

PROJECT MANAGEMENT PROCESS QUALITY: A CONCEPTUAL MEASUREMENT MODEL

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A distinction is made between the quality of a product and the quality of the project management process on construction projects. This research focuses on quality in the project management process and seeks to establish the nature and significance of the relationship between quality in the project management process and project performance. The motivation for the research is drawn from the need to understand the influence of project management on project performance. Here a conceptual model to measure project management process quality is presented and shows that such a model can be used to develop a causal model that can relate project management process quality and project performance.

Keywords: decision making, project performance, project management, quality.

INTRODUCTION

Studies on quality in project management (PM) have been presented in various perspectives. For example Hides *et al* (2000), Gupta and Graham (1997), Shenar (1997) analysed the use of projects and/or project management in implementing quality management initiatives, while Orwig and Brennan (2000) examined at the compatibility of total quality management and project management. Orwig and Brennan (2000) argue that by considering project management and total quality management (TQM) in terms of the fundamental principles of customer focus, teamwork and client satisfaction, it can be shown that by instituting a formal project management methodology and instituting basic project management techniques, project based organizations are fulfilling the principles of quality management. Other studies (Byde 1997, Henderson and McAdam 2000, and Barad and Raz 2000) analysed the use of quality management principles in projects environments.

The Project Management Institute (PMI) project management body of knowledge (PMBOK) categorizes quality management as one of its core processes. However it looks at quality management in terms of its application towards achieving product/service quality and not application of quality management to project management activities (Orwig and Brennan 2000).

This research looks at quality in the project management process and how this impacts on project performance. It seeks to contribute to the debate on the impact of project management on project performance. This paper reports on the development of a conceptual model that can be used to measure project management process quality.

The paper starts by firstly defining project management and project management processes. The project management processes are defined in terms of project

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management activities. The second part defines project management process quality (PMPQ) and presents a conceptual model that can be used to measure project management process quality. Although this model is yet to be empirically tested, possible benefits of the approach are discussed.

PROJECT MANAGEMENT

Project management can be defined as “The planning, co-ordination and control of a project from inception to completion on behalf of a client requiring the identification of the client’s objectives in terms of utility, function, quality, time and cost, and the establishment of relationships between resources, integrating, monitoring and controlling of the contributions to the project selecting alternatives in pursuit of the client’s satisfaction with the project outcome” (Walker 1996: 5). The central point in considering project management definitions is that PM is a process concerned with the management of a project to a successful completion. Although there are arguments concerning what should be regarded as the criteria for judging project success, the primary criteria, usually include completing the project on time, within budget, at the desired level of quality and satisfying the customers needs (Kerzner 1998).

Before examining project management process, it is important first of all to understand what a ‘*process*’ is. A process can be defined as a ‘course of action, proceeding, series of operations, series of actions *etc.* (Oxford dictionary). Cleland (1994) defines a process as a system of operations in a production of something i.e. a series of actions, changes, or functions that bring about an end result. He looks at PM as being a series of activities embodied in a process of getting things done on a project by working with members of the project team and with other people in order to reach the project schedule, cost, and technical performance objectives. It is seen from the definition of ‘*process*’ that the PM process can be portrayed in terms of actions, changes or functions.

Project management processes are grouped into two. Product oriented processes and management oriented processes (ISO 10006, PMI 2000, Abdomerovic and Blackmore 2001). In differentiating between project management processes and product oriented processes, the PMI (2000) defines project management processes as that which ‘describe, organize and completes the work of the project while product oriented processes as that which specifies, and creates the project’s product. This differentiation is also identified in ISO 10006 (ISO 1997). Sparrius (1994) also divided the management of projects into two processes-the technical process and the management process. Walker (2002) in discussing project systems distinguishes between the operating system, through which the project is achieved and the management system, which acts on behalf of the client and manages the operating system.

PROJECT MANAGEMENT PROCESS QUALITY

The general quality definitions of ‘*a trait or characteristic used to measure the degree of excellence of a product or service*’ (Wideman 2001) and ‘*fitness for purpose*’ (Turner and Simister 2000) apply to Project management process. Turner (1999) presents a five-element model of managing quality on projects, which includes, quality of the product, quality of the management process, quality assurance, quality control and people’s attitudes. The two distinct inter-linked perspectives of quality in a project, product quality and project management process quality (PMPQ) are both

underpinned by quality assurance and quality control procedures and affected by attitudes.

This distinction between product quality and project management quality is also recognized in the project management body of knowledge (PMBOK) (PMI, 2000) and ISO 10006 (ISO 1997). However the emphasis in research in quality in construction has been on the quality of the product while the quality of the management process has received little attention (Zulu and Brown 2002). Orwig and Brennan (2000) also recognize this and point out that academia has directed scant attention toward the effect quality management might have on project management processes. This is against the recognition that neglecting any one of the quality perspectives on a project would likely lead to project failure (ISO 1998, Turner 1999). This research focuses on the quality of the project management process.

PROJECT MANAGEMENT PROCESSES

Literature review reveals a number of project management processes in terms of project management functions or activities. Woodward (1997) presents the major tasks of a project manager a plan-measure-control cycle (see figure 1). He notes that the major tasks of project management are the planning and control of the work being done. Planning is the first step in the process, which seeks to set out the work that is to be done. This will set the baseline upon which actual performance will be measured against. This is similar to the BS-6079 project management process model of planning and control (BS, 2000)

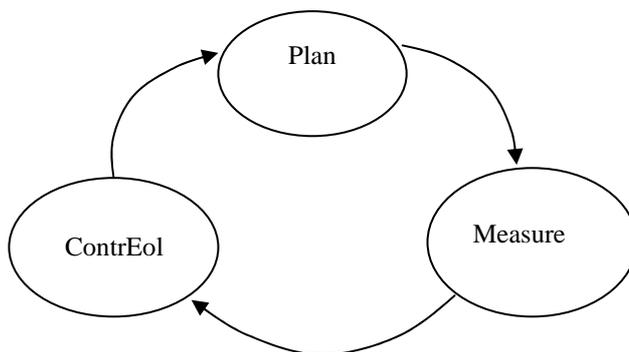


Figure 1: Model of plan-measure-control cycle (Woodward, 1997; 26)

Kerzner (2000) recognizes the project management responsibilities and skills as being similar to the general management functions but redefined to suit temporary organizations. He points out that although their fundamental meaning remain the same, their applications are different. He recognized the following as the management functions: planning, organizing, staffing, controlling and directing. This is similar to the fractal project management process model in Turner (1999)

The Project Management institute's project life cycle (PMI, 2001) approach model divides the project management process into five process- initiating processes; planning process; executing process, controlling process and closing processes. These process groups are linked and are applicable to any phase of the project life cycle.

The ISO 10006 model divides the project management processes into ten sub processes which include, strategic processes, interdependence processes, scope related processes, time related processes, cost related processes, resource related processes, personnel related processes, communication processes, risk management processes,

and purchasing related processes. This differs from the general project life cycle approach in that the process groups can be applied to any project phase. Elbeik and Thomas modelled classic project management and divided it into six distinct functions as comprising project definition, planning, team building, leading and motivation, control, communication and review and exit.

Walker (2002) takes a systems approach to analysing the process of managing projects. He distinguishes between two systems in the construction process. The first system he identifies is the operating system through which the project is achieved. The second system is the management system, which carries out the decision-making maintenance and regulatory activities that keep the operating system. In differentiating the two, he notes that the two are differentiated on the basis of skills. The skill of the management system is management while those of the operating system are professional and technical. Thus the operation system is concerned with professional and technical tasks while the management system is concerned with integrating and controlling its work. This management system acts on behalf of the client which can take part in different forms ranging from being contained within the clients organization or being a consultant project manager. Within the management system Walker (2002) identifies the management activities as including the following; approval and recommendation, boundary control, monitoring and maintenance, and general and direct oversight. However he notes that general and direct oversight, although it is not a project management activity as such but is directly relevant to the effectiveness of the project management process. These will usually be the responsibilities of the client and contractor.

THE CONCEPTUAL PROJECT MANAGEMENT PROCESS QUALITY (PMPQ) MODEL

The conceptual PMPQ model is developed from literature review and in particular uses a '*management system actions*' based on work by Walker (2002). The model incorporates project management activities identified by Walker (2002), and redefines them to take a broader perspective. Firstly the project management activities are discussed and then the conceptual model that can be used to measure project management process quality is presented.

Project Management Processes

The following activities are taken as the key project management processes

- Decision making processes
- Integration processes
- Monitoring and maintenance sub processes

It should be stated however that these process groups are not presented in there sequential order. Their application will be throughout the project life cycle as presented in Figure 2, although the degree of their application may vary depending on the project phase.

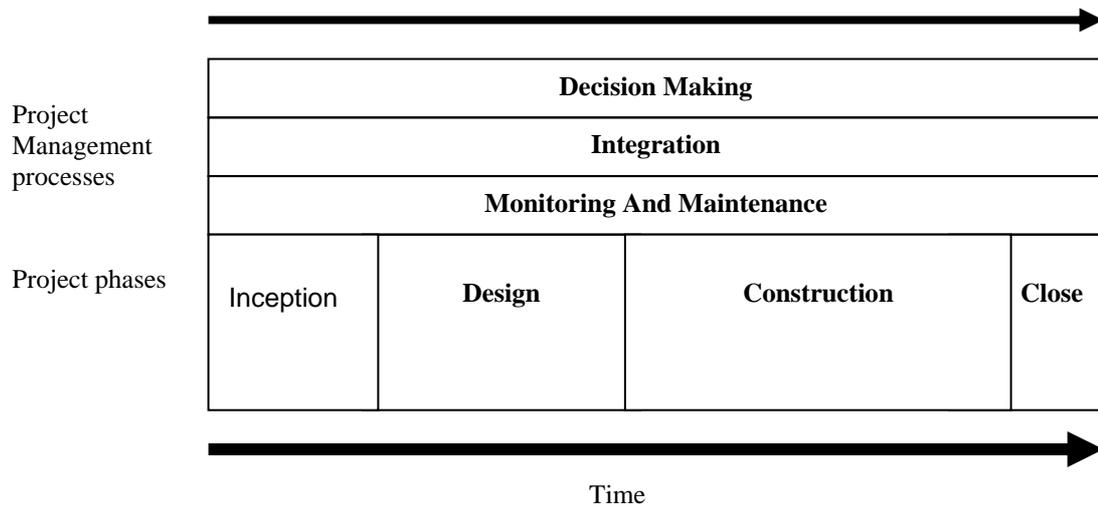


Figure 2: PMPQ Model

Decision-making processes:

This process will be manifested in various ways. For example project management functions will involve planning, approvals and recommendations, tradeoffs etc. Kerzner (2000) points out that planning is decision making based upon futurity. Walker (2002) divides decision making in a project into three main types. These are primary and key decision, which will be the premise of the client and operational decisions, which will be made by the project team. Although Walker (2002) does not include decision making as one of the project management activities, he differentiates operating system and management system by the skills requirements and states that the operating system is managed by the managing system which carries out decision making, maintenance and regulatory activities that keep the operating system working. Project management's involvement in decision-making will integrate the decision making process from the clients primary and key decision making to operational decisions. Decision making in this model includes such activities as strategic and operational decision-making, translation of client's objectives into brief and communicating this to project team and approval and recommendation of decisions to clients. These activities will be exercised at various decision points during the course of the project.

Integration processes:

The critical role of the project manager as that of integrator is recognized in literature (Egan (1994), and Pocock *et al* (1997)). Pocock *et al* (1997) used degree of interaction (DOI) as a measure of integration in analysed the relationship between integration and performance. They found out that projects with higher DOI performed better than projects with lower DOI. Their study however does not answer the question of whether project management improves integration or not. The influence of project management's role in improving integration was not part of their study. Integration can be taken to include team integration and process integration through such activities as boundary control and interface management. The major tasks in this process will include, design of project organization structure, identification of the way in which the client is integrated into the project, establishment of appropriate information and communication structures, chairing meetings of project team, and team and process integration.

Monitoring and maintenance

Walker (2000) recognizes monitoring and maintenance as one of the key project management activities. Monitoring relates to checking and controlling prior to output while maintenance ensures that the task has the capability to achieve the purpose. Monitoring involves ensuring that appropriate techniques and procedures are used, ensure contributors have the capability to do the job, activating the framework for relationships established for the contributors, monitoring and controlling work to ensure brief is being satisfied including adherence to budget, investment and program of plans. It also includes evaluation of project final and phase outcomes and provision of feedback. Most studies have looked at the impact of project management processes as defined in PMBOK but these relate to product-oriented processes. Others have looked at the above processes but this has been done as piecemeal analysis. No research so far has taken an aggregate view of project management processes quality.

Project Management Process Quality (PMPQ) constructs

The measurement of quality in most research work has been dominated by the use of quality factors and indicators. Factors would include those practices or conditions that would be necessary for good or bad quality while attributes are the indicators of quality. Using these two, quality can be measured. For example Rounce (1998), in studying quality in architectural building design developed a set of indicators of quality (12 positive quality indicators) and another set for non-quality (19 negative quality factors). Similarly Chan and Tam (2000), Tilley et al (1999), Parzinger and Nath (2000), used similar methodologies of measuring quality. The use of quality awards such as the MBQA (Anderson and Jerman 1998) and the EFQM (Europa 1999) in identifying quality attributes has also been widely used. This research uses a similar approach and identifies factors that would be critical to process quality. Below are the factors identified that would be used to measure quality in each sub-process.

Decision-making processes quality model

Figure 6 shows the decision making quality constructs. Six quality factors are identified will be critical to achieving process quality in the decision making process. These includes client’s objective, Organization structure, preparation of the programme, decisions made, recommendations, communication of decisions. (See Figure 3).

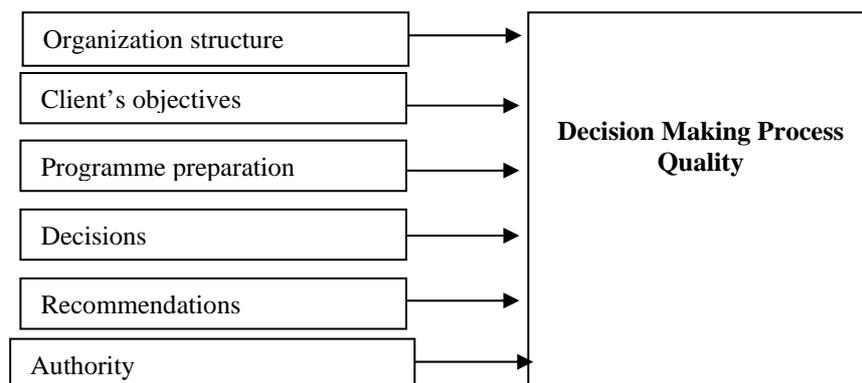


Figure 3: Decision making process

Integration processes quality model

The factors that are identified as being critical to quality in the integration process would include, team building, information and communication systems, meetings, organization structure and client integration (See Figure 4).

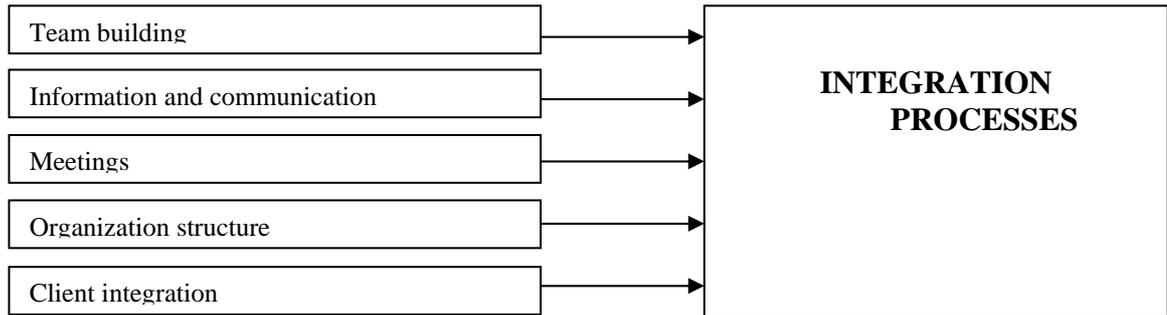


Figure 4: integration process

Monitoring and maintenance processes model

Project monitoring and maintenance processes would be influenced by the following factors, appointment of team members, motivation of team members, monitoring system, control system and review processes (See Figure 5).

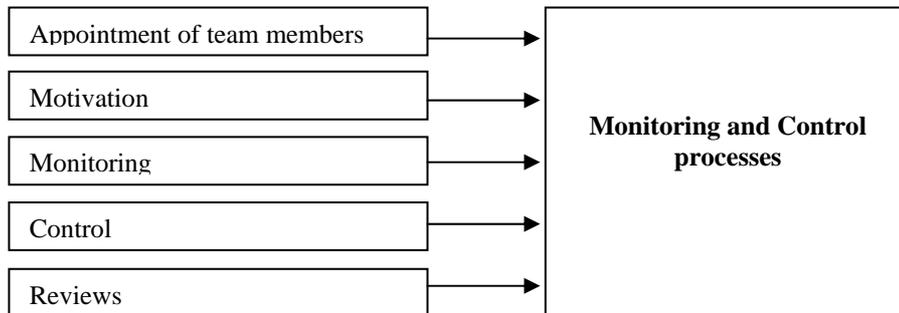


Figure 5: monitoring and control process

Aggregate project management process quality (PMPQ) model:

Figure 6 shows the conceptual aggregate PMPQ model. The model shows that PMPQ can be measured by the aggregate influence of the three PMPQ quality constructs, decision-making, integration and monitoring and maintenance processes.

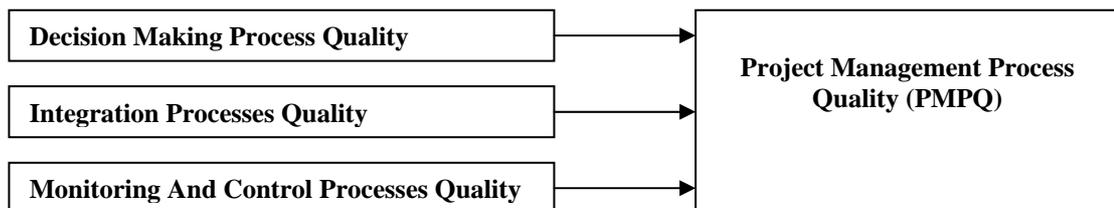


Figure 6: Aggregate PMPQ model

CONCLUSION

The paper shows that it is possible to define quality in the project management process by using quality factors in the project management process. Although there are many process models that are identified in literature a project management activity based model is used in this research. The PMPQ model developed contributes to the project management body of knowledge in that it develops a model that can be used to measure project management quality. The next step in the research is to test the model and find out how project management process quality influences project management performance. The model would be an important tool to project managers in that it could be used as a management process quality assessment tool. Further when the relationship between PMPQ and project performance is established it can also be used

as an awareness map of the critical quality factors that would influence project outcome and hence be beneficial as a process improvement tool.

REFERENCES

- Abdomeovic, M and Blakemore, G (2002) Project process interactions, in *International Journal of Project Management*, **20**(X), 315-323
- Alarcon, L F and Ashley, B D (1998) Project management decision making using cross-impact analysis, *International Journal Of Project Management*, **16**(3), 145-152.
- Anderson, R, Jerman, R and Crum, M (1998) Quality management influences on logistics performance, *Transport Research-E*, **34**(2), 137-148.
- Barad, and Raz, T (2000) Contributing of quality management tools and practices to project management performance, *International Journal of Quality And Reliability Management*, **17**(4/5), 571-583.
- Bryde, D (1997) Underpinning modern project management with TQM principles, *The TQM Magazine*, **19** (3), 231-238.
- BSI, (2000) *BS 6079-1 Guide to Project Management*, BSI
- BSI, (1998) *BS ISO 10006:1997, Guide to Quality in Project Management*, BSI
- Chan, A P C and Tam, C M (2000) Factors affecting the quality of building projects in Hong Kong, *Inter Journal Of Quality And Reliability Management*, **17**(4/5), 423-442.
- Cicmil, S (1997) Critical factors of effective project management, *TQM Magazine*, **9**(6), 390-396.
- Cicmil, S (2000) Quality in project environments: a non-conventional agenda, *International Journal of Quality and Reliability Management*, **17**(4/5), 554-570.
- Cleland, D (1994) *Project Management*, 2nd Ed, McGraw-Hill
- Collier, D (1995) Modelling the relationships between process quality errors and overall service process performance, *International Journal Of Service Industry Management*, **6**(4), 4-19.
- Europa (1999) *Quality in Construction-the European way to excellence in construction. Final report*, <http://europa.eu.int/comm/enterprise/construction/quality/qualhome.htm>, (25/07/2003)
- Gupta, V and Graham, D (1997) A customer driven quality improvement and management project at Diamond offshore drilling, *Project Management Journal*, September, 22-28
- Hair, J et l (1998) *Multivariate Data Analysis*, Prentice Hall, USA
- Herderson, J and McAdam, R (2000) Managing quality in project-based emerging network organizations, *International Journal of Quality and Reliability Management*, **17**(4/5), 364-376.
- Hides, M, Irani, Z, Polychronakis, I and Sharp, JM (2000) Facilitating total quality through effective project management, *International Journal Of Quality And Reliability Management*, **17**(4/5), 407-422.
- Kerzner, H (1998) *In Search Of Excellence in Project Management*, Van Nostrand Reinhold.
- Morris, P.W.G *The Management Of Projects*, http://www.umist.ac.uk/CRMP/management_of_projects.htm (25/10/2001)

- Orwig, R and Brennan, L (2000) An integrated view of project and quality management for project based organization, *International Journal of Quality and Reliability Management*, **17**(4/5) 351-363.
- Parzinger, M and Nath, R (2000), A study of the relationship between total quality management implementation factors and software quality, *Total Quality Management*, **11**(3), 353-353.
- Pocock, J Liu, L and Tang, W (1997) Prediction of project performance based on degree of interaction, *Journal Of Management In Engineering*, **13**(2), 63-76.
- Project Management Institute (2000) *A guide to the project management body of Knowledge (PMBOK® Guide) 2000 Edition*, PMI, Pennsylvania, USA
- Rounce, G (1998) Quality, waste and cost considerations in architectural building design management, *International Journal Of Project Management*, **16**(2), 123-127.
- Shenhar, S (1997) Mapping the dimension of project success, *Project Management Journal*, June, 5-13.
- Tam, C M, Tong, T, Chiu, G and Fung, W (2002) Non-structural fuzzy decision support system for evaluation of construction safety management system, *International Journal of Project Management*, **20**(4), 303-313.
- Tan, R and Lu, Y (1995) On the quality of construction engineering design projects: criteria and impacting factors, *International Journal Of Quality And Reliability Management*, **12**(5), 18-20.
- Tilley, P, McFallan, S and Tucker, S (1999) Design and documentation quality and its impact on the construction process; design and documentation quality impacts, *CBI W55&W65 Joint Triennial Symposium*, 1999, Capetown South Africa.
- Turner, R J (1999) *The Handbook of Project-Based Management*, McGraw-Hill,
- Walker, A (2002) *Project Management in Construction*, Blackwell science.
- Wideman, M (2001) *Wideman Comparative Glossary Of Project Management Terms v2.1*, http://www.pmforum.org/library/PMG_Q00.htm (09/03/2002)
- Zulu, S and Brown, A (2002) Project management process quality research: An exploratory examination. In: Akintola, A (Ed) *18th ARCOM Conference, September 2002, University of Northumbria, Association of Researchers in Construction Management Vol. 2*.