

# A QUAL-QUANT (Q<sup>2</sup>) METHOD FOR EXPLORING AND APPRAISING PROJECT MANAGEMENT COMPETENCY REQUIREMENTS FOR MANAGING LARGE PROJECTS IN GHANA

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## ABSTRACT

This research aims to explore project management competency requirements specific to managing large and complex projects in the context of the Ghanaian construction industry. It adopted a Focus Group Discussion to identify eighteen core project management competency areas (PMCAs). A structured survey questionnaire was then administered to one hundred project managers to elicit relevant data (on these PMCAs) that were analysed through the chi-square test of hypotheses. The study's findings identify important competency profiles that can be mapped and customised towards improving workplace learning and training requirements of project managers in Ghana and, perhaps, other developing countries.

**Keywords:** Competency, Focus Group, Large Projects, Project Management, Qual-Quant

## INTRODUCTION

The evolution of Project Management as an academic field has traditionally conformed to the Lateral Curriculum Philosophy that assumes few courses in advanced concepts, terminal in nature and continued professional development-based (Alter and Koontz, 1996). For instance, Caupin et al. (2006) and Helgadottir (2008) examined the International Project Management Association Competence Baseline definition and argued that project

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management competency requirements assume three interrelated areas mainly: contextual, technical and behavioural. These interrelated dimensions of project management competencies have assumed prominence in project management literature. In order to meet specified performance within cost, time and quality, the focus of project management educators, researchers and practitioners have traditionally been directed to an intensive search for new and better methods of fulfilling these three competency requirements (Helgadottir, 2008). As a result, there are a number of accredited Ghanaian academic institutions now collaborate with recognized world class institutions such as Project Management Institute, Association of Project Management and International Project Management Association to offer project management training and capacity building programmes to individuals employed in the construction industry.

A cursory observation of the training content and modules of these project management institutions indicates an inclination to the competency areas mentioned by Caupin et al. (2006) and Helgadottir (2008). However, project managers' competencies in handling construction projects to achieve desired deliverables, budget and quality have been questioned in the context of the Ghanaian construction industry (Ahadzie, 2008). This underscores the findings of the studies that have reported untimely completion of projects, sub-optimal workmanship, cost-overruns, delay in honouring certificates, exorbitant variations and fluctuations in the context of developing countries (Sambasivan and Soon, 2007; Olatunji 2008). Typical with most developing countries, project management education has constantly been modelled on the experiences of the developed countries without due recognition of the possible "contentual" and "contextual" differences.

Surprisingly, up till the end of the 20<sup>th</sup> century, most of the literature on project management competency was reported to be relevant to the developed countries (Low and Ben, 1999). However, a recent study by Crawford (2005) has shown that project management practices differ across geographical regions and applications areas. This suggests that, in developing professional qualification and academic programmes for project managers, the contentual and contextual dimensions of the training should be considered within the framework of the various knowledge constructs identified in the literature; and also in the light of the recommendations by Crawford (2005).

Drawing on from this, there is therefore the need for project-based organisations in the construction industry in developing countries to also strive towards establishing the appropriate measures, which are in tandem with their technological, socio-economic, structural and cultural practices. The contribution of Project Managers (PMs) towards achieving effective managerial performance on project delivery has also recently been heightened (Ahadzie et al, 2009). Furthermore, the problems hindering project management education and practice in Ghana remain unknown. Thus, this research is founded on the contention that, if the performance of PMs of large construction firms is to be relevant in the construction industry in developing countries, then the underlying competencies and competency requirements that would help project managers to articulate their strategies within the overall business process need to be identified. Identification and development of appropriate performance measures could therefore enable PMs operating in Ghana to have a clear understanding of the important skills they should acquire towards improving their own professional development. It is hoped that the findings would be beneficial to other emerging sectors of the Ghanaian construction industry particularly in respect to the future development of appropriate project management curriculum. While the study is unique to Ghana, there is

also the potential that many project-based sectors of the construction industry in developing countries will find the findings useful towards the advancement of improved project management practices due to similarities in their technical, socio-economic and cultural practices.

In sum, the prime aim of this research is to explore, identify and prescribe key project management competency domains for PMs' capacity building in Ghana. The rest of the paper follows the following order: Section 2 contains a review of previous studies with a view to draw out research questions capable of filling some of the existing research void. Section 3 discusses the adopted methodology used in collecting and analysing primary data for the study. Sections 4 and 5 focus on qualitative and quantitative data analyses respectively. Section 6 highlights the implications of the study's findings for project management while the last section contains conclusions and recommendations based on the findings of the study.

## LITERATURE REVIEW

### Contextualising Project Managers' Functions

While the central role being played by Project Management and PMs in the success of various organisations is widely recognised in the construction industry, it is interesting to note that the interpretation of the title itself is often far from agreement (Ahadzie, 2007: p.28). In some instances, the term has been used to describe persons or entities that monitor, oversee and/or provide broad supervision on projects (Morris, 2003). Some researchers have also attempted to provide an alternative understanding by distinguishing the roles of the PM from that of, say, a project coordinator. However, the same researchers have acknowledged that the distinction can be very thin depending on the roles assigned and prevailing (Ahadzie, 2007: p.27). More recently, Jha and Chandrashekar (2006) also attempted to provide some further insights and reported that, generally, the term PM, project coordinator, construction manager, project administrator and project controller are often used interchangeably. As this debate continues, one critical issue that cannot be overlooked is the suggestion that the title should be used for one who exercises total authority and also accepts full responsibility for the management of projects (Jha and Chandrashekar, 2006). Equally, Ahadzie, (2007: p.28) contends that it is important to focus on what the PM does rather than what should be the precise definition or title, as this holds the key to achieving project objectives.

Ahadzie (2007) further argues that if there should be any definition at all, such a definition should uphold the principles of project management, which is to consider the interests of the client as a priority. However, given that stakeholder interest is gradually replacing the traditional client focus, PMs are faced with not only playing the role to satisfy the traditional single client but also "multiple clients" whose diverse interests also have to be satisfied. The role of a PM involves considering various aspects of planning, coordinating and controlling of project. These roles can be categorised into two: one is the core role of a PM (activity planning, creating charts scheduling, risk analysis and control) and the other role is the general role played by the PM dealing with the project teams and other subsidiary tasks which are essentially performed by all managers (Lei Seng and Skitmore, 2005). It is

important to discuss the responsibilities of the PM whilst discussing the role of project management as an efficient tool to tackle complexities and uncertainties in projects.

Conventionally, PMs are responsible to key project stakeholders which include the client and the project team. Performing responsibilities towards each of this stakeholder group is essentially a core and vital role of the PM. For instance, the project manager is expected to keep the senior management of the organisation informed about the project status at all stages, including the problems anticipated, chances of running over budget or being late in completion of the project. Likewise, the PM is responsible towards the project team by ensuring that their integrity is maintained even in the case of conflicting demands made by the other stakeholders with legitimate interests. At the same time, the manager is expected to ensure the quality, dimensions and other specifications of the client.

On the other hand, the PM's role in the project team varies with the nature of the team. The PM's contribution in the project specialized team will be different from his contribution in other functional teams. Several authors have argued that it is crucial for the PM to help project workers with the transition of work or new projects (Hayes, et al. 2000; Crawford, 2005). The project worker tends to pay more attention towards their own career as the project nears completion, leading to non completion of project on time. Hence, the manager should be aware of this and help in the transition process. With the advent of agile projects combined with increased modern complexities and uncertainties, the role of PM has become more intense and challenging. The PM has to perform the role of a risk manager along with the other project management roles s/he performs (Atkinson, et al. 2006).

### **The Contention of Project Management Competency**

Whiddett and Hollyforde (2003) acknowledge that definitions for competency are hard to find in literature perhaps Gale (2007) offer a valid reason why it is difficult to find a universal definition for competency by arguing that competency is a normative concept and not a descriptive concept but Gale (2007) went further to describe competency as with the capacity to undertake specific types of actions, and it can be considered a holistic concept involving the integration of attitudes, skills, knowledge, performance, and quality of application. In a practical view, Parry (1998) defined competency as "A cluster of related knowledge, attitudes, and skills that affects a major part of one's job (i.e., one or more key roles or responsibilities); that correlates with performance on the job; that can be measured against well-accepted standards; and that can be improved via training and development.

Wood (2009) defined competence as the goal to manage competence in an organization involves identifying a set of highly desirable attributes that can positively influence desired organizational outcomes. Wood (2009) further pointed out that researchers and practitioners are interested in creating competency models that are used for hiring, retention, and training practices to improve the quality of the organizational workforce; it is in meeting this desire that most common definition in literature consist of skills such as technical, social or interpersonal, and cognitive or problem-solving that, ideally, can be measured and improved over time. Project management competency can be viewed in several angles, for instance the Queensland University of Technology(QUT, 2010) identified organizational project management competency theme to consist of education initiatives for senior management and

certification for Project Board members. The QUT (2010) conceded that these are really part of a strategic feature that draws support from other project management themes.

In an empirical study, Barry (2005) clearly pointed out competency characteristics to include motives, self-concept, knowledge, skill, business, personal, interpersonal, management, and project management objectives. Barry (2005) further made an interesting revelation on project management competencies in which Barry (2005) contended that it is more difficult to measure some aspect of project management competencies namely leadership skills; Barry (2005) clearly suggested that these skills are observed through practice and cannot be directly measured in the sense of determining whether or not a person has them and to what degree. According to Barry (2005) those competencies that cannot be measured largely consist of personality traits which are mostly due to innate culturally or by hereditary, these traits are difficult to develop through training.

In another perspective Taylor (1998) also advocated project management competencies to be categorized under personal characteristics consisting of being flexible and adaptable, possessing and exhibiting initiative and leadership, being confident and persuasive, possessing verbal fluency, possession of ability to balance technical and human components of a project, problem-solving and decision-making capability, and good time management skills; behavioural characteristics namely leadership, mentoring others, negotiations, strong interpersonal skills, and the ability to communicate effectively; general business skills consisting of the understanding of organizational culture and organization's core business; understanding marketing, change control, contracting, purchasing, law, personnel administration, and the general concept of profitability; understanding the concept of direct and indirect cost allocation; and knowing how to transmute business requirements into project system requirements; and technical skills comprising of being knowledgeable in the field, but a generalist with broad awareness of supporting engineering and scientific principles, technology, human relations, management, and communication skills. Barry (2005) affirmed that the professional competence is paramount in the management of projects successfully especially in recognition of the emerging trends in project management and with the fact that many projects commissioned ends up as failure. In a similar manner the, the views of Kerzner (2000) are worth considering at this instance that current trends in project management does not demand only technical competence but equally important to possessing powerful project management competence is the understanding of technology rather than being a technical expert. In consonance with Kerzner (2000), the Project Management Institute (PMI, 2000) advocates that certain general management competencies are needed for successful project execution; these management competencies consist of leading, communicating, negotiating, problem solving, and influencing the Organization. According to Pierce (1994) jobs consist of deliverable outputs which are occupationally specific job-task competencies with underlying abilities as behavioural competencies.

In an empirically derived model, Rubin and Dierdorff (2009) categorize managerial competencies as managing decision-making processes which comprises of getting information; judging the qualities of things, services, or people; managing human capital consisting coaching and developing others; resolving conflicts and negotiating with others; developing and building teams; managing strategy and innovation involving thinking creatively; developing objectives and strategies; provide consultation and advice to others; managing the task environment consisting of communicating with persons outside organization; establishing and maintaining interpersonal relationships; selling or influencing

others; managing administration and control which comprises evaluating information to determine compliance with standards; documenting or recording information; performing administration activities; and managing logistics and technology inspecting equipment, structures, or material; controlling machines and processes; interacting with computers. According to Brannick et al. (2007) competencies are conceptualize in terms of the activities and personal attributes in relation to discharging specific duties of an occupation.

Again Cheng *et al.*(2005) contends that the understanding of the competency for a particular role is important for the identification of the areas of work that is job-task competencies managers need to be competent together with the behavioural competencies that they need in order to be effective. Similarly, Boyatzis (1997) opined that for the understanding of the attributes that a person brings to work there is the need to distinguish not only the competency type but the level of the competency displayed. Additionally, in their research Cheng et al. (2005) contended that behavioural competency is the basis for distinguishing superior managers from average managers; and that this differentiation is possible through the identification of behavior. The job-task model is suitable for the construction industry while the behavioural competency is generic in nature (Cheng *et al.*, 2005). In an empirical research, Cheng et al. (2005) found twelve competencies that distinguish managers to include achievement orientation, initiative, information seeking, focus on client's needs, impact and influence, directiveness, teamwork and cooperation, team leadership, analytical thinking, conceptual thinking, self-control and flexibility. According to Wood (2009) much of the contentions concerning project management competency revolve round the inclusion of personal innate characteristics such as attitude and personality. For instance, Northouse (2004) developed a skills-centric model which wholly considered a person's problem-solving skills, social judgment skills, and knowledge, but neglects individual attributes such as cognitive ability, motivation, and personality outside the competency definition. Wood (2009) argued that attitudes included in Parry model of competence are not included in Northouse model because they are not traits that are acquired through training or experience yet on the contrary, the Northouse model considered social component involving the skills necessary to work with others to solve problems, garner support for change, and understand underlying human environment of an organization.

The most striking contention or confusion surrounding project management competency is demonstrated in Pellegrinelli and Garagna (2010) in which they contended that those responsible for selecting project managers have desperate sources draw on. Pellegrinelli and Garagna (2010) further argued that a key problem is the untangling trait attributes and taking decision on what to do with other factors such as values and motivations. Pellegrinelli and Garagna (2010) contend that project competency must commensurate the complexity of projects to be executed; Pellegrinelli and Garagna (2010) pointed out that a project manager who is able to manage a less, easier project may not be competent to manage a harder, more complex project.

Ahadzie (2007: p.34) reports that there is confusion over the use of the term competency in construction management research. It is therefore important to put the meaning of the term in context before taking this study further. Cheng et al. (2003) have identified two interpretations in the use of the term "competency" stemming from the US and UK perspectives. The US perspective defines competency as the underlying attributes of a person - largely an input-based methodology. In contrast, the UK perspective sees competency as a set of performances and standards often linked to output-based measures (i.e. competence).



An existing review of literature by Brophy and Kiely (2002) also revealed three main positions taken towards the definition of the terminology, attributed mainly to observable performance, the standard or quality of the outcome of the person's performance and the underlying attributes of the person. To this effect, it is common to find in the literature that the terms competency and competence are often used indiscriminately as a synonyms (Dainty et al., 2004).

In the opinion of Cheng et al. (2003) and consistent with recent findings by Ahadzie et al. (2009), the divergent interpretations adopted by the US and the UK have largely led to confusion in the definition of the terminology. Nevertheless, following the increasing attention that competency-based approaches are gradually receiving in construction management research, it is now becoming clear and accepted that competency is best used to describe input-based measures (Low and Ben, 1999) rather than an externally or output-based measure (Dainty et al, 2004). There is now a general acknowledgement by HRM researchers that, the term competency should be defined as a person related concept that refers to the dimensions of behavioural action as against competence which is a concept related to some output-based measures (Ahadzie, et al. 2008).

Drawing on from the above, it has been demonstrated that universal definition for project management competency are hard to find in literature; those that exist are divergent. Project management competency has been defined to suit the perceptions, opinions and circumstances at a particular period of time. In spite of the non-uniformity in the definition of project management competency; there exist some level of similarity in the determination of skills that constitute the components of project management competency. Numerous literature have identified project management competency skills to include flexibility, adaptability, verbal fluency, mentoring ability, general business skills, leadership skills, technical skills, management skills, technology comprehension, negotiation; this list is endless as project circumstances will require which project management competency skills to use. Literature also demonstrated the use of competency skills to differentiate job titles especially senior project managers from junior project managers. For instance competency skills such as achievement orientation, initiative, information seeking, focus on client's needs, impact and influence, directiveness, teamwork and cooperation, analytical thinking, conceptual thinking, self-control and flexibility are all used to distinguish senior managers from juniors. It is possible that a junior manager may possess these skills or in another vein a manager may not possess these skills but will deliver complex projects that senior managers are not able to deliver. Thus, this practice is unfair in the sense that possession of skills alone should not be the basis for the differentiation of job titles but the task accomplishment must be one of the paramount criteria that should be used in this differentiation.

Again, there is evidence of efforts on competency-based measures for PMs within the contexts of large projects (Ahadzie et al., 2008a; 2009); continuing education in project management with reference to the sub-contracting industry (Alter and Koontz, 1996); qualities of a good PM (Cheng et al., 2005; Jha and Chandrashekhar, 2006); senior management perceptions of project management competence (Hayes, et al., 2000 ;Crawford, 2005); performance measures/models for construction PMs (Dainty et al., 2003; 2004; 2005); the impact of corporate strengths/weaknesses on project management competencies (Isik, et al., 2009). Furthermore, similar previous works on PM competencies and skills have been carried out in different parts of the world. These include Singapore (Ling, 2003); Australia (Lei-Seng and Skitmore, 2005) and Ghana (Ahadzie, 2007).

In spite of the novel attempts to develop an acceptable concept for project management competency; there exist contentions that must be addressed. The contentions concerning the formulation of a workable definition for project remains one of the tasks that must be addressed. In this light, it is therefore pertinent to address this gap by formulating a universal definition for project management competency. Similarly, developers of project management competency models disagree on which competency skills to include in these important models. For instance, the Northouse competency model does not the competency attitudes in Parry model. Hence much of the contentions here revolve round the inclusion of personal innate characteristics. The understanding of the competency needed for a particular job-task is also a missing link since these competency skills are variedly defined to suit different situations for a particular project.

Equally contentious is the numerous desperate sources those seeking to select project managers draw on in their bid to hire project managers. Project management competency must commensurate the level of complexity of projects. Project managers can manage projects that are suitable to their ability. The question is “what level of competency is required for a particular type of project in order to successfully execute the project to the satisfaction of all project partners?” Literature has demonstrated the over concentration on project management competency skills to the neglect of measuring the or assessing the level of competency required for a particular project. With such a paucity of literature on project management competency skills assessment or measurement, it is pertinent to address this gap; it is in this vein that the use of a robust qual-quant approach is novel and significant for this study as far as construction projects are concerned.

## RESEARCH METHODOLOGY

A mixed methodology involving qualitative and quantitative (QUAL-QUANT or Q-squared) approach was adopted in eliciting the relevant data from project managers in the Ghanaian construction industry. A mixed method of a Focus Group Discussion (FGD) and questionnaire administration was adopted because it will make the study more robust due to a variety of factors. These include the higher number of participants, the observer’s independence, the quality of the data obtained, the ability to evaluate facts quantitatively and qualitatively and respondents’ independence (Easterby-Smith et al., 2002). According to Easterby-Smith et al., this method of data collection prevents the research from being method-bound as the method combines the strengths of both approaches (qualitative and quantitative) as well as off-setting the deficiencies of one approach with the other’s strengths.

The literature review identified appropriate theoretical framework and project management competency knowledge areas for this study. The review was followed by FGD using professional PMs and project management researchers to verify the known competencies and explore new domains which have not been given expanded view in the literature. Subsequently, a self-administered structured survey questionnaire was used to collect primary data based on the insights obtained from the literature and the results from the FGD.

The focus group consisted of 12 participants excluding the moderator (i.e. one of the researchers) and a hired professional secretary to take and transcribe the minutes of the meeting. Three (3) of the participants were drawn from academia who have substantial



experience in project management, curriculum development and educational psychology. Five (5) other participants were seasoned project managers (PM's) drawn from top construction firms in Ghana (PMs from contractors' perspective). The major commonalities of this category of participants is the fact that each member of the group has had an opportunity to enrol in a formal training in project management; have worked on many large and complex project in the past; and have had over 10 years involvement with project management practice where they were able to relate practical knowledge to the PMC development process.

Two (2) other project managers were drawn from the consultants' group. The unique attributes of these PMs are that each has obtained Architectural and Quantity Surveying first degrees with advanced qualifications in project management; substantial experience in supervising and managing large contractor groups on complex projects; and had previous experience working in the contractors outfit. The remaining two (2) participants of the group were drawn from the clients' group that has had project management experience working with several other PMs. One of the researchers has for many years been the CEO of a leading construction firm in Ghana and this was instrumental to securing the participation of the FGD members. The assemblage process of the focus group panel members commenced in early June 2009. The panel members were contacted through series of informal discussions and prior contacts on issues relating to project management education which triggered their interest.

The FGD started with the moderator welcoming the participants to the meeting and introducing the agenda of the meeting to them. Emphasis was laid on the fact that the goal of the discussion was to know what each participant thinks about the subject and that there were no right or wrong answers in the discussion. The rationale was to form common opinions that will aid the identification of PMC for PMs in large construction firms in Ghana. Each member, however, was entreated to: feel free, be frank and share viewpoints, regardless of other members' position on the subject. Guidelines for the discussion were also outlined after which printed open-ended questions together with notepads and pens were distributed to the participants. Participants were informed that the session will be recorded by both electronic (video) and manual media (note taking). Altogether, the FGD lasted for about 3 hours with intermittent breaks for refreshment.

Data obtained using the questionnaire approach is limited to the written responses of subjects to pre-arranged questions. Once the survey questionnaires were drafted, they were discussed with few project management researchers and small number of respondents having characteristics similar to those of the target group of respondents. This helped to re-design the questionnaires, making it more consistent and focusing it on strategic issues. The format of the questionnaires was guided by considerations of appeal to respondents and ease of reading. Similarly, the number of questions in each set was kept low as much as possible to encourage respondents to take their time in answering the questions. The questionnaire was designed to include; closed-ended questions and scaled-response questions.

The closed-ended questions were used to save the respondent time and effort in supplying the required data. The questionnaires consisted of four (4) groups of questions. The motives of the first two groups of questions were to determine the PMs' experience and professionalism. In the last two group of questions, respondents (PMs) were asked to respectively rate the relative importance of the 18 PMCA (which were generated through the FGD) and their proficiency in those variables on a Likert response scale of 1-5. The rating

involved the respondents to decide whether the variable is “Not Important (1)”, “Less Important (2)”, “Quite Important (3)”, “Important (4)” and “Very Important (5)”; and Not Proficient (1)”, “Less Proficient (2)”, “Quite Proficient (3)”, “Proficient (4)” and “Very Proficient (5)” respectively.

Considering the geographically dispersed nature of large construction firms in Ghana, the questionnaires were personally administered via face-to-face and through the emails of some of the project managers; and with the help of two trained research assistants. This approach was chosen because it was suitable to the exploratory nature of the research and the main advantages of this approach lie in the fact that it enhances the response rate and being cost effective. The main disadvantages of the face-to face administering are inherent in the geographical limitations of the survey and the vast resources needed if such surveys are to be carried nationally, making it more expensive and time consuming (Frazer and Lawley, 2000).

The questionnaires were pre-tested using few samples of project managers in Ghana. After the questionnaire was pre-tested, it was revised based on the feedback received from them and finally administered. The questionnaires were randomly distributed to 100 PMs selected from these large construction firms in Ghana. Out of the 100 questionnaires distributed to the PMs, 54 were returned, completed and were used in the analysis, representing 54 percent of the response rate. The relative high response rate of 54 percent could be attributed to the strict adherence to the techniques employed in distributing the questionnaires and the approach by which the field survey was conducted. The whole survey process took approximately 4 weeks to be completed.

## **EXPLORING PROJECT MANAGEMENT COMPETENCIES USING FOCUS GROUP DISCUSSION**

In order to understand the relevance of project management competencies in project outcomes and project success, it was important to provide an understanding into the terminology of project; what constitutes large construction projects and definition of project success to position the research in an appropriate context.

*A member of the panel asked a question about the contextual meaning of a “project” and what constitutes “large projects” since the research intends to explore project management competencies for PMs working on large construction projects.*

This question triggered a lot of interest by panel members. The premise for the discussion was that “it is possible that PMs would need special skills to handle a large project that involves several stakeholders and cost several million dollars than a relatively smaller project”. It is therefore important to contextualise the definition of project and what constitutes large construction projects. This would then provide insights into the various project management competencies required by project managers in the context of Ghanaian construction industry. In exploring the meaning of a “project” a member of the panel who has several years experience working as project management consultant indicated that “a project may be defined as any series of activities and tasks that have a specific objective to be completed within certain specifications, have funding and time limitations and consume

resources". This definition provided was consistent with earlier propositions by Kerzner (2001).

The next task was to contextualise the meaning of "large project" following the lead question posed by the panel member. During the discussion, one member who has several years of experience in managing projects for both public and private sector clients in Ghana and abroad explained that the distinction between large and small projects are often subjective and sometimes may be misleading. The emphasis was that, for instance, a "large project" in one context may be a "small project" in another context and vice versa. Another member supported this and cited an example that a large project in developing country like Ghana may be a small project in a developed country such as the United Kingdom. This contention tallies with the view of Kerzner (2001) who believed that there seems to be no universally accepted definition of the term 'large project' or 'project complexity' in the construction industry.

In recognition of this, however, another member of the FGD indicated that although an implicit definition of large project may not exist universally, but somewhat there should be boundaries for consideration when discussing issues on project size. The member further pushed forward his argument by stating that large construction projects are often referred to as being complex. Further to this point, it was mentioned by the moderator of the panel that: the definition of a complex or large construction project should refer to the interaction, interdependencies and interrelationships between parts of a project and that the greatest deal of complexity lies within the organisational aspects of a project. Majority of the panel members agreed with this view.

Another interesting question was put forward by a panel member; and that had to do with whether there is a distinction between a "large project" and a "mega project"? There were divisions amongst the responses provided by the panel members. Whilst some held the view that the terms large project and mega project are used interchangeably, and they have the same contextual meaning; others held opposing views. For instance, as indicated by Warrack (1985; 1992), a mega project usually is defined by absolute size, and the size criterion here is set at \$1 billion (Sykes, 1990; Flyvbjerg, 2005). Elsewhere, Warrack (1992) argues for a relative rather than absolute size definition; thus, in some contexts, a \$100 million size could constitute a mega project.

As the discussion proceeds, a panel member drew the panel's attention to the fact that differentiating large/mega projects from smaller projects based purely on financial terms whether absolute or relative may not be sufficient to define the competency requirements for project managers. Surprisingly, this suggestion by the panel member was vastly supported by other panel members as members tried to define the premise for understanding complexities of large/mega projects, and how these large/mega projects could be effectively managed within the context of project management genre. Subsequently, panel members reached a consensus by identifying the characteristics of large/mega projects that define both relative and absolute nature of large/mega projects. Quite a deviation from the financial definition as noted earlier by previous authors, among others, panel members indicated that large/mega projects are inherently risky due to long planning horizons and complex interfaces. Consistent with the proposition made by Warrack (1992), the discussion pointed out that there are several stakeholders with conflicting interests in mega projects decision-making. This make is quite difficult to manage the varying stakeholder values, interests and aspirations of mega projects. Further manifestations of large/mega projects as explained by the panel members

were embedded in the often reported misinformation about benefits, costs, risks and the high socio-economic and environmental impacts.

*Another question was put forward by the moderator; and quoting from the question list “What do you think are some of the roles that Project Managers (PMs) on large construction projects are expected to perform”?*

It is clear that much has been reported in the literature review section about innate roles played by project managers throughout the project cycle. However, during the panel discussion, a member indicated that the main role played by project managers on large/complex projects is decision-making; and the decision process involves interactions between the project, people and finances. Implicitly, panel members held convergent views about the role of project managers. These roles include: leading, coordinating, controlling, planning, organising, monitoring, managing, communicating, empowering and delegating. Furthermore, while some panel members expressed that all these roles played by project managers’ focus on the “art” and “science” of project management, others differentiate between “leaders” and “managers.” Another panel member summed up the thinking by stating that the “leader/art side requires strong communication, visioning, and interpersonal skills, while the manager/science side requires detailed knowledge of methodology and tools, plus strong analysis and problem-solving skills”.

*The panel also discuss issues regarding to project management competencies required for PMs to be able to discharge their roles. This was followed when the moderator put forward the lead question “Could you please share your views on project management competencies for PMs on large constructions projects”.*

Drawing on the premise that actual management experiences (Egger et al., 1996); ethical knowledge (Helgadottir, 2008); and financial knowledge (Owusu-Manu and Badu, 2009) should be incorporated into project management education, panel members were asked to share their views on project management competencies and, identify as much as possible, expected project management competency areas. Such information was necessary because it provided the platform for the group to develop the broad philosophy of project management competencies. In order to get at specific competencies, the need was felt by panel members to be directive by asking participants to identify a list of both technical (task/work-oriented competencies) and managerial competencies (contextual/people-oriented) of project management. The constant comparative method of data analysis was adopted at this stage of the discussion. According to Bogdan and Biklen (1998) and Merriam (1998), this method involves an iterative process of collecting data, identifying major and recurring themes in the data, developing categories for these themes, and working with and coding the data to reveal representations of the identified categories. Next, each panel member condensed initial identified the initial list of raw data on project management competencies into more refined categories representing higher-level themes. For example, initial raw codes of “outcomes,” and “objectives” were condensed into one code, such as “goals,” that captured the common theme as expressed by panel members.

After the completion of independent analyses, the panel met to compare and discuss identified themes referring back to the raw data for guidance when needed. As a result of the

discussion, the panel finally agreed upon a list of eighteen (18) core project management competency areas. These are: schedule management and planning, cost management, quality management, human resources management, risk management, supply chain management, claims management, knowledge management, health and safety management, conflict and dispute management, environmental management, ethical management, stakeholders' management, information technology management, communication management, materials resources management, financial management and plant and equipment resources management. Indeed, these findings support the conceptual maps of project management competency in the literature and the argument made by Alter and Koontz (1996), Morris (2003), Chen and Partington (2006), Chen et al. (2008) and Ahadzie et al. (2008a,b; 2009), that project management must be conceptualised beyond the commonly emphasized project administration expertise (setting and managing scope, timelines, and budgets). Moreover, certain competency areas such as finance, ethics and culture which are rarely mentioned by most authors were also identified by the focus group as important competency areas for a 21<sup>st</sup> century business process. It has earlier been mentioned that project management is a complex process targeting multiple outcomes; requiring the acquisition of a variety of knowledge and skill sets that often cross different areas of expertise, including management, information technology, engineering, etc (Kerzner, 2001). The next step of the research is to test these project management competency areas (PMCA) on large sample of project managers using survey questionnaires to improve validity of the results. The justification for this test is that, these variables are firmly rooted in the theoretical literature of project management and it is important to determine whether these conceptual maps confirm the empirical realities of large number of project managers in the Ghanaian construction industry.

## APPRAISING PROJECT MANAGEMENT COMPETENCIES

### Data Analysis and Discussion of Survey Results

In order to put the discussion in its context, it is important to describe the characteristics of the respondents (project managers) involved in the survey. As earlier indicated, the main characteristics that were of interest to this study were experience and professionalism. The criteria for experience and professionalism in the context of this research are determined by the number of years of practice and the financial scope of projects handled. Tables 1 and 2 respectively presents the results of the years of experience and the average size of projects (financial scope) managed within the period of project management practice. From Table 1, 14.8 percent of the project managers involved with the survey had less than or equal to 5 years work experience in project management practice; 35.2 percent had a work experience of 6-10 years; 20.4 percent had working experience of 11-15 years; 14.8 percent had working experience of 16.20 years; and the remaining 14.8 percent had over 20 years experience. Regarding the financial value of projects executed, less than 2.0 percent (1.85) has managed and executed projects of less than or equal to \$ 2.5million dollars while an overwhelming majority of the project managers, representing 48.15 percent had worked on projects that are over \$10 million dollars in value. The conclusions drawn on these findings are that the respondents have reasonable experience in project management practice. Furthermore, the

findings suggest that most respondents are regularly active and have executed large construction projects. It seems, therefore, plausible to conclude that those who responded to the survey are sufficiently experienced in project management competency to provide data which is credible and representative.

**Table 1. Project Managers Years of Experience in Project Management**

Years	Frequency	Percent	Valid Percent	Cumulative Percent
=<5yrs	8	14.8	14.8	14.8
6-10yrs	19	35.2	35.2	50.0
11-15yrs	11	20.4	20.4	70.4
16-20yrs	8	14.8	14.8	85.2
>20yrs	8	14.8	14.8	100.0
Total	54	100.0	100.0	

**Table 2. Financial Scope of Project Executed by Project Managers**

Project Size (\$ X10 <sup>3</sup> )	Frequency	Percent	Valid Percent	Cumulative Percent
=<2,500	1	1.85	1.85	1.85
2,000 – 5,000	7	12.96	12.96	14.81
5,000 – 7,500	11	20.37	20.37	35.18
7,500 – 10,000	9	16.67	16.67	51.85
>10,000	26	48.15	48.15	100.0
Total	54	100.0	100.0	

### Working Hypotheses

Towards the appraisal of the identified project management competencies; two categories of hypotheses were developed. Whilst the rationale for the first category of hypotheses was to confirm whether the PMCAs identified in the literature and the focus group discussion conform to the general thinking of large sample of project managers in Ghana, that of the second category of hypotheses was to test whether indeed project managers have the requisite proficiency in the application of these competencies. This would then provide pointers as to where future training needs should be directed at.

In the first category of hypotheses, the hypotheses were stated as follows:

1. *Null Hypothesis (H0)*: The project management competency areas identified by the focus group are unnecessary or unimportant competency requirement for project managers in the Ghanaian context.



2. *Alternative hypothesis (H<sub>A</sub>):* The project management competency areas identified by the focus group are necessary or important competency requirement for project managers in the Ghanaian context.

In the second category of hypotheses, the *hypotheses* were stated as follows:

1. *Null Hypothesis (H<sub>0</sub>):* Project managers working on large construction firms in Ghana have weak proficiency in the project management competency areas identified by the focus group.
2. *Alternative hypothesis (H<sub>A</sub>):* Project managers working on large construction firms in Ghana have strong proficiency in the project management competency areas identified by the focus group”.

### Preliminary Test and Descriptive Analysis

Before the Chi Square test was performed to test the hypotheses of the study, preliminary descriptive analysis such as mean ranking of each of the PMCA variable was conducted to help provide a clearer picture of the consensus reached by the respondents; and the results are tabulated in Table 3.

**Table 3. Descriptive Statistics of the Importance of PMCA as Necessary Project Management Competency Requirement**

Importance of PMCA	N	Mean	Std. Deviation	Std. Error
Financial management	54	4.78	.502	.072
Cost management	54	4.59	.599	.078
Materials resources management	54	4.54	.573	.074
Schedule management and planning	54	4.57	.665	.090
Quality management	54	4.44	.634	.085
Plant and equipment resources management	54	4.44	.634	.085
Communication management	54	4.39	.685	.095
Human resource management	54	4.30	.717	.101
Claims management	54	4.28	.878	.124
Information Technology	54	4.09	.708	.102
Supply chain management	54	4.08	.756	.109
Risk management	54	4.04	.776	.113
Health and Safety management	54	4.00	.801	.117
Stakeholders' management	54	3.87	.933	.129
Knowledge management	54	3.87	.825	.119
Environmental management	54	3.67	.777	.114
Conflict and dispute management	54	3.63	.958	.135
Ethical management	54	3.39	.998	.138

For each of the PMCA, the null hypothesis was that each variable was unimportant ( $H_0: U = U_0$ ) and the alternative hypothesis was that the variable was important ( $H_A: U > U_0$ ); where  $U_0$  is the population mean and drawing from Ling (2003), the  $U_0$  was fixed at 3.5. Thus, based on the five-point Likert rating scale, and consistent with Ahadzie et al (2007) and Ling (2003); a PMCA variable was deemed important if it had a mean of 3.5 or more. Where two or more variables have the same mean, the one with the lowest standard deviation is traditionally assumed the highest importance (Field, 2005). According to Ahadzie et al (2007 and Field (2005), the standard error is the standard deviation of sample means and it is a measure of how representative a sample is likely to be to the population. Based on the results presented in Table 3; since virtually all the PMCAs (except the one on ethical management) have mean values above the accepted population mean of 3.5, it is reasonable to conclude that they are necessary competency requirements for project managers in the context of the Ghanaian construction industry.

## Test of Hypotheses

### *Hypotheses Category 1*

The hypotheses were tested using Chi Square test at conventionally p-values of  $p \leq 0.05$ . The rule for the acceptance or rejection of a hypothesis is that if a p-value of  $> 0.05$  is achieved, the hypothesis is accepted but if p-value of  $\leq 0.05$  is achieved, the hypothesis is rejected. The results of the chi square tests as presented in Table 4 below indicated that; all the PMCA variables identified recorded p-values of  $\leq 0.05$ . This signals that the null hypothesis which was postulated on the premise that the PMCA identified by the focus group are not necessary project management competency requirement for project managers in the Ghanaian context was not supported and therefore rejected. The results contribute to the project management competency debate and suggest that, the PMCA identified pertains to the Ghanaian construction industry; and support the key conceptual strands earlier noted. However, there was an exception as to the rejection of the null hypotheses. For instance, the chi-square test presented in Table 4 recorded p-value (0.164) which is more than the conventional p-value  $> 0.05$  for the variable "Ethical Management". Drawing on this premise, the null hypothesis which stated that "*Ethical management related issues are not necessary project management competency requirements for project managers on large construction projects*" was accepted.

This is not surprising because, practically, ethical issues are concerned with what is right, wrong, fair, just, good or bad; about what we ought to do, not just what is the case or what is most acceptable or expedient (Preston, 1996). Recently, Walker, et al (2007: p.103) contributed to the scarcely ethical debate and concluded that "ethics is a multifaceted concept that includes the study of morality, the legitimacy of moral claims and basis of justification of decisions and may include: conflict of interest, fraudulent behaviours and corruption". Conventional wisdom tells that many of the ethical issues mentioned above are rarely addressed in project management literature until recently. This result is consistent with what a member of the focus group discussion earlier said indicated "in my career development in project management, I hardly sat in ethical management modules; and people virtually do not talk about ethical issues". However, Walker et al. (2007: p.104) have argued that ethics is fundamental to business conduct. Conventional wisdom informs the thinking that a moral

relationship lays at the confluent of agreements and contracts between two people or two organisations, and that unless there is a basis of trust, business cannot proceed. This view suggests that the organisation is a moral player in society with duties and responsibilities, and in order to advance its interests it must engage in behaviour that is acknowledged to be at least the minimum moral standard.

**Table 4. Chi Square Test of Project Management Competency Requirements**

	Chi-Square	Df	Asymp. Sig. <i>p</i> values	Decision
Schedule management and planning	53.943 <sup>a</sup>	3	.000	Reject
Cost management	28.778 <sup>b</sup>	2	.000	Reject
Quality management	28.778 <sup>b</sup>	2	.000	Reject
Human resource management	33.407 <sup>c</sup>	3	.000	Reject
Risk management	27.037 <sup>c</sup>	3	.000	Reject
Supply chain management	24.962 <sup>a</sup>	3	.000	Reject
Claims management	29.704 <sup>c</sup>	3	.000	Reject
Knowledge management	16.963 <sup>c</sup>	3	.001	Reject
Health and Safety management	18.741 <sup>c</sup>	3	.000	Reject
Conflict and dispute management	25.259 <sup>d</sup>	4	.000	Reject
Environmental management	26.889 <sup>c</sup>	3	.000	Reject
Ethical management	5.111 <sup>c</sup>	3	.164	<b>Accept</b>
Stakeholders' management	11.037 <sup>c</sup>	3	.012	Reject
Information Technology	7.444 <sup>b</sup>	2	.024	Reject
Communication management	13.000 <sup>b</sup>	2	.002	Reject
Materials resources management	24.111 <sup>b</sup>	2	.000	Reject
Financial management	57.333 <sup>b</sup>	2	.000	Reject
Plant and equipment resources management	17.333 <sup>b</sup>	2	.000	Reject

<sup>a</sup> 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 13.3;

<sup>b</sup> 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 18.0;

<sup>c</sup> 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 13.5;

<sup>d</sup> 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.8

#### *Hypotheses Category 2*

Similar to category 1, the hypotheses were tested using Chi Square test at conventionally *p*-values of  $p \leq 0.05$ . The rule for the acceptance or rejection of a hypothesis is that if *p*-value

is  $>0.05$  is achieved, the hypothesis is accepted but if  $p$ -value of  $\leq 0.05$  is achieved, the hypothesis is rejected (Field, 2005). The results of the chi square tests are presented in Table 5 below. They indicated that project managers working on large construction projects in Ghana have strong proficiency in the PMCA variables identified since the variables recorded  $p$ -values of  $\leq 0.05$ .

**Table 5. Chi Square Test of Project Managers Proficiency in the Project Management Competency Areas**

	Chi-Square	df	Asymp. Sig. $p$ values	Decision
Schedule management and planning	21.340 <sup>a</sup>	3	.000	Reject
Cost management	37.231 <sup>b</sup>	4	.000	Reject
Quality management	52.231 <sup>b</sup>	4	.000	Reject
Human resource management	14.923 <sup>c</sup>	3	.002	Reject
Risk management	9.231 <sup>c</sup>	3	.026	Reject
Supply chain management	17.094 <sup>d</sup>	4	.002	Reject
Claims management	22.200 <sup>e</sup>	4	.000	Reject
Knowledge management	24.000 <sup>c</sup>	3	.000	Reject
Health and Safety management	42.377 <sup>d</sup>	4	.000	Reject
Conflict and dispute management	41.245 <sup>d</sup>	4	.000	Reject
Environmental management	24.731 <sup>b</sup>	4	.000	Reject
Ethical management	25.308 <sup>b</sup>	4	.000	Reject
Stakeholders' management	29.400 <sup>e</sup>	4	.000	Reject
Information technology	30.868 <sup>d</sup>	4	.000	Reject
Communication management	38.962 <sup>b</sup>	4	.000	Reject
Materials resources management	22.308 <sup>c</sup>	3	.000	Reject
Financial management	30.863 <sup>f</sup>	4	.000	Reject
Plant and equipment resources management	11.231 <sup>c</sup>	3	.011	Reject

<sup>a</sup>. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 13.3.

<sup>b</sup>. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.4.

<sup>c</sup>. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 13.0.

<sup>d</sup>. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.6.

<sup>e</sup>. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.0.

<sup>f</sup>. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.2.

This signals that the null hypothesis which was postulated on the premise that project managers working on large construction projects in Ghana have strong proficiency in the PMCA was not supported and therefore rejected. The rejection of the variable “Ethical Management” in this context is quite surprising.

Conventionally, one would expect that since the variable has been rejected as a necessary project management competency requirement in the previous test, it should follow that project managers would not be proficient in its application. This suggests that ethical issues may be assumed to be traditional and cultural practices in organisations and that may not necessarily need a separate module to teach. It follows that organisations develop policies and procedures as part of corporate governance for individuals to follow – this is an example of normative ethics or the clarification of behaviour standards about what we ought to do. As ethics is directly concerned with behaviour, it therefore has relevance to the way people behave in organisations. However, in recent times, studies on ethics have been popularised in academic literature and there has been a renewed emphasis to incorporate ethical management in project management and construction disciplines (Helgadottir, 2008). An important question to answer is, why should we consider ethics at all in business? There are some who argue that business transactions and business activities are limited activities and, as such, managers are constrained to only consider actions that advance the interests of the organisation. This position advocates that managers are constrained in their decision making to only consider decisions that advance shareholder interests and it is wrong for them to engage in socially responsible activity, other than obeying the law – a view of the classical approach to social responsible practices.

## **IMPLICATIONS OF FINDINGS FOR PROJECT MANAGEMENT**

The foregoing findings of this study have implications for project management education, practices and effectiveness. They are also of importance to PMs (particularly those working on large projects in developing economies) in relation to their efficiency and career progression. This study sheds more light on the important skills PMs should acquire towards improving their own professional developments.

It identifies and recommends seventeen key project management competency domains that have not been hitherto given prominence in the current literature for PMs’ capacity building in a developing economy, Ghana.

These various competency profiles can be mapped and customised towards improving workplace learning and training requirements of project managers in Ghana. While the study is unique to Ghana, there is also the potential that many project-based sectors of the construction industry in developing countries will find the results useful towards the advancement of improved project management practices due to similarities in their technical, socio-economic and cultural practices. The results of this study should help these in establishing the appropriate competency measures which are in tandem with their technological, socio-economic, structural and cultural practices.

Furthermore, the study provides an important guideline to project management educators; working project managers; and aspiring project managers on what is expected of them in terms of their project management skills. The findings also implies that project management educators may assume ethical issues to be traditional and cultural practices in organisations

and may not necessarily need a separate module to teach current and potential PMs. The study also provides a basis for which large construction firms, consultants and clients (who employ the services of project managers) in the Ghanaian construction industry could recruit, monitor, retain and promote PMs.

## CONCLUSION

Drawing extensively on the conceptual maps of project management competencies in the literature, a focus group discussion was held to explore the appropriateness of these competency areas in the context of the Ghanaian construction industry.

As a result of the literature review and subsequent focus group discussions, eighteen (18) core project management competency areas were generated and tested on a large number of project management professionals in Ghana. It was hypothesized that “the project management competency areas identified by the focus group are unnecessary or unimportant competency requirements for project managers in the Ghanaian context”.

The chi-square test revealed that, pertaining to the Ghanaian context, all the project management competency areas identified are important except one variable, “ethical management”; and an explanation was advanced for this observed trend. The study was able to establish that the project managers involved in the survey had significant proficiency in the application of all the 18 competency areas identified.

Practically, the identification of these competency profiles provides an important guideline to project management educators, working project managers and aspiring project managers on what is expected of them in terms of their project management skills.

Subsequently, these findings may help PMs who lack the relevant skills to strive to acquire the relevant training as part of their professional development. The findings also provide a basis on which large construction firms, consultants and clients who employ the services of project managers in the Ghanaian construction industry could recruit, monitor, retain and promote PMs. Clearly, a well-designed and delivered project management education and training programmes are critical to developing and maintaining the required level of technical, professional and managerial expertise for managing large and complex projects in Ghana.

The study has wider implications for project management and project delivery within the Ghanaian construction industry. It is recommended that project management education and training courses should be consistent with the core competency profiles for project managers as identified by this research.

As project management educators, researchers and practitioners continue to search for new and better methods of fulfilling the main three project management competency requirements (contextual, technical and behavioural), this research provides some answers to the important competencies and skill-sets requirements for large construction projects in a developing economy using a robust qual-quant approach. This represents a unique contribution to the discipline.

Future research may adopt longitudinal approach or a multi-country focus in order to enhance the validity and generalizability of findings.



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