

## **A DELPHI TECHNIQUE APPROACH TOWARDS THE NEED FOR AND RELEVANCE OF CONSTRUCTION PROJECT MONITORING AND EVALUATION PRACTICES**

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### **ABSTRACT**

The practical experience of the researchers on the implementation of the inductive methodology to knowledge dissemination using the Delphi technique approach is reported in this study. The Delphi method is a vital procedure of reaching consensus on issues that cannot be resolved in a once-off discussion. The research commenced with five questions to ascertain the views of experts with the aim of reaching consensus on the need for and relevance of monitoring and evaluation (M&E) implementation in achieving project **success in Ghana's construction industry**. Experts for the study were identified from the Ghanaian construction industry (quantity surveyors, architect, and engineers), research, and academic institutions of higher learning faculties in Ghana. After two iterative Delphi rounds, consensus was achieved on the need for and relevance of M&E to achieve project success as suggested by the experts during the Delphi process. Based on the difficulties faced in the process, the study recommends clear and concise instructions to Delphi experts on the process. Also, the length of the structured Delphi questionnaire should be as short as possible to ensure a high response rate with a constant reminder to experts before the close of the submission of responses. In conclusion, the authors argue that the Delphi technique is vital for studies in areas where consensus on the need for and relevance of construction project management practices is yet to be reached.

**Keywords:** Delphi technique, Ghana, monitoring and evaluation, need and relevance, project success

### **1. INTRODUCTION**

A critical task for project managers and teams to deal with has always been to achieve project success during project execution (Pinto and Slevin, 1988). Hence the question that comes up is how success will be achieved. Extant literature on construction project management has outlined numerous strategies to achieve the overarching challenge of project success (Ofori-Kuragu, Baiden, and Badu, 2016; Takim and Akintoye, 2002). Project success is determined to have been achieved when the project is completed to specification, within project budget and project handed over to the client on the agreed schedule (Ofori, 2013). While several scholars have recognised the implementation of M&E as a vital project management tool/function that can bring about successful project

delivery (Ofori, 2013), several other researchers are indifferent about the role of M&E in achieving project success, suggesting project team members have different views on how project success should be attained. This is probably as a result of the limited understanding of the role of M&E in project management towards achieving project success (Munns and Bjeirmi, 1996) and individual interest of project team and stakeholders. This has compelled the overconcentration of attention to other project management areas such as human resource, communication management, scope management, time cost and quality management, integration and risk management at the expense of monitoring and evaluation which addresses all these project management objectives towards achieving project success.

M&E practice seeks to coordinate all project success indicators to ensure that all project inputs are effectively and efficiently applied to the project to guarantee the desired output. This is achieved through the systematic collection of project progress information about cost, time, quality, satisfaction, performance, health and safety, and human resources and by examining the extent to which they are being achieved (Tengan and Aigbavboa, 2016). Successful M&E, therefore, would bring together relevant stakeholders to plan for effective project implementation, foster effective communication and leadership on projects, and establish a transparent approach to project delivery (accountability). It is therefore imperative for construction industry practitioners to rethink M&E implementation with the aim of achieving success.

As part of a broader PhD study to model the significant determinants of effective M&E in the Ghanaian construction industry, establishing the need for and relevance of M&E practice among construction industry players is necessary. This is ascertained through the application of the Delphi technique using construction industry experts (professionals, researchers, and academics) to reach consensus on the need for and relevance of M&E implementation **in Ghana's construction industry** for a possible policy proposal to be advanced. The Delphi technique is acclaimed as a vital tool for establishing consensus on issues that are impossible to agree on in a once-off discussion.

## **2. METHODOLOGY**

The study adopted the qualitative research approach. While the Delphi technique is a typical quantitative methodology (Skulmoski, Hartman, & Krahn, 2007), it is equally useful for qualitative research where research participants are engaged in a conversation in a natural sense, unlike research undertaken in the laboratory. Hence the Delphi methodology is rigorous enough to capture qualitative data. From the review of literature, the significant impact of M&E in the broad-spectrum of project management towards the achievement of project success is well documented. Whereas the need for and relevance of M&E in other cultural contexts is known, the case of the Ghanaian construction industry is generally known among practitioners only as generated from literature on other cultural contexts. This is evident in the paucity of available research on M&E concerning the country's construction industry. The need to provoke debate on the significance of construction project M&E in the GCI is considered in this study, hence a research method that could generate and encourage the discussion of different opinions in an attempt to ensure consensus on the subject matter was promoted for this study.

A one-off survey questionnaire method was therefore eliminated, and the Delphi method preferred. The Delphi technique emanates from the constructivist approach to knowledge, and it overlaps between quantitative and qualitative methods of data collection

and analysis (Aigbavboa, 2015; Fletcher and Marchildon, 2014; Green, 2014). These characteristics, according to Stewart (2001), allow the research results and conclusions to represent a shared meaning based on interactive process drawn from a pool of experts. Also, the Delphi method is a robust method for a rigorous interrogation of experts (Habibi, Sarafrazi, & Izadyar, 2014). Unlike ordinary survey research, the Delphi's strength also lies in the iterative process (rounds of questioning) used which provides an opportunity for initial feedback, assembling of responses, and the circulation of assembled responses to experts for further review. This unique process requiring group communication is central to the strength of the Delphi method (Stitt-Gohdes and Crews, 2004). Hence, a Delphi study was conducted to determine and solicit experts' views to concretise the implementation of M&E in the GCI. Two rounds of the Delphi process were conducted before experts could reach consensus on the questions that were posed to them.

### **3. CONDUCTING THE DELPHI STUDY**

The Delphi study has been described as an iterative predicting process characterised by three main features, namely anonymity, repetitive process with control response and statistical response (Chan, Yung, Lam, Tam, and Cheung, 2001). It is also a systematic, interactive research method used to obtain the judgement of a panel of independent experts on the subject being investigated (Hallowell and Gambatese, 2009). These empanelled experts remain unknown to each other throughout the iterative process of responding to the series of questions. The series of iteration therefore generates a consensus on the issue as the experts have the opportunity to modify or stand by their response or agree with the agreed position of the previous iteration; hence the goal of the process is to eliminate or reduce to the minimum the variability of the feedback and to reach to group consensus about the precise value (Hallowell and Gambatese, 2009).

The general premise of this study was therefore to attain consensus as to the need for and relevance of M&E for a holistic achievement of project success in the Ghanaian construction industry. While attaining group consensus is critical for the Delphi study, Chan et al. (2001) inform that the careful selection of experts significantly influences its success. Chan et al. (2001) further posit that the focus during response analyses should be on the response of the group rather than the individual responses. Therefore, the median, mean and interquartile (IQD) score analysis which measures consistency and agreement was adopted. The next section provides an overview of the Delphi process used in this study (see Figure 1).

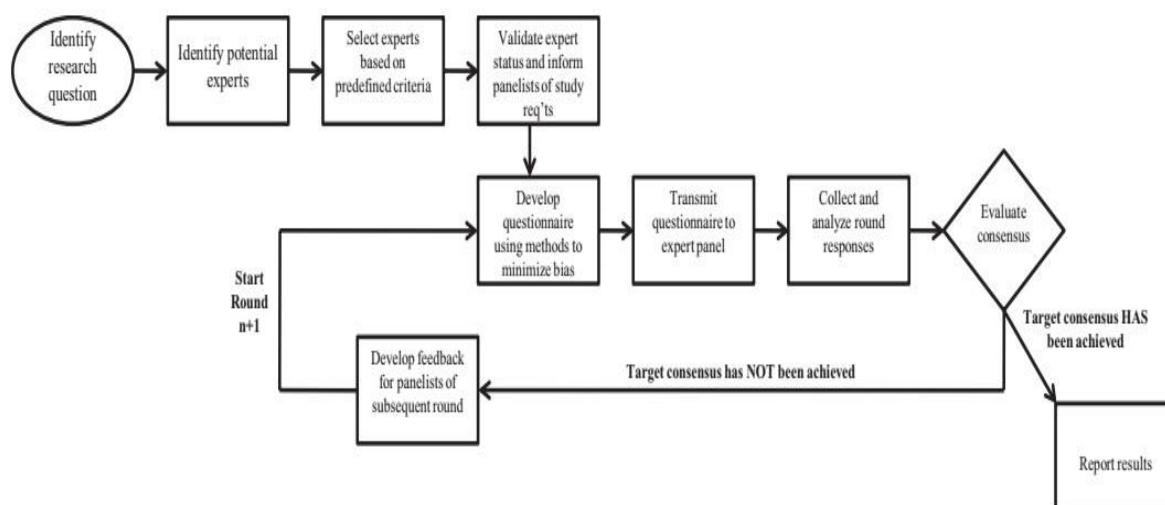


Figure 1: Delphi process  
 Source: Hallowell and Gambatese (2009)

#### 4. IDENTIFY, SELECT AND VALIDATE EXPERTS' STATUS

Since experts form the cornerstone of a Delphi study, the demographic characteristics of pre-qualified experts are provided here to portray their level of knowledge and expertise in contributing as an expert to the study. A list of project managers, academics, and industry professionals (quantity surveyors, architects, and engineers) from Ghana who were believed to have significant knowledge of and expertise on construction project M&E were identified. An initial twenty (20) experts willingly consented to participate; hence 20 Delphi questionnaires were sent out for the Delphi round 1. Thirteen (13) experts responded to the round 1 survey while eleven (11) returned in round 2. An attrition rate of forty-five per cent (45%) was recorded. The educational levels of experts indicate seventy-three per cent (73%) had a master's degree while twenty-seven per cent (27%) had a PhD degree in construction-related fields of study. Experts for the study belonged to various recognised professional bodies in the country. Specifically, about forty-six per cent (46%) were professional members of the Ghana Institution of Surveyors, while the Ghana Institute of Architects (GIA) and the Ghana Institution of Engineers (GhIE) constituted twenty-seven per cent (27%) each.

Experts had substantial years of experience of working in the construction industry. About forty-six per cent (46%) of the experts had between six and ten years' working experience in the construction industry. Twenty-seven per cent (27%) of the experts had between 11-15 years' experience while twenty-seven per cent (27%) had over sixteen years of experience in the industry. All experts had been involved in construction project delivery at the metropolitan, municipal and district assemblies (MMDAs) of Ghana, either as consultants or builders (contractors). Finally, experts were drawn from diverse institutions in the construction industry. The academic institutions (lecturers at universities) constituted about forty-six per cent (46%), with the research institutions and construction industry constituting twenty-seven per cent (27%) each. Based on the criteria described above,

experts qualified as having the required knowledge and expertise to provide useful response for the study.

## 5. DETERMINING CONSENSUS

Skulmoski et al. (2007) argue that there is a direct relationship between the method of data collection and the results. Hence a detailed Delphi result is important to indicate areas of agreement and disagreement. The findings of the Delphi rounds are presented and discussed in the subsequent sections. In determining consensus, however, no single consensus was agreed on one approach, suggesting a multiplicity of approaches in arriving at consensus (Aigbavboa, 2013; Holey, Feeley, Dixon, & Whittaker, 2007; Raskin, 1994; Rayens and Hahn, 2000; Spinelli, 1983). The study therefore established consensus in line with Raskin, (1994) on each statement achieving an interquartile deviation score less than or equal to one ( $IQD \leq 1$ )

### 5.1 Delphi Round 1

The need for and relevance of M&E in the Ghanaian construction industry is determined. Five questions were asked in this regard:

1. Is M&E a relevant project management tool in achieving project success in the Ghanaian construction industry?
2. Does the Ghanaian construction industry have an M&E policy framework document for construction project M&E?
3. Does the Ghanaian construction industry require an M&E policy framework to guide M&E practice in construction project delivery?
4. Should an M&E policy framework be made a responsive criterion for the selection of project consultants and contractors in the GCI?
5. Should organisations establish a separate M&E unit to monitor and report on project implementation?

All thirteen (13) experts agreed on the question relating to the relevance for M&E in achieving project success in the Ghanaian construction industry based on the median score of 8.0 with an interquartile deviation (IQD) score of 1.0 indicating a strong consensus amongst experts. Secondly, whether the Ghanaian construction industry has a policy framework for M&E recorded a median score of 10.0 and an IQD score of 3.0, signifying strong agreement that the GCI lacks such a policy document but recorded weak consensus ( $IQD \geq 2.1 \leq 3$ ). Referring to Table 9.2, the need for an M&E policy framework for use in the Ghanaian construction industry was agreed upon amongst experts, hence recording a median score of 9.0 and an IQD score of 1.0. Furthermore, considering an M&E policy framework document as a criterion for selecting consulting firms for M&E services, a consensus was not reached amongst experts, indicated by an IQD score of 2.0 and a median rating of 9.0. There is, however, a weak consensus regarding the establishment of M&E units at the MMDA level to undertake a monitoring and supervisory role on projects with a concern for empowering existing departments to undertake such services. A median score of 9.0 and a very high IQD score of 3.0 was recorded.

## 5.2 Delphi Round 2

Out of the five questions asked to ascertain the need for and relevance of M&E in the Ghanaian construction industry, four issues were agreed upon with three of them achieving consensus by experts recording median ratings between 9 and 10 and the interquartile deviation between zero and one ( $IQD \leq 0.0$ ) respectively. Though it was agreed amongst experts that an M&E policy framework document should be made a responsive criterion for the selection of project consultants in the GCI, recording a median score of 9.0 suggesting high agreement among experts, consensus was not achieved, based on the IQD score of 1.5. On the other hand, there was average agreement by the experts that M&E was a relevant project management tool in achieving project success in the Ghanaian construction industry based on the median score of 8.0 but they reached unanimous consensus when an interquartile deviation (IQD) score of 0.0 and a standard deviation score of 0.30 were recorded.

**Table 1: Availability, need for and relevance of monitoring and evaluation**

QUESTIONS	MEDIAN	MEAN	STDEV	IQD
Monitoring and evaluation is a relevant project management tool in achieving project success in the Ghanaian construction industry.	8,0	8.09	0.30	0.0
The Ghanaian construction industry DOES NOT have an M&E policy framework document for construction project M&E.	10,0	9.36	2.11	0,0
The Ghanaian construction industry requires an M&E policy framework to guide M&E practice in construction project delivery.	9,0	8.73	0.9	0,0
An M&E policy framework document should be made a criterion for the selecting project consultants and contractors in the GCI.	9,0	9,00	3.61	1.5
Organisations should establish a separate M&E unit to monitor and report on project implementation.	9,0	8.45	1.13	1,0

## 6. DISCUSSION

The objective of the first Delphi study was to ascertain the need for and relevance of M&E in the Ghanaian construction industry. Findings suggest that M&E is significantly needed for and relevant to implementation in the GCI. This position was found to be consistent with the need for M&E in other industries and cultural contexts for achieving project success (Barasa, 2014; Kamau and Mohamed, 2015). Specifically, on the five main questions asked in answering the Delphi question one, experts agreed that M&E is a

relevant project management tool in achieving project success in the Ghanaian construction industry. This position was found to support the study by Kamau and Mohamed (2015) when the efficacy of M&E functions in achieving project success in Kenya was studied. Further, experts unanimously agreed that the Ghanaian construction industry lacks an M&E policy framework to guide M&E implementation on projects in the Ghanaian construction industry and therefore its importance in supporting the achievement of project success is significant.

The first step to institutionalise M&E is to establish an M&E unit at organisational and institutional levels in Ghana where infrastructure development is targeted and supported with funding from central government and donor agencies. Experts expressly agreed on the establishment of M&E units at the institutional or organisational level to monitor and report on project implementation for the study. The need to establish M&E units at organisations is supported by a study by Abrahams (2015) to facilitate close supervision to ensure project success. In a contrary observation, even though the use of M&E policy framework as a responsive criterion in selecting project consultants (M&E specialist) and contractors in the GCI was highly agreed on by experts, obtaining a median score of 9.0, consensus was not achieved for such a requirement to be executed as it recorded an IQD of 1.5 which is above the cut-off for the study. Hence the variableness amongst experts on the statement explains the high standard deviation score of 3.61.

## **7. CONCLUSION AND RECOMMENDATION**

The study explored the experience of the researcher of the adoption of an inductive methodology to knowledge dissemination using the Delphi technique methodology. The study was successful as consensus was reached amongst experts on the need for and relevance of M&E in achieving project success in the construction industry after a two-round Delphi iteration. Specifically, eleven out of the twenty experts initially invited to agree and participate in the Delphi study concluded the study by providing a timeous response. The multiple parameter criteria adopted for achieving consensus were found to be vivacious. Based on the difficulties faced in the process, the study recommends that a clear and concise instruction to experts on the Delphi process is critical as unclear instructions influence the output of a study. Additionally, the structured Delphi questionnaire should be as short as possible to encourage a high response rate with constant reminders to experts before the close of the submission for responses. In conclusion, the Delphi technique is recommended for studies in areas where consensus on the need for and relevance of project management practices in achieving project success is yet to be reached.

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