria	project manager	Royal Mediterania Garden Residences	PT.Tiara Metropolitan Jaya	Agung Podomoro group
v0038	Mr. Rumpoko Adi	project manager	Royal Mediterania Garden Residences	PT.Tiara Metropolitan Jaya	Agung Podomoro group
v0039	Mr. Samsu Atmadji	project manager	Seasons city	PT.Cakrawira Bumimandala	Agung Podomoro group
v0040	Mr. Eddy Sunaryo	site manager	Casa grande	PT.Elite Prima Hutama	Pakuwon Group
v0041	Mr. Pulung Prahasto	project manager	Menara MTH	PT.Adhi Reality	Adhi reality

No.	Name	Position	Project	Company Name	Group Name
v0042	Mr. Teby Suripto	project manager	Sentra Timur Residence	PT.Barkrie Pangriota Loka	Bakrieland
v0043	Mr. Patricius Renaldi	site manager	Grandsoho	PT.Supradinakarya Multijaya	Intiland
v0044	Mr. Willy Premadi	site manager	MTH park	PT. Berkat Berlian International	Intiland
v0045	Mr. Yadi	site manager	Gandaria City	PT.Artisan Wahyu	Pakuwon Group
v0046	Mr. Gatot Suroso	deputy project manager	Seasons city	PT.Cakrawira Bumimandala	Agung Podomoro group
v0047	Mr. Nagib Sahab	site manager	Seasons city	PT.Cakrawira Bumimandala	Agung Podomoro group
v0048	Mr. Jimmy	site manager	Seasons city	PT.Cakrawira Bumimandala	Agung Podomoro group
v0049	Mr. Windoko	project manager	Bakrie tower	PT.Bakrie Swasakti Utama	Bakrieland
v0050	Ms. Renny Soviahani	director	Salemba apartment	PT.Adhi Reality	Adhi reality
v0051	Mr. Andre Legoh	executive director	Essence on Dharmawangsa	PT.Prakarsa Semesta Alam	Individual owner
v0052	Mr. Imam Purwono	project manager	Essence on Dharmawangsa	PT.Prakarsa Semesta Alam	Individual owner
v0053	Mr. Annas Zamroni	project manager	Salemba apartment	PT.Adhi Reality	Adhi reality
v0054	Mr. Wiyoko Ariyanto	project manager	Lifesyle&Entertainment Center	PT.Bakrie Swasakti Utama	Bakrieland
v0055	Mr. Yustinus Iwan K	project manager	The Grove & Mediawalk	PT.Bakrie Swasakti Utama	Bakrieland

No.	Name	Position	Project	Company Name	Group Name
v0056	Mr. Bambang Triono	project manager	Pakubuwono	The Pakubuwono Development	Pakubuwono
v0057	Mr. Heryanto Slamet	project manager	Central park	PT.Tiara Metropolitan Jaya	Agung Podomoro group
v0058	Mr. Djafarullah	project director	Sentra Timur Residence	PT.Barkrie Pangriota Loka	Bakrieland
v0059	Mr. Andi Patria Nusantara	project manager	Sentra Timur Residence	Perum Perumnas	Perum Perumnas
v0060	Mr. Denny Sulaiman	project manager	Gading Icon	PT.Mahardhika Propertindo	Duta Anggada Group
v0061	Mr. Harris Amin Singgih	project manager	Paladian Park	PT.Pembangunan Perumahan <Persero> Tbk	PP group
v0062	Mr. Leonard	project manager	Tempo	PT.Tempo Land	Individual owner
v0063	Mr. Teby Suripto	project manager	Sentra Timur Residence	PT.Barkrie Pangriota Loka	Bakrieland

Appendix C.2 Summary of owners' perception

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
1a	The CM consultant is sensitive and specific at owner's needs	• because CM consultant has to deliver the owner's needs to the contractor to be implemented correctly in the construction • otherwise there will be misunderstanding and wrong construction	• CM consultant still needs to improve this service	• Interpreting what owner wants from the design and contract that has already been made.
1b	The CM consultant communicates with owner to get accurate reflection of the owner's needs	• because many modifications from owner might occur in the middle of the project. CM consultant have to keep communicates with owner, otherwise there will be misunderstanding because of wrong information. • because owner wants the outcome quality of their project to be precise and accurate	• current practice is sporadic which means that it looks like they understand and doing the work according to the owner's needs but actually it might be not • the difficulty to implement this service because several CM consultants feels uncomfortable to repetitively asking and disturbing the owner	• to talk with detail and intensively with the owner

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
1c	The CM consultant is able to recognize, identifyand define problems immediately	• because owner may not be expert at identifying the construction problem	• the current practice in Indonesia shows that this service can use some improvement	• CM consultant has to analyze the problem from several aspects such as how the problem occurs; and what is the cause or source of the problem • CM consultant has to try to make an advice or solution regarding the problem and give this opinion to the designer
1d	The CM consultant shows genuine interest and enthusiasm in performing the service	• because owners want CM consultant as their representative to be responsible taking care the project as what an owner would do	• Based on owners' perception, CM consultant needs to improve their interest about the successful of the project	• being more responsible, more care and give more attention into the project

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
1e	The CM consultant explains how jobs will be administered and what the owner can expect from them	• because owner needs to check the compatibility of the method proposed by the CM consultant in order to achieve the project's goals • because owner needs to keep track and monitor the process of the project and therefore owner needs to know how CM consultant will manage the project and the procedures in constructing the project	• The explanation of how jobs will be administered were considered good enough and implemented correctly by many CM consultants. However, several owners claimed that its implementation in the real practice is different and not the same from what presented previously	• explain the schedule planning of the project • explain the Standard Operational Procedure (SOP) which should include all the procedure in the project
1f	The CM consultant supervises the security and safety management of the project	• because working in the construction has a very high risk of accident • because many accidents might resulted in a bad reputation of the owner	• Several owners claimed that accidents and thieving sometimes happened in their project	• CM consultant gives warning and reminding contractor if something is not according to the safety regulation • there should be routine safety talk

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
		• because some items in the construction are expensive and might get stolen	• CM consultant should be more confidence in giving warning to the contractor	• CM consultant should check the procedure for safety and security management that were proposed by the contractor
2a	The staff has good hospitality and friendliness	• because hospitality and friendliness is necessary to maintain a good working environment of all participants in the project	• many CM consultant in Indonesia has the nature of being friendly and perform good hospitality in performing their service in the construction project	• CM consultant should not over friendly with the contractor and becomes too soft in front of them. CM consultant still needs to be strict in managing the project
2b	The staff has good manner and politeness in performing the service	• because many construction's participants has lots of stress and tired working in construction and can get easily offended	• this manner and politeness already implemented well enough in Indonesia	• good manner and politeness should be implemented in the communication with the project participants such as owner, contractor and sub-contractor • should not overdo the politeness in front of contractor

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
2c	The CM consultant has good understanding and knowledge of the current situation of the industry and their owner's circumstances (i.e. political, financial, etc).	• because owners might be busy with their business and not aware of current situation of the construction industry • because owners have their own financial or political situation that may affect the project	• CM consultant concentrates more on the project rather than looking into the current industry and owner's circumstances	• CM consultant should understand owner's situation when owner has a problem • CM consultant needs to inform owner immediately concerning the current industry situation such as price fluctuation of the materials which may give benefit to the owner on buying cheaper materials before the price goes up
2d	The staff are able to communicate in a non-technical way with the owner that may not be familiar with engineering discipline	• Because owner might don't have engineering background to understand the terms in construction project	• current practice of this non-technical speech ability was considered to be good enough	• to be able give explanation with language and terms that can be easily understood by the owner • the project manager from CM consultant should able to communicate and explain in non-technical way to the owner

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
2e	The CM consultant provides services which are flexible and customized for each owner	• because owner may want to hire CM consultant in several different ways such as hiring CM consultant for supervising only; or include managing the project; or include managing the budget; • because many times owner needs to change design, specification or schedule in the project	• current practice in Indonesia shows that it can use some improvement • CM consultant being to flexible regarding the price of their service. In order to compete with the other company, they try to lower their price to win the tender.	• should not be too flexible regarding the price of their service • CM consultant should provide scope of their work depending on owner‘s decision • CM consultant needs to be flexible and is able to adjust their service performance according to the changes
2f	The CM consultant is capable of providing good quality and reliable advice	• because owner may not be familiar with engineering and construction project	• CM consultant capability in giving the advice can still be improved	• CM consultant can give more contribution in giving advice from the management of the project‘s viewpoint

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
				• CM consultant should be involved since the beginning of the project in order to give more proper advice
2g	The CM consultant is creative in performing the service	• because owners do not have enough experience in construction as CM consultant to be able to be creative regarding construction matters	• the current practice in Indonesia shows limitation in the implementation of creativity in construction. Therefore, the staff of CM consultant should have more experience to makes them smarter than contractor. It will also make them more capable in leading the project	• creative can be in the way of management of the project such as making priorities which work should be done first • creativity can also be implemented in their method for supervising the construction process such as improving the effectiveness of CM consultant's supervising

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
				• CM consultant can also be creative in solving the problem in construction without changing the design and increasing the cost • creativity also limited in changing the design, but if they get approval from the designer then it should be fine • creativity can be improved by sharing knowledge and experience between each other staff on how to solve the problem or how to increase the effectiveness or efficiency of the project

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
2h	The CM consultant proactively develops various solutions when problems occur	• because in making the decision, owner needs to choose from several options, which one is the best and the cheapest solution	• For better service quality, CM consultant should have the courage to give solutions. The reason is that owners expect the CM consultant can help them by giving reliable solutions. It will be better rather than just sends the problem to designer.	• the solution that CM try to developed should not effecting completion date of the project, the cost is as low as possible and has good quality • CM consultant should try to at least propose two solutions because owner wants to see and choose which solution is the best for their project
3a	The CM consultant is able to implement and maintain or watch over the contract that has already been agreed between owner and contractor	• because owners might not be expert and familiar with the construction's type contract	• CM consultant thinks and concerns owner more than the contractor	• to be professional in watching over the contract • CM need to understand what is written in the contract

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
				• CM needs to be smart in order for CM to judge whether contractor is right or wrong • CM should be accurate in collecting the data of records of the project because this data
3b	The CM consultant is able to anticipate the problem before it happens in the project.	• because owner and designer might make a mistake in the design • because contractor might make a mistake in the process of construction	• CM consultant in Indonesia still needs to improve their capability in anticipating of the problem before it happens in the project	• to properly check the drawing whether it has correct relation between the architect, the structural and the mechanical & electrical • CM consultant should able to remind or give warning before contractor do something wrong in the process of construction

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
3c	The CM consultant is able to maintain owner's project information confidentially	• because owners afraid their competitor copying their project • because owner afraid the information can be used for bad purpose such as fraud • because owner afraid another party might take advantages from the information	• the current practice in Indonesia shows that it depends on what information owner wants to be classified and to whom it need to be classified	• CM need to keep confidential the drawing, the design, the specificationand the cost of the project which is the most important to be kept secret
4a	The CM consultant promptly responds to owner's requests, queries and complaints	• because if owner's queries or request is not responded immediately then owner cannot make decision which will cause the delay for the project	• the responsiveness of CM consultant in handling the request, queries and complaints can still be improved	• CM consultant as the leader of the project in construction site, should be able to answer several questions that not deeply related to structural or technical

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
				• if CM consultant in unable to answer because the queries or complaints are deeply concerning the technical or structural then CM consultant should immediately send it to the corresponding and related party such as the designer or the contractor
4b	The CM consultant is able to cooperate and coordinate with the other parties in construction (i.e. owner, contractor, sub-contractor and other consultants)	• because construction involves lots of project participants such as contractors and sub-contractors	• CM consultant still needs to improve their capability in coordinating and especially in pushing the contractor.	• CM consultant not only work together with other parties, but also give guidance and lead the project • cooperation and coordination should be implemented in the professional way

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
4c	The CM consultant properly provides regular dialogue on progress of the project	• because owner needs to monitor the progress of their project regularly to check the accurateness of the project whether it is exactly as owner wants or not • because it can avoid missing communication between owner and CM consultant	• current practice is if owner ask and try to communicate then CM consultant will react and gives information, but if owner not ask anything then they may not gives any information and try to communicate • right now owner can know more the condition and situation of the project more than the CM consultant	• meeting for all staff need to be conducted every week • to communicate with the owner in the daily activity every day • to keep everyone inside the CM consultant to stay updated with every information and current condition of the project
4d	The CM consultant is able to provide good control for quality of materials and workmanship	• because owners care and pay attention about the quality of the result as the first priority • because famous and big contractor company does not guarantee the result of their work always produce good quality	• CM consultant needs to improve their accuracy in controlling the quality of workmanship	• to supervise and check the project accordingly with the standard operational procedure (SOP) that the company proposed to owner previously in the beginning of the project

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
				• to have a checklist form in supervising and checking the project
4e	The staff are accessible and could be reached easily by owner.	• because owner does not directly manage and lead the project in the construction site	• This service of CM consultant service quality is considered already well implemented. Several staff of CM consultant always stays and sleeps every day in the construction site	• the project manager of CM consultant is the right staff that should be accessible and could be reached easily by the owner • the staff of CM consultant should provide themselves with telecommunication devices
5a	The CM consultant is able to complete the project within the scheduled dates	• because owner may need to use the building as soon as it finishes to start their business activity as soon as possible	• to finish the project within the scheduled dates not entirely depends on CM consultant, but it also depends on the owner.	• to make a good plan and schedule that covers the entire work package and reasonable to be done.

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
			• If owner make any modification or increases an additional work, it will increase the time needed to complete the work and make it more difficult to complete the project within the scheduled dates	• in case of any delays in the middle of construction, CM was expected to able push the contractor to pace up their progress and make their work more efficient • CM consultant able to see the symptoms if the project seems will be late or will have a delay and make an early warning to the contractor to pace up their working performance • make value engineering regarding the working method or the management procedure that maybe can make the work more effective and efficient

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
5b	The CM consultant shows initiative in performing the service	• because initiative performance of CM consultant as the leader of the project can increase the progressiveness of the project	• The research found that the implementation of initiative in performing the service is still need to be improved. The improvement should be conducted in several forms such as initiative in anticipating the problem; initiative in developing a solution; and initiative in making a decision	• being initiative in performing the service should not be conducted without referring to the SOP • If related to the cost then it needs the involvement of owner in making the decision
6a	The staff has good academic knowledge, experience and is able to give valid contribution	• because academic knowledge and experience play a very important role that affects the service quality of a CM consultant • because CM consultant needs to be smarter and more expert than contractor, in order to manage and supervise the contractor	• The current practice shows that this knowledge and experience of CM consultant's staff is still need to be improved. There is an imbalance quality level among the CM consultant's staff. • The experience of CM consultant's staff nowadays also still not good enough. Most of them are fresh graduate which means lacks of experience.	• knowledge of a CM consultant's staff should cover the understanding of material, drawing, work method and basic calculation. In addition, understanding about construction regulation and everything about working permit related to the government's permit is also considered to be important.

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
				• experience of a CM consultant's staff should cover the knowledge of common problems in construction and capability to solve it. It is necessary for a CM consultant to have an experience in the same field of building construction rather than in another type of project.
6b	The CM consultant has high accuracy, detail and completeness of the records	• because reports and records are the tools for owner to evaluate and analyze the process of the project • because this reports and records also can act as a prove or evidence when there's any dispute with the contractor	• CM consultant's documentation, reporting and recording of the process of the construction are well organized and quite accurate	• CM consultant have to record the activity of the project using the checklist form and later on make the report of all activity each day • CM consultant should make the daily report, monthly report and photo recording

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
		• because these records will be used as their reference to check the as-built drawing		
6c	The CM consultant has good and sufficient track record in similar project	• because the complexity and the coordination needed are different • because track record in similar project may bring support the CM consultant to deliver better service quality	• currently many CM consultants may already have experience in the building construction project	• level of experience or track record in of the CM consultant should be in accordance with the current project
7a	The CM consultant informs the owner immediately about any sudden and urgent situation related to the project	• because owner needs to make decision immediately what the next step to do • because it related to the coordination with the other parties	• CM consultant initiative and response to immediately inform the owner still needs to be improved • CM consultant just informs the situation only in the weekly meeting	• Many media of technology can be used to inform owner immediately such as cell phone and email

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
7b	The CM consultant is able to use and understand the tools for QC, in order for them to check it properly	• because CM consultant is more familiar with the tools and equipment for the construction rather than the owner • because if CM consultant does not understand how to use the tools then they may not qualify enough to check the process of the QC properly	• current practice of CM consultant being able to understand the tools for QC is limited only to the traditional tools such as ruler, meter, water pass, theodolite • CM consultant does not familiar and does not have updated knowledge about the latest technology of tools and methods for QC such as the laser level, the digital concrete test hammer, x-rays and ultrasonic testing	• CM consultant to have more knowledge about the modern tools for QC
7c	The CM consultant is able to complete the project within the agreed budget	• because owner may have limited source of budget for the project	• Current practice in Indonesia shows that several owners did not include the CM consultant in managing the budget or cost of the project	• CM consultant can be more aware and extra careful in evaluating the distribution of the work package for the project

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
				• CM consultant can try doing value engineering to the design or the working method in order to improve the process of the project to be more efficient. • CM consultant also can contribute in finishing the project on budget by being more careful and detail in managing and supervising the project
7d	The CM consultant builds up trust and honesty in the working relationship	• because owner needs to be sure that CM whom they hired can be trusted and not taking any inappropriate advantage from owner • because owner cannot fully monitor the project for 24 hours a day	• CM consultants in Indonesia still need to improve their honesty	• CM consultant has to be honest, not accepting bribe money • CM consultant should have high integrity

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
			• the old staff of CM consultant seems to be more experience in cheating and corrupting	• CM consultant should not provoking the other parties to corrupt or do illegal things
8a	The CM consultant does a job according to the SOP that has already been agreed	• because SOP is the guidance or rules for conducting the construction project which should be followed by all project participants	• The research found there are several CM consultants that doing their exactly with the SOP and some of them did not • several CM consultants still have lack in implementing the SOP such as did not bring the checklist form when inspecting the construction and make changes without approval from the designer	• CM consultant should show some initiative such as talk directly to contractor/designer rather than just following SOP which is only sending letter.
9a	The CM consultant is able to complete the project under its technical requirements/specifications	• because owner cannot come and control the contractor every day. Therefore owner needs CM consultant to supervise the contractor to finish the project with the correct specifications	• project's specification may change because of owner's decision. • There are also some cases that the materials are unavailable	• CM consultant need to check whether the contractor really using the correct material and whether the contractor really installing the correct material

No.	CM consultant's service quality items	The reason its important to be provided	Current practice of each service	Suggestions for performing the service
9b	The CM consultant uses computerized systems and software which are compatible with the owner	• because owner may not familiar with the engineering program or software that being used by CM consultant	• CM consultant use common programs from ms project and primavera for managing the project	• it will be very useful if CM consultant able to put the data or progress of the project in the online database
10a	The staff has the capability to do immediate problem solving	• because owner does not have enough experience and time to solve every problems that occur in construction site	• The current practice of this service shows that CM consultant needs to improve this service. Based on owners' perception, it will be better if CM consultant can improve their capability to do immediate problem solving	• Being able to do immediate problem solving should be provided by the project manager and not by the normal staff. • If project manager cannot solve it then it should be forwarded to the project director and its engineering team in the office • The way that CM consultant solves the problem should make sense and can be explained properly to the owner

BIOGRAPHY

William Mulijadi was born on 07 May 1986 in Jakarta, the capital of Indonesia. He finished his bachelor‘s degree in Civil Engineering at Bandung Institute of Technology (ITB) – Indonesia. His undergraduate research focused on Structural Engineering, specifically on the Special Moment Frame (SMF) and Ordinary Moment Frame (OMF). During his undergraduate study in ITB, he was active as the vice head of social department in Civil Engineering Student Organization (HMS – ITB), Bandung.

With the encouragement from his undergraduate teacher, Dr. Masyhur Irsyam and Dean of Faculty of Industrial Technology, Dr. Dwiwahju Sasongko, he applied for a Master‘s Degree in Civil Engineering under ASEAN University Network / Southeast Asia Engineering Education Development Network (AUN/SEED-Net) Scholarship. Due to the exposure he gained during his undergraduate study, he chose the Construction Engineering and Management field. Furthermore, he focused to do a research on service quality of CM consultant in Indonesia.