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IDENTIFYING ATTRIBUTES FOR EXPERT CONSTRUCTION PROJECT MANAGERS IN THE CONTEXT OF CHINA

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ABSTRACT

The Construction Industry in one of the most booming industries in China at present. Like any other big industry, it has the competitions, the risks, and the complexities. Just a few decades ago, a Construction Project Manager (CPM) was not recognized with that significance. But with the industry becoming complicated, the job of CPM has become multi-dimensional, and there is an overall concern to improve their skills to make them fit for the changing scenario. Currently in China, the CPMs are categorized mainly through educational degrees. However, empirical observation suggests that there are several other tacit attributes a CPM needs to possess which can separate an expert one from an average one. A CPM needs to carry out many responsibilities on and off the site. In this study, the top responsibilities of CPMs were first identified through literature review. Then a survey was conducted on CPMs, with the respondents carefully chosen through conditional random sampling in the province of Shandong, one of the busiest provinces considering the construction sector. With several demographic criteria hypothesized to be those tacit predictors of expertise, a comparative statistical analysis was conducted by using Analytic Hierarchical Process (AHP) in order to identify certain determining attributes. The study suggested that such method can be helpful for the industry when there is a need for systematic search for suitable CPMs.

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Keywords: Construction project manager, Project Management, Construction industry, Job responsibility, Expert, China.

Contribution/ Originality

This study's primary contribution is to develop a set of criteria to define an 'Expert' Construction Project Manager. Expertise play a crucial role in today's multidimensional construction industry, and the set of criteria was developed by investigating their perception to carry out certain top professional responsibilities in the particular context.

1. INTRODUCTION

China is currently undergoing steady development in the construction industry. The characteristics of modern construction projects have changed considerably during this progress. The building standards of construction became higher, composition of working teams became more complex, the concerns with the environment became central, and the risk of projects increased rapidly. In almost all issues, expert advice is the prime requirement. The experts are expected to deliver suggestions in a professional manner with utmost acceptability. In case of Construction Project Management, there is no exception. An expert Construction Project Manager (CPM) holds immense responsibility to cover all the implications of identifying, appointing, instructing and completing projects whatsoever. However, identifying criteria for 'Experts' itself is a challenge in any profession. There is no straightforward list of criteria for experts in any field. It depends on the context. Nevertheless, a tentative list can always be handy to run the industry. Trivial they may appear, it is sometimes tricky to determine such a list. This study is such an attempt to find out such list in a systematic way that can be accepted in the industry whenever a need for selecting experts arises. That can lead to a more productive and smooth working relationship in the industry.

2. BACKGROUND STUDY

2.1. Construction Project Manager's Role

A Construction Project Manager (CPM) is the person responsible for accomplishing the management related construction project objectives. CPMs in the past were individuals and the profession was largely neglected in construction industry. They worked almost invisibly, and hardly got any incentives or recognition for their works. It was not until the late 20th century that Construction Project Management became one of the most important fields in construction. It is due to the increasing complexities in the industry when CPM's role became more and more crucial.

In performing the projects, all key stakeholders have to contribute to achieve the project goal. As part of the project stakeholders, the CPMs hold major accountability and responsibility in delivering the projects. There are some important points that are related to CPMs deliverables. According to Mintzberg (1990), CPMs roles include recruiter, resource allocator, representative, entrepreneur, or liaison. They are primarily responsible for the overall success of delivering a project, by reaching the target safely and correctly. A CPM must be efficient to perform within tight time-scales, maintain the cost within fixed budgets, and create a positive impression so that a good relationship is retained with the clients throughout the contract. They must organize a top team to complete the work, while educating and instructing the employees. An assured high quality in performance is what the purchasers would always look for.

2.2. General Overview of CPM's Profile in China

China currently has certain regulations regarding the qualification of CPMs. Only Constructor Contractors can become a CPM. A National Class 1 Construction Contractor needs to pass the national registered qualification examination in China. Only then they can hold the post of the CPM. The duties and responsibilities of a CPM range from hiring workforces for the project to responding to citizen's calls concerning the project's compliance relevant laws. A CPM is expected to be an experienced and well-educated professional, well-equipped to deal with all these issues. The Chinese construction industry has five parts: Residential, Commercial, Heavy Civil, Industrial, and Environmental. CPM needs to contribute similarly in each sector.

In China, the roles of the CPM can be the following five elements: 1. The Head of the Project Contract Performance, 2. The Supervisor of the Project Implementation, 3. The Commander of the Construction Project, 4. A Bridge between Project Communication and Coordination, and 5. The Center of the Project Control (Hills *et al.*, 2008). The key point how a CPM can become a good CPM depends on these particular qualities and the degree of their skill. The construction companies are therefore seriously concerned about how to select, cultivate, and reinforce the management, so that excellent CPMs can play their crucial role in full. The intention of all the related enterprises is to remain invincible in the intense market competition.

2.3. CPM's Status in China

The CPM's contribution in China's construction industry is quite significant. There were some fundamental changes that occurred in the construction industry in China after the economic reform. Currently the industry is an essential part of the national economy (Wu, 2008). The development of the construction industry has gathered an amazing speed in recent years. However, the necessary consequent reforms were not easy as it is not a single sector. No reform process can be that systematic. The challenges are serious, need deeper level of restructuring. That also makes the role as well as the status of CPMs more complex. The status of CPM in China can be explained under several statements.

2.3.1. Some CPMs Lack Certain Professional Qualifications

According to statistics, China has more than 100,000 construction enterprises at present, the staffs more than 35,000,000. Government department in charge of construction has been approving CPMs qualification certificate for a number of the staffs reaching nearly 500,000, including the first class CPMs who are about 120,000 in number. This huge CPM team, mostly emerged from the construction site on the frontlines are rich in practical experience, have certain ability to solve practical problems, have made significant contribution to the development of construction industry, However, there are very few in this huge team those have systematically studied the knowledge of project management. Over the years, China lacked some guidelines for them. At present, part of this huge team personnel still below par level in terms of professional qualification, the project management knowledge is partially imbalanced, especially in the part of the legal knowledge, and engineering economy (Zhang, 2006).

2.3.2. The CPM's State of Positioning is Not Clear

The original intent of any Construction Enterprise is to make itself a profit center. However, in many cases, the profit must go through CPM because of the scope of authority of the contract. At present, some CPMs tend to go over the line when they deal with the Enterprise, and they even bargain beyond the legal boundaries of the contractual relationship. It might be because the CPM is

aware of the money flow, and can control at certain point. That gives them the opportunity to extend their right, but in some cases put the Enterprise in financial crisis. In some places, or in some construction enterprises, the CPM can become a synonym for 'labor contractor'. Their positioning as such can seriously affect the healthy development of the standardization of the construction market and the construction enterprise.

2.3.3. The Project Manager's Credit Crisis Become Risky for the Enterprise

Some CPM's embezzlement of money from construction projects has already become one of the biggest headaches for Construction Enterprises. Besides the expanded rights showed by the CPM, this is another big issue for which the project capital often goes out of control, and causes big economic risk for the Construction enterprise. In many cases the dispute is too big, and risks a healthy relationship between the stakeholders.

2.3.4. Abuse of Project Department Autonomy

Generally speaking, the construction enterprises have a certain physical distance between the department and project due to the vast area in China. Some of them are cross region, and some others even in different provinces. Because of this distance, information is not unobstructed, and most construction enterprises tend to set up the project department at the location of the Project construction. That leads the project department to have its own official seal. The department also usually set up own financial accounts. The purpose of establishment of project department is to improve the efficiency of the project management, but that also creates some situations for project managers to abuse power as they possess certain autonomy (Zhang, 2006).

3. CPM'S PROFESSIONAL CATEGORIES IN CHINA

3.1. The Four Grades

CPM's professional qualifications are divided into four grades in China: A, B, C, and D. 'Grade A' CPM is expected to be an international figure, and can be selected for any kind of job irrespective of any scale or kind. 'Grade B' CPM can take up large construction projects, 'Grade C' CPM can take up to medium-sized construction project, and 'Grade D' CPMs can take up only small construction projects. The definition of the scale of the project is described in Table 1 (CCIA, 2005).

Project Category	Grade A	Grade B	Grade C	Grade D
Scale of Project in terms of area	Large and medium- sized construction project general contracting projects	Monomer building area of more than 30,000 sq.m.; Group project more than 100,000 sq. m.	Monomer building area less than 30,000 sq. m., but more than 10,000 square meters. Maximum 100,000 sq. m. for a group project but over 50,000 sq. m.	Monomer building area is below 10,000 sq. m.; Group project under 50,000 sq. m.
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Table-1. Grades of CPM in China

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	U	Investment is 100 million yuan of above		
terms of			more than 30 million yuan	

3.2. The CPM's Professional and Academic Qualifications

The 'Grade A's CPMs must meet the following conditions: (1) have either a bachelor's degree or above with relevant experience in project management of more than 8 years, or a college degree or above with project management experience of over 10 years; (2) be a registered architect (local or international), registered structural engineers, supervising engineer, cost engineer or similar academic qualifications, and participated in international (Engineering) Project Management Professional certification or EPC project manager job occupational standards training; (3) have experience in large engineering project management, the main administrative tasks undertaken in at least two investment of more than 100 million yuan in the construction of the project; (4) can lead all management personnel, skillfully use project management methods, the successful completion of the construction project previously undertaken; (5) have a certain level of foreign language speaking ability, be able to read or recognize foreign language drawings and related documents.

The 'Grade B' CPMs must meet the following conditions: (1) have a bachelor's degree along with relevant experience in project management of more than six years, or have a college degree or above along with project management experience of more than eight years; (2) be a registered architect, structural engineer, supervising engineer, cost engineer, or similar) under local standard; (3) have experience in large engineering project management, the main administrative tasks undertaken in at least one investment of more than 100 million yuan project; (4) have a limited level of foreign language speaking ability.

The 'Grade C' CPMs must meet the following conditions: (1) have a college degree or above along with more than four years of construction management experience, or with secondary or higher education along with more than six years of construction management experience; (2) have two registered construction department and appropriate professional qualifications; (3) have experience in medium-sized project management, the main administrative tasks undertaken in at least one major investments of more than 30 million yuan project.

The 'Grade D' CPM must meet the following conditions: (1) have a college education along with construction management experience of more than 2 years, or secondary and higher education along with construction management experience of more than 3 years; (2) have obtained project management related vocational qualification training and obtained similar vocational qualification certificate; (3) have experience in leading at least one small construction project management.

4. AN AVERAGE CPM AND AN 'EXPERT' CPM

From the grading system, one can be tempted to directly infer that an expert CPM might be the one from grade A, as it contains the highest level of qualifications. However, in the field, an 'expert' CPM is not recognized only by academic qualifications or from experiences. They also include some other tangible and intangible criteria, which are often considered in selection process.

The tangible criteria can include age, working experience, working with loyalty in one company for a longer period, the number of projects successfully handled and such. The intangible criteria can include personality, leadership quality, loyalty, sense of responsibility, bonding ability with coworkers and such. However, for this study, the investigation was limited to the tangible criteria only.

4.1. Intangible Indicators of 'Expert's

Experts are those on whom one can rely in need. It is quite subjective because a particular situation may label one as expert but in another situation that particular person might need other experts for assistance. Experts can be, because of their professional or technical qualification, recognized to have more knowledge of a subject beyond that of the average person. Not only that, experts might sometimes need to show enough smartness to deviate from established norms in case of urgency or novel situation.

In the field of Construction Project Management, an 'Expert' CPM can give different impressions such as:

- They can become a role model for the people around or for other new professionals in the field with the display of their authority and status.
- They can help enterprises to set some effective rules and regulations with the use of their extensive knowledge or abilities.
- They can often put forward some reasonable suggestions not always agreeing on the particulars of a field of Building Law & Regulations
- When faced with complex special circumstance, they can deliver special knowledge that makes them stand out from an average person.
- An expert not only can deliver the best when situation demands, but also act as inspiration to others, and inspire the beginners during the process (UA, 2011).

4.2. Tangible Criteria to Select 'Expert' CPM

From literature three Criteria were identified as indicators of an 'Expert' CPM, as they were emphasized by many scholars to be the key factors behind the efficiency of CPMs. Therefore the challenge was to find a useful range of these criteria, which were more elaborated in the methodology section.

4.2.1. Age

Though one can argue that a beginner is always in the most vulnerable stage in terms of performance, a person's job performance does not necessarily indefinitely improve just because a person ages. However, there are different correlations between performance and age depending on different types of jobs. Aging is most likely to affect job performance if job tasks require sensory perception, or physical strength, which are the basic gross or fine motor skills. The fine motor skills such as sense of responsibility and judgment are also closely related to age, and there have been many researches on that.

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If a particular job performance is considered to be closely correlated to age, looking for the most effective age range remains a priority. In many cases at certain age range, performance peaks, and in a lower or higher range than that, performances might be affected. From another perspective, newer or younger employees might be considered more flexible, while older ones less. That might lead to think that older workers are no longer assets to the company. It is tempting to assume that if one person has given such impression, a generalized impression develops. However, contrary to that, for example, just because an older worker has health problems at 60 does not necessarily mean all 60 year olds will have the same. Some may never have any health issues beyond this age, might be capable to continue to do certain kind of jobs. Therefore, determining methods to find the effective age group for particular tasks can positively affect a company's performance in the future (Avolio *et al.*, 1990).

4.2.2. Work Experience

There is always a debate whether work experience can contribute good performances. While students or freshmen are the most enthusiastic bunch, they lack experiences and might not get the benefit of doubt to be superior to another candidate who has more experience but might lack that enthusiasm. Again, for certain jobs, especially related with fine skill, experience plays significant role.

4.2.3. Experience in Working in one Company for a Longer Time Period

There is a direct relationship between job changing and success in a career. Changing of jobs frequently usually affects one's career negatively. There are many well-established companies that have training programs for their employees. This is because they are interested in investing in the workforce they have rather than hiring new people in regular intervals. Therefore, a past record is always worthy to evaluate a job seeker to check whether that person possesses the capability to concentrate or focus and fulfill the interest of the company on a long term basis.

5. METHODOLOGY, RESULTS AND ANALYSIS

The existing grading system in China can work as a preliminary filter to select a CPM, but the other criteria needs to be assessed during the selection process when an 'expert' in the field is being searched. Therefore, it seemed useful to look for qualification standards for expert CPM beyond the grading system. This study tried to find that, however, it focused on the tangible aspect only.

5.1. Sample

However, it was neither a straightforward nor an easy task. Therefore, the sample was based on conditional random sampling. The primary condition was that the respondents must be 'Grade A' CPMs. However, on top of that, these CPMs must be already someone widely recognized in their field, and were considered as a reliable source of knowledge to others. Thus the empirical observation on the intangible criteria was used to determine the sample. Shandong Province was selected for the sample to be chosen from. A total of 87 respondents were chosen for the study.

5.2. Finding the Top Responsibilities of CPMs

As a first step, a list of responsibilities in Construction Project Management was chosen from literature and from interview with the selected CPMs. The list was shown in table 2. After selecting 16 of them from the survey, the respondents were asked to rank the top three of them. Three tangible criteria of the respondents were also recorded. These are: Age, Work Experience (years), Maximum Number of years in one Company. They were chosen on the basis of the literature review.

Responsibilities	Ranking according to the degree of Importance
Draft Contracts	
Dispute Management	
Keep Client (and Boss) in the Loop	
Stay Under Budget	
Stay on Time	
Set Goals	
Get Equipment and Materials	
Hire, Fire, Supervise	
Plan the Work	
Manage Risk	
Team Leadership	
Strategic Influencing	
Business Partnering	
Scalability, Interoperability,	
Portability Analysis	
Controlling Quality	
Benefits Realization	

Table-2. The preliminary list of Responsibilities of CPM

Analytic Hierarchy Process (AHP) software was used to derive an overall result of top three responsibilities. AHP is a structured technique for organizing and analyzing complex decisions. Based on mathematics and psychology, it has been extensively used especially in qualitative researches (Sun, 2005).

It has been particularly effective in group decision making in the field of business, industry, healthcare, and education, where the best suitable decision is preferred to a 'correct' decision. Through its comprehensive and rational framework for structuring a decision problem, it has been popular in ranking qualitative attributes, and that is the reason behind using this method in this study.

From the AHP analysis, the top three responsibilities were identified as the follows. A brief elaboration seemed important to highlight why these three could be considered as significant for CPMs to possess.

5.2.1. Controlling Quality

Construction projects involve work sections containing a wide range considering the cost. Like any other industry, quality of the products is a main concern. Minor defects can result in fatalities. That can add to the extra burden of insurance, inspections, and changes in regulations. Therefore CPMs need to monitor the quality at every phase and sectors of the project. Good CPMs try to ensure that the job is done correctly at the first place, and the quality can be ensured in a way that no major mishap occurs as a consequence (Hendrickson and Au, 1989).

5.2.2. Business Partnering

Partnering is a method where both or more parties get mutual benefit. A successful long term partnership can have many positive outcomes. In partnership, parties look for the best possible value that satisfies all the partners, rather than searching for the best value that does not satisfy all. Contracts are subject to rigorous competition, but a good judgment can produce that kind of long term benefit to companies. Therefore, CPMs have a tricky role here and successful strategies can ultimately bring benefit to their reputation as well as to the company (Roe and Jenkins, 2003).

5.2.3. Team Leadership

CPM is often the leader in small or big teams in the project. As the leader, they need to set the main goals with major ambitions. They would often be asked to clarify the roles and responsibilities of the team members. A good leader also needs to acknowledge the contributions from the team members. When the team works as a whole, it can be considered as the leader's success also. Leadership is a soft skill that can be developed through experience as well as intuitions. A CPM necessarily needs to possess this quality.

5.3. Finding the Criteria for 'Experts'

The next step was to compare the performance of each individual ranges under each criteria, and find which ranges remained consistent with the overall list of three top responsibilities. The matching group(s) was considered as possessing the criteria to become 'Experts'.

5.3.1. Age

The ranges were: Age<30, 30<age<60, and 60<age. It was found that Age <30 was not consistent with the overall result set (fig 1). So this group was not considered as 'Expert's while the other two were considered. Therefore, Age>30 was considered to be one of the criteria to be recognized as 'Expert' CPMs.

ean Leadership ontrolling Quality enefits Realisation	0.1121 0.5031 0.0282		_	_	AM
ute Management ness Partnering	0.0364 0.0728				3 Most Important Responsibility Controlling Quality
ability, Interopera on Time oals	0.1151 0.0728 401 0.1151 0.0230				Stay On Time Team Leadership
ay Under Budget an the Vork		mi i bii	0640 40 V - I D	1 10 10 10	



5.3.2. Working Experience (WE)

The ranges were: WE <10 years, 20>WE>10 years, 30>WE>20 years, WE>30 years. WE<10 years was not consistent with the overall result (fig 2). So this group was not considered as 'Expert's. Therefore, Working Experience of more than 10 years was considered to be one of the criteria to be recognized as 'Expert' CPMs.



Figure-2. Results from the range of 'Working Experience' of less than 10 Years

5.3.3. Staying in One Company (OC)

The ranges were OC <10 years, 20>OC>10 years, 30>OC>20 years, OC>30 years. OC <10 years was not consistent with the overall result. So this group was not considered as 'Expert's.. Therefore, staying in a company in more than 10 years was considered to be one of the criteria to be recognized as 'Expert' CPMs.

Tean Leadership	0.1379	
Controlling Quality	0.5773	
Benefits Realisation	0.0089	
Stay Under Budget	0.0160	2 Most Important responsibilities
Business Partnering	0.0483	3 Most Important responsibilitys:
KeepClient (andBoss)	in 10.0503 •oj	Controlling Quality
Plan the F ork	0.1108	
Dispute H anagement	0.0115	Team Leadership
Scalability, Interopera	hil0.0200 ?oi yAnalysis	Plan The Work
Stay on Time	0.0080	

Figure-3. Results from the range of 'Staying in one Company' for less than 10 years

Finally, from the analysis, the 'Expert' CPM was considered to possess the following range of tangible criteria: Age >30, Staying in a Company >10years, and Working Experience >10years.

6. FINDINGS

After determining the range of the tangible criteria of an 'Expert' CPM in the context of China, a qualitative explanation appeared to be significant to reflect on them.

6.1. An 'Expert' Should Be Older than 30 Years Old

If a CPM has spent more time on works and have been through more battles in their project, that person is likely to have more credibility than the younger ones. In fact, a younger CPM should always pay their respect to the elders as experience counts at least for the beginners. It is of course debatable if the ability and credibility can be hundred percent determined by age, but definitely their experience measured in years can give them grip on the other top responsibilities. If they are committed to their job for a longer time, it also increase the probability to face different difficult situations, and enable them to be more fit in the industry. The findings do not say any specific level where the age can start to play a diminishing role, but definitely an age higher than thirty can be considered as a useful criterion for someone to become an expert. A person with an age higher than thirty is assumed to achieve more sense of responsibility and independence, disposition for composed decision making abilities, not blundering with them, a person with more focused approach by taking things seriously. Therefore, the findings can be justified.

6.2. An 'Expert' Should Have Working Experience Higher Than 10 Years

Work experience equips CPM with certain soft skills such as team building, leadership qualities, communication skills and such, all of which are sought after by employers. Work experience also equips CPM with knowledge that would enhance ability of judgment, which is the key to take over any job responsibilities. A CPM can develop more analytic abilities and critical thinking abilities with more and more working experience, and can work more authoritatively that is so important to give an impression of an 'Expert'.

6.3. An Expert Should Have Experience to stay in a Particular Company for more Than 10 Years

Moving from one company to another several times in a short time span gives employers the impression that the person might have certain problems. It can be that the person's contribution was not well understood, or that person might have been putting negative impact for a reason whatsoever, or that person was unable to get along with others in the particular work environment. When a CPM becomes responsible for the project, the sense of responsibility and leadership is critical. How to get along with colleagues around, how to stick to finish the work and similar soft skills can reflect the overall quality of the CPM. Moving to another company usually shows higher ambition, which might sometimes be seen as positive, but not always like that when a company depends to rely on a particular person. So CPMs who stayed in a company for more than 10 years are likely to go through enough experience to achieve confidence with themselves as well as of the people around to be recognized as exerts.

7. CONCLUSION

CPMs have the overall responsibility for the successful planning, execution, monitoring, control and closure of a project. So determining an expert is crucial. Today, China needs a batch of authoritative experts to improve the whole environment of its booming construction industry. Finding expert CPMs can contribute more positively to the building industry as well as to the

whole society. One must look at the bigger picture and go for the best. Finding experts are those tiny steps that can contribute to that bigger goal. Finding experts in the field of construction project manager is such a tiny step, and a tinier part of that was tried to be achieved through this study.

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