

Study on the Analysis of Domestic Construction Management Orders

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Abstract: Currently, there is insufficient research on the construction management performance since the CM system was introduced in Korea. For successful completion of construction projects, active use of construction managers on projects is necessary by introducing construction management to the projects. In view of this, this study analyzed the annual CM performance from 1996 to 2013 but for the past 5 years from 2009 to 2013, a detailed analysis was carried out. For different sectors, CM performances were divided into public and private sectors, for project types, construction, civil and others, for project phases, pre-design, design, construction and post-construction phases, for contract types, sole and joint contract types, for project scale, the amount of the projects was taken into consideration and they were divided into large, medium and small scales and for the types of projects, they were divided into, shops, department stores, shopping centers, hospitals, government buildings, hotels, accommodation facilities, factories, buildings for workshops, office buildings, stadiums, playgrounds, schools and other construction types and all the data divided into such categories was analyzed. The results in this study can be used as a basic reference for studies in analysing construction management performances.

Keywords: Construction Management, CM Orders, Orders Analysis, CM performance

I. INTRODUCTION

A. Background and Purpose of the Study

Due to a succession of large scale collapses that occurred, the Korean government introduced construction management system in December 1996 for the first time and the construction management was incorporated into Construction Industry Framework Act. Since its introduction, construction management in Korea has seen a quantum leap of development in the past 20 years.

In 1997, CM contracts started off with a total of 6 (1,952 million won) in the private sector and this has since gradually spread to public sector. According to the CM performance review results in 2013, the CM market grew by about 88 times in terms of number of CM contracts, 528 cases, and by about 166 times in terms of the amount, 323,621 million won compared to 1997.

However, there is insufficient study on CM performance as studies related to CM mostly focus on CM application and stimulation. This study will look at trends in CM projects in the past 18 years by organizing and analyzing status of domestic CM orders and look at measures for future development.

B. Scope and Method of the Study

This study is based on CM performance report data analyses of the status of annual CM performance from 1996 to 2013. The data only includes performances of CM for Fee and excludes data on performances of CM at Risk.

The performances of the five years from 2009 to 2013

are analyzed in detail and for project sectors, they are divided into public and private sectors, for project types, into construction, civil and other project types, for project phases, into pre-design, design, construction and post-construction phases, for contract types, sole and joint contract types, for project scale, the amount of the projects is taken into consideration and they are divided into large, medium and small scales and for types of projects, they are divided into, shops, department stores, shopping centers, hospitals, government buildings, hotels, accommodation facilities, factories, buildings for workshops, office buildings, stadiums, playgrounds, schools and other construction types. It is expected that this study could be utilized as a basis for the analysis of CM performance in the future.

II. INTRODUCTION AND STUDY OF CM

"CM" is defined as work that is carried out for management of construction work such as planning, feasibility studies, analysis, design, procurement, contract, construction supervision, assessment and post-construction management and etc. (As defined in Construction Industry Framework Act, Article 2 , Sub-clause 8).

Since the late 1990s, much study has been conducted on introduction and activation of CM. These studies can be divided by 5 years in 4 different stages.

The first stage is "the late 1990s" which looked at "definition and introduction of CM", the second stage is

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"the early 2000s" which looked at "CM legal / institutional establishment and expansion", the third stage is "the late 2000s," which looked at "securing competitiveness in CM", and the fourth stage is "the early 2010s" which looked at "making foundations for venturing into overseas CM markets." (Jung et al. 2012).

III. CM PERFORMANCE ANALYSIS

CM performance analysis which is comprehensive and quantitative for the past 18 years is very complicated and difficult work. Thus, this study was carried in five categories which are as follows.

- 1) Total CM performance by year
- 2) Public and private sectors and further classification pending the amount and the number of projects in each sector.
- 3) Construction types, i.e., construction, civil and others in each year and further classification pending the amount and the number of projects in each construction type.
- 4) Divide the overall project phases by amount and number of projects
- 5) Contract types for 5 years (2009 ~ 2013).

A. Performance Analysis by Year

CM performance has steadily increased since CM introduction in 1997. Due to the mega project of US military base relocation from 2007 to 2012, there were differences in increase or decrease of CM performance but nonetheless there was a gentle curve of increase in CM performance if the figures for the US military base relocation are excluded. Due to the slump in the domestic construction market in the recent years, the size of the CM market is keeping steady without any increases in the low 300 billion won mark.

TABLE I
 Contract Analysis by Year CM Elements

Overview of CM Statistics 1996 to 2013: 3,045,995 million won for 3,422 project		
Variables	Public sector	Private sector
Amount	₩ 1,480,782 million (48.61%)	₩ 1,565,213 million (51.39%)
No. of Projects	1,217 contracts (35.56%)	2,205 contracts (64.44%)

B. Performance Analysis of Public and Private Sectors

The results of CM performance analysis for public and private sectors show that the amount in the two sectors are similar but the number of projects in the private sector was much higher than in the public sector. This means that the size of the projects in the public sector were bigger than those in the private sector.

When looking at the yearly trends for the public sector, the number of projects and the increase and the

decrease in the amount do not deviate much from the trends in the total yearly CM performance but the reason for the high amount in 2007 and 2012 can be attributed to the US military base relocation. The reason for high number of projects in CM performance in 2013 compared to the amount was due to the number of projects that were reported by Lotte Engineering & Construction, HKCMC Co., Ltd, Saman Corporation and others which were small in project size. In particular, Saman Corporation mainly reported its CM performance in planning phase, feasibility study of the pre-design phase, basic plan establishment, capability review and in case of HKCMC Co., Ltd, it reported many small amounts in its CM performance of the design phase, writing up of the work schedule for the construction phase, process management, establishment of initial process plans, etc which resulted in a high number of projects. Annual trends in the private sector were not too different from the total yearly CM performance trends.

TABLE II
 Contract Analysis by Year CM Elements of Sectors

Variables		Construction	Civil	Guitar
Project Types	Public	₩ 870,975 million (82.25%)	₩ 164,976 million (15.58%)	₩ 22,989 million (2.17%)
		447 contracts (88.34%)	29 contracts (5.73%)	30 contracts (5.93%)
	Private	₩ 764,583 million (94.59%)	₩ 15,189 million (1.88%)	₩ 28,527 million (3.53%)
		929 contracts (91.72%)	62 contracts (6.12%)	22 contracts (2.17%)
	Total	₩ 1,635,558 million (87.59%)	₩ 180,168 million (9.65%)	₩ 51,516 million (2.76%)
		1,376 contracts (90.59%)	91 contracts (5.99%)	52 contracts (3.42%)

C. Performance Analysis by Project Types

In project types, construction consisted of 87.59% in project amount and 90.59% in the number of projects. Looking at the yearly CM performance, construction, civil and others were worth less than 50 billion won at the inception stage of the CM introduction but the CM performance in construction seemed to increase gradually. 442.3 billion won of CM performance in construction was reported in 2012 but for civil, landscape and industrial equipment and others, the amount was still less than 50 billion won. This indicates that CM was active in the construction field but there was lack of CM utilization in civil and other fields. The analyzed results of the public and private sectors were not much different from the analysis of all CM performance but the civil projects in the public sector was higher than in the private sector since the amount was small when taking into account the number of projects, it can be seen that there were many projects with small amounts.

D. Performance Analysis by Project Phases

When looking at the project phases based on amount, phases from design stage to the post-construction stage took up the highest percentage at 39%. This means that 3 stages combined together, the design, construction and post-construction stages result in high construction cost but also, when looking at the number of projects, the percentage is the highest at 24%, leading to a conclusion that currently, the CM orders are most common for design to post-construction phases.

In the public sector, pre-design phase to post-construction phase and design phase to post-construction phase were most common at 72%. When analyzing the data based on the number of projects, pre-design phase to post-construction phase comes to 13% whereas it is 37% when the analysis is based on the amount but this can be due to the large scale public projects such as the US military base relocation project with project orders in the form of pre-design phase to post-construction phase which were measured in the CM performance. Design phase to post-construction phase show the same pattern. In the graph for the private sector, based on the amount, design phase to post-construction phase takes up 50% of all the projects and unlike the public sector, design phase to construction phase takes up 20% of all the projects. When looking at the number of projects, a similar pattern appears which means that in the private sector, CM is not very much utilized in the pre-design phase. In the graph, it shows that the CM performance amounts to about 15% including the design phase compared to 57% in the public sector, indicating a much lower percentage.

E. Performance Analysis by Types of Orders

When looking at the types of orders, sole contracts and joint-contracts showed similar figures based on amounts. However, when looking at the number of projects, sole contracts showed a much higher figure at 1,599 projects (78%). This figure indicates that there were a large number of small firms which worked on a large number of projects in feasibility study in the pre-design phase, design VE in the design phase and work schedule planning in the construction phase. When looking more closely in the sectors, in the public sector, joint-contract came to 83% based on amount but based on the number of projects, it was only 43% which is lower than the figure for sole contracts. This means that large orders were given mainly to joint-contracts. On the other hand, in the private sector, sole contracts were most common when looking at the amount and the number of projects.

F. Performance Analysis by Project Size

In the graph for the size of projects, there were 494 projects(35.29%) that were less than 50 million won, 552 projects(39.43%) that were between 100 million to 500 million won and 354 projects(25.28%) that were between 1 billion to 3 billion won.

For the projects that were less than 50 million won, there was a large number of small size projects covering work for pre-design stage (feasibility studies and planning) and construction stage (work schedule planning and process management).

Looking at the data for projects between 1 billion to 3 billion won, it shows a large number of order types. This indicates that CM was largely utilized in the construction and when looking at the construction cost rate scheme, it appears that there was a large number of CM orders for projects between 20 billion and 30 billion won.

G. Performance Analysis by Project Types

There were private orders for shops, department stores, shopping centers and office buildings whereas for government office buildings, there was a large number of CM orders with sizable amounts for construction of new government office buildings due to the government agencies moving to regional areas.

IV. MEASURE FOR CM DEVELOPMENT

A. Results of CM Performance Analysis by Year

Due to the slump in the domestic construction market in the recent years, the size of the CM market is keeping steady without any increases in the low 300 billion won mark and as a result, it is now necessary for CM to venture into overseas market and locally, develop new services and uncover and invest in new markets.

B. Results of CM Performance Analysis by Sectors

In the private sector, it is thought that CM is making good progress and with continued effort on the part of the construction companies to provide quality CM services, the situation will get better. However, a systematic complementation is needed to prevent proliferation of untested and unworthy construction companies.

C. Results of CM Performance Analysis by Project Types

In the types of projects, as already discussed in the data analysis, CM utilization is quite low in civil and other projects. In case of civil work, there are hardly any private orders and hence the CM needs to be utilized by the public sector but as yet this is not taking place. There is a need for change in types of orders and much improvement is needed for CM promotion and pilot projects.

D. Results of CM Performance Analysis by Project Phases

Gauging success of projects depends on how soon the construction managers are introduced into the projects in the early stages and the effect of CM services is all the more prominent as a result. A lesser number of private project orders than public projects, in the design phase

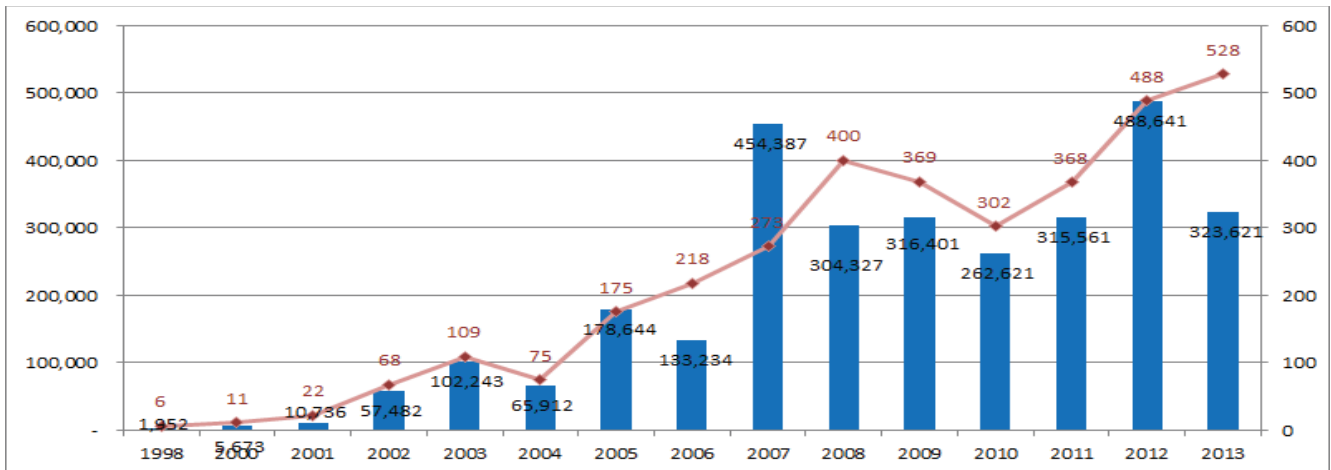


Fig 1. CM INDUSTRY TREND : 1998 TO 2013 STATISTICS

indicate that the effect of CM depending on the stage of the introduction of the CM, is not widely known and hence, there is a need for much more promotion of CM. In the private sector, there have been cases of loss suffered as a result of using untested agencies and developers in the project planning stage and hence a systematic complementation is necessary.

E. Results of CM Performance Analysis by Types of Orders

Due to the nature of public work construction, the amount of the projects is substantial and there is no risk of non-payment and hence, there are more joint-contracts. In private projects, private contracts take place depending on the companies' sales capacity and at times, there is limited competitive bidding according to clients' needs and hence there are more cases of sole contracts.

F. Results of CM Performance Analysis by Project Size

As already discussed in the data analysis, for project sizes, projects amounting between 1 billion and 3 billion won (15%) were most common. This indicates that there were many CM orders for projects with amounts between 20 billion and 30 billion won in construction. Civil work is a national business-oriented and for such projects, the role of project planning, pre-design phase and design phase in the early stages is most important and hence, there needs to be stimulation of CM in the civil work. Also, there needs to be much more orders for projects amounting to more than 5 billion won in construction cost and the construction companies need to be ready to be able to carry out such projects.

G. Results of CM Performance Analysis by Project Types

For project types, analysis of data indicates that for civil work, industrial installations, landscaping and other project types, there are hardly any orders in these areas.

there are various types of civil, industrial installation and other types of projects and for those types of projects that

need specialist skills, CM services need to be introduced and hence widen the CM market in civil, industrial installations and other types of projects. When looking at the yearly graph for government buildings, there was insufficient amount and number of projects but it started to increase from 2010 but this is due to the government agencies moving to regional areas and when this project finishes, the figures are expected to decrease.

V. CONCLUSION

CM business has shown growth every year until now in the number of projects, project amounts and project size since its introduction in 1996 despite a downturn in the construction market. However, despite this growth, it is difficult to find research based on the current CM business status. Accordingly, this study based its research on the CM performance results that were reported to the Construction Management Association of Korea and analyzed the status of the domestic CM performance and put together a basic material.

Having analyzed the current status of CM business, it was shown that the number of projects with total cost of less than 3 billion was the most common at 15%. In addition, the number of CM contracts has been increasing every year and hence the CM business is showing gradual increase.

However, construction supervision which was carried out under Construction Technology Management Law came under Construction Technology Promotion Law as of 23rd of May 2014 whereby public works are ordered under CM with work carried out by companies with supervision authorities on behalf of the owner. This resulted in a decrease in CM orders that was carried out from pre-design phase and the construction phase is carried out by CM instead of construction supervision. This further resulted in decrease in CM orders from pre-design phase and with companies carrying out the supervision work on behalf of

the owners that was previously done by construction supervision, there is a limit to orders which results in exclusion of CM specialists. This has led to inhibition in progress for sound construction management which further results in decline of competitiveness by global standard and hence solutions for such situation should be sought without delay.

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