

THE EXTENT OF MULTI-PROJECT MANAGEMENT IMPLEMENTATION IN THE UK CONSTRUCTION INDUSTRY

Aminatuzuhariah M Abdullah and Ian G Vickridge

Centre for Research in the Management of Projects, Pariser Building, UMIST, P O Box 88, Manchester M60, UK

In the Multi-Project (M-P) environment, the aspect of complex issues is much wider than in a single project environment. For example, complexity in the M-P environment relates to those aspects concerned with the multiple interfaces between the projects, the projects and the organisation and parties involved in the projects. One such strategy that provides an environment to alleviate these complex issues is to adopt a Multi-Project Management (MPM) approach. This approach has been well recognised in various industries, but the scarce amount of literature on MPM for the construction industry implies that this approach is not well known amongst construction practitioners, especially in the UK. To test this hypothesis, a questionnaire survey, involving 155 client and client representatives, was conducted to investigate the extent of MPM implementation in the UK construction industry and to obtain opinions on the subject. Findings presented in this paper indicate that this hypothesis is true and there is a need to establish best practice in MPM, which will provide guidelines on better management of construction M-Ps for clients and clients' representatives in the future.

Keywords: practitioner, complexity, multi-project management, programme management

INTRODUCTION

The growing demand for large, complex and multi-projects in recent years make project management of these kinds of project more challenging. In the multi-project (M-P) environment, the aspect of complex issues is much wider than in a single project environment. For example, Payne (1995) states that complexity in the M-P environment relates to those aspects concerned with the multiple interfaces between the projects, the projects and the organisation and the parties involved in the projects. It is also concerned with the controls used by management, and the choice of how much integration of the multiple projects is either desirable or practical. The differences in terms of size, required skills, and urgency create additional complexity for MPM (*also known as programme management*).

This complexity often demands that work be done with a high level of office interdependency; the spread of involvement is sometimes very wide. The integration of such a variety of expertise, and the various interests of many stakeholders, into working towards the project's objectives can prove difficult to achieve.

The management of a M-P leads to a situation in which several projects have to be accomplished side by side, while sharing some human resources from a common resource pool. Many authors such as Kulbis (1997) and Hardy and Chaudhuri (1998)

state that traditional concepts and perceptions in project management theories are not sufficient to deal with the M-P situation.

EXISTING LITERATURE AND BENEFITS OF USING MPM

Since the early nineties, a considerable amount of literature has been published on how to manage M-Ps. Many authors believe that the MPM approach can alleviate the complexities mentioned above. A review of the literature reveals many benefits that can be realised by implementing this approach. They are summarised as follows:

- greater visibility of projects to senior management and more comprehensive reporting of progress (Kulbis 1997, Becker 1997, CCTA 1994);
- better prioritisation of projects (Payne 1995);
- more efficient and appropriate use of resources (Kulbis 1997, Daw 1999);
- projects driven by business needs (Hayden 1998);
- better planning and co-ordination; incidence of work backlogs and duplication of core functionality and components can be reduced (Pellegrenelli 1997; Daw 1999);
- better recognition and understanding of dependencies (Kulbis 1997; Becker 1997).

Literature gap in MPM for the construction industry

Most of the existing literature on MPM comes from the information technology, pharmaceuticals and telecommunication industry (for example, CCTA 1994 and 1996; Sandvold 1998; Saladis 1996; Gibson and Marlow 1998). The literature approaches the subject from various perspectives such as co-ordinating, scheduling, and resource management, and provides various models on how to manage such projects. However, MPM models recommended by these authors focus on implementation within one organisation only.

Companies typically employ a discipline or functional - management approach (Anderson 1995). Construction projects are typically a joint undertaking that involves owners, sponsors, external consultants, specialists and construction contractors. Hence, company organisation level models will not automatically lead to successful MPM application at the construction project level, because substantial differences exist between project and company environments (Anderson 1995).

The literature review undertaken also reveals a major gap in the comprehensive model for managing M-P especially for construction. This is agreed by Sandvold (1998), Van Der Merwe (1997) and Blismas et.al. (1999). The literature on construction related problems tends to concentrate on scheduling and resource management of repetitive works such as installation of utilities on various sites (for example, Van Der Merwe 1997; Saladis 1996), or descriptions of large M-Ps, such as the Hong Kong Airport projects (Schmitz 1998).

Limited work has also been carried out to test the practicality of the theoretical solutions suggested by many authors before. Although many models provide valuable information to practitioners and a valuable checklist for construction practitioners, there is little indication that construction industry practitioners, especially in the UK, are implementing such an approach in managing M-Ps. Hence, this research was conducted with the main aim of establishing best practice in MPM for construction.

RESEARCH METHODOLOGY

To realise the main aim of the research stated above, the research was conducted in three stages. Through the preliminary literature review in the first stage, the literature gap was identified and the opportunity for the research was established. The review of literature also lead to the hypothesis that the MPM approach is not well recognised by construction practitioners in the UK construction industry. To test the hypothesis above, the author established some key research questions such as:

- Do the practitioners agree with the MPM definition as concluded from the literature review?
- What is the extent of MPM implementation in client representative companies?
- What are the reasons for them not implementing a MPM approach?
- Do they use PRINCE 2 or any other approaches to managing M-Ps?
- Does implementing MPM assure the benefits claimed in the literature?

The data for this research was collected in two phases. The first phase aimed to answer the above questions and to investigate the extent of MPM implementation in client representative companies, as well as to investigate the perceived opinions on this subject.

A pilot questionnaire was drafted and discussed with four local MPM companies. Having validated the recommendations from the interviewees, the amended questionnaire was posted to 155 construction related companies throughout the UK including clients, designers, cost and project management consultants, as well as contractors with a turn-over of more than £10 million or who were known to have a large number of staff. The samples were chosen at random from various sources, such as the New Civil Engineering Consultants File, 1998, the New Civil Engineering Contractors File, 1998, and The Chartered Institute of Building Directory, 1994/1995.

Once data had been obtained from the survey, statistical tests (i.e. the frequency and mean score tests) were used to test the hypothesis. Findings from the first phase of the data collection are presented in the following sections.

These findings reinforced the need to establish best practice in MPM for construction. Hence, the third stage of the research was conducted to realise this objective. In order to do this, the propositions of the MPM model, key elements and associated best practice for construction M-Ps were developed based on a more extensive literature review, pilot studies, and an investigation of a major case study (i.e. the Commonwealth Games M-P in Manchester). These propositions have been presented at a previous conference (see Abdullah and Vickridge, 1999). In this paper, the authors illustrated thirteen MPM elements and associated best practices for construction M-Ps. The thirteen elements are: M-P goals and strategy; MPM Organisation; Master Plan for M-P; Integrated MPM Information System; Communication Plan; Financial Strategy; Risk Management Plan; Quality, Environmental, Health and Safety Management Systems; Design Strategy; M-P Planning and Control; Change Management; Contract and Procurement Strategy; and M-P Benefits Plan, Evaluation and Corrective Measures.

These elements cover all aspects of MPM and have been adapted for use in the construction M-Ps. For example, elements such as the Master Plan, the Environmental, Health and Safety Management System, the Design Strategy, and the

Contract and Procurement Strategy have been added as a consequence of the responses obtained from the first phase postal survey and pilot studies.

Using a structured interview, this MPM model and best practices were then tested empirically with ten respondents from the first phase of the postal survey, that were willing to participate further in the research. Conclusions were drawn and compared with the existing research propositions. These conclusions were used in an interactive process, as a further basis for discussion in subsequent interviews and as a way of testing their validity. This was done until all the research participants agreed with the final recommendation of MPM best practice.

ANALYSIS OF THE FIRST PHASE POSTAL SURVEY RESULTS

Questionnaire responses

Out of 155 questionnaires sent, 80 companies responded to the questionnaires, giving a 51.6% response rate. The companies that participated in the survey were multi-disciplinary companies, offering various types of services including civil engineering, building construction, town planning, project management and construction management. The majority of respondents came from cost and project management consultants (35.0%), followed by designers (33.8%), contractors (17.5%) and clients (13.8%). This covers all parties usually involved in the delivery of construction M-Ps.

MPM Definition

The following definition of MPM was proposed:

“The management of a set of projects which are related in their objectives, clients, financing, resources, environment or operation”.

Respondents were asked whether they agreed with this definition. 52.5% agreed with the definition and 7.5 % did not agree. 40.0% of the respondents were not aware of MPM and were not familiar with the terminology.

Awareness / Implementation of MPM

The participants were then asked about their awareness and use of MPM in their companies. Table 1 shows the findings of the survey, which indicate that a large proportion of the respondents (i.e. 40.0 %) was not aware of MPM.

Out of a total of 27 design consultants who responded to the questionnaire, only 29.6% are implementing MPM. The Cost and Project Management Consultant companies (CS/PM) lead the other type of companies in implementing this approach. A large proportion of the design consultants (44.5%) was unaware of MPM.

Table 1: Percentage of companies indicating awareness of MPM

Awareness/ Companies	% in relation with companies				Overall % on total respondents
	Design consultants	C/PM Consultants	Construction	Client	
4a	25.9	10.7	28.5	18.1	20.0
4b	0	3.6	0	0	1.2
4c	29.6	46.4	42.9	36.4	38.8
4d	44.5	39.3	28.6	45.5	40.0

4a: Aware of such an approach but not implementing it

4b: Will implement a MPM in the near future

4c: Currently implementing MPM, or have done so in the past

4d: Not aware of the approach at all

Reasons for not Implementing MPM

Those respondents who were aware of MPM, but not implementing it, were asked the reasons for not doing so. The results are shown in Table 2.

Most companies gave more than two reasons such as 5a, 5e and 5f. However, the most popular reason is 5a - *not required by clients* (64.7%), followed by 5e - *have more confidence with traditional type of project management* (41.2%) and 5f - *not been involved in any work that would require a MPM* (41.2%). This indicates that many clients may not be aware of the benefits of MPM and do not ask their consultants to use this approach. However, this result also shows that companies may not be aware that MPM could be used to manage a portfolio of projects from different clients.

Table 2: Percentage of agreement for not implementing MPM

Reasons for not implementing MPM	%
5a – Not required by clients	64.7
5b – Not convinced it works	11.8
5c – Do not fully understand the approach	35.3
5d – Lack of programme management expertise	11.8
5e – Have more confidence with traditional type of project management	41.2
5f – Not been involved in any work that would require a MPMA	41.2
5g- Others	6.7

Experience in managing MPM

41.9% of the respondents who are implementing MPM have over 10 years experience of the approach. 38.7% have 5 to 10 years and 19.4% have less than 5 years. This reinforces the validity of the opinions given, as most of the companies have lengthy experience of MPM.

Criteria for Selecting a Portfolio of Projects

To check the consistency of the MPM definition and their awareness of the main issues, the participants were asked whether they agreed on the criteria below for selecting projects for MPM. These have been suggested by many authors (such as CCTA 1994 and 1996; Pellegrenelli 1997), who stated that projects must be grouped to form project portfolios before the implementation of MPM. CCTA (1996) recommends that the criteria for grouping projects should include:

- Shared objectives or the projects address a common problem;
- Shared a common purpose in support of the strategic aims of the business;
- Shared resources that can be optimised by co-ordination across projects;
- Have interdependencies or closely related technical interfaces.

79.8% of the respondents agree with the criteria, showing their understanding of the subject.

Model/approach used whilst implementing MPM

Of all the MPM models in the existing literature, the model (named PRINCE 2) established by the Central Computer and Telecommunication Agency (CCTA) is believed by many authors (for example, Bradley 1997 and Newman 1999) to be the most comprehensive. However, when asked which approach they used, most respondents (90.3%) used their own approach, and only 3.2% used PRINCE 2 as a reference. 6.5% stated that they used their client's approach or a combination of their own approach and that required by the client. This result shows that, even though PRINCE 2 has been well received in other industries, the construction industry has not

adopted it. Further investigation by the main author established that PRINCE 2 could not be adopted directly for construction M-Ps, for similar reasons to those given by Anderson (1995).

Elements for MPM

Many authors, for example CCTA (1996) and Sandvold (1998), emphasise the importance of considering various elements and preparing the documents listed in Table 3. These documents are used as a reference and act as guidelines for all parties involved in the M-P. A M-P Implementation Plan, for example, represents the heart of MPM. This 'action plan', amongst other things, describes the prioritisation of projects, their interdependencies, their planning and control measures and milestones for each project.

Table 3: Availability of documents whilst implementing MPM

Documents prepared	Missing frequency and valid respondents	Percentage of respondents said 'Yes' (%)
9a – M-P Implementation Plan	5 (26)	73.1
9b - Contract and Procurement Strategy	4 (27)	92.6
9c – M-P Planning and Control Plan	4 (27)	92.6
9d – MPM Information Plan	4 (27)	77.8
9e - Communication Plan	4 (27)	81.5
9f - Financial Management Plan	4 (27)	85.2
9g - Quality Management System	4 (27)	88.9
9h – M-P Benefits Plan	5 (26)	11.5
9i - Risk Management Plan	4 (27)	81.5
9j - Project Portfolio Plan	7 (24)	29.2

Out of 31 respondents who are currently implementing MPM, only 27 companies answered this question, which was designed to check the participants' familiarity with these MPM elements. Table 3 shows the percentages of the companies that have prepared these important documents in the past whilst implementing MPM. These percentages were based on the 27 companies only. However, not all the respondents marked all the answers. The number of missing responses varies from 4 to 7. Table 3 shows the number of respondents that participated in this question, and the percentage of the companies that have considered these elements and prepared related documents in the past whilst implementing MPM.

It can be seen that most companies are aware of the importance of a Contract and Procurement Strategy, a M-P Planning and Control Plan, a MPM and Information Plan, Communication Plan, a Financial Management Plan and a Quality Management system, to be integrated in the MPM. 73.1% have prepared a M-P Implementation Plan and a Risk Management Plan, which are also believed by many authors to be important. A M-P Benefits Plan, which is recommended by CCTA (1996) as important, has not been recognised by many respondents and only 11.5% claimed that they have prepared such a document. A Project Portfolio Plan, which is also recommended by CCTA (1996), has also not been recognised by the respondents.

The lack of recognition of a M-P Benefits Plan and a Project Portfolio Plan was surprising, because many authors (CCTA, 1996 and Becker, 1997) emphasise the importance of checking the benefits of the MPM throughout its life cycle.

Disadvantages of MPM

To investigate the awareness of the companies further, respondents were asked about the disadvantages and advantages of MPM. The recognition of the significance of MPM could influence the implementation of the MPM. Out of 31 companies who are

currently implementing MPM, only 28 answered the question on the disadvantages of MPM. The percentages shown in Table 4 are based on 28 companies only. It can be seen from Table 4 that many of the respondents disagree (17.2+27.9=45.1%) with all the disadvantages listed, 29.3% are neutral and 25.7% agree with the disadvantages.

Table 4: Disadvantages of MPM

Disadvantages	Strongly Disagree (%)	Disagree (%)	neutral (%)	agree (%)	strongly agree (%)
10a	17.9	39.3	28.6	14.3	0
10b	17.9	28.6	32.1	17.9	3.6
10c	17.9	25.0	35.7	21.4	0
10d	17.9	35.7	21.4	21.4	3.6
10e	14.3	10.7	28.6	32.1	14.3
Average	17.2	27.9	29.3	21.4	4.3

10a: Too costly

10b: Time consuming

10c: Too much formality and rigidity

10d: Causes resistance and conflict within the company

10e: Require common IT Systems and software across all parties

Of all the disadvantages listed, 10e scores the highest agreement. According to a few respondents, common IT systems mean more overheads need to be provided in terms of upgrading, and training strategies are required for their own staff, their clients, or other team members involved in the same project portfolio. One respondent stated that initial setting up is time consuming and costly, but it is worth it in the long term. Last but not least, staff training and commitment from all parties are required for the approach to be really effective.

Advantages of MPM

Many authors, such as Pellegrinelli (1997), Becker (1997) and CCTA (1996) agree that MPM provides many advantages to companies who use it. This question was asked to check the participants' awareness of the advantages or benefits of MPM. Out of 31 respondents, 30 answered this question. The results are shown in Table 5.

Table 5: Percentage of agreement on advantages of implementing MPM

Advantages	Strongly Disagree (%)	Disagree (%)	Neutral (%)	agree (%)	strongly agree (%)
11a	3.3	6.7	26.7	63.3	0
11b	0	6.7	16.7	50.0	26.7
11c	6.7	20.0	40.0	30.0	3.3
11d	3.3	3.3	26.7	46.7	20.0
11e	0	3.3	33.3	46.7	16.7
11f	0	3.3	23.3	56.7	16.7
11g	0	10.0	40.0	23.3	26.7
11h	0	6.7	23.3	60.0	10.0
11i	0	20.0	20.0	43.3	16.7
Average	1.5	8.9	27.8	46.7	15.2

11a: Greater visibility of projects to senior management

11b: More comprehensive reporting of progress

11c: Better tracking of progress relative to competitors

11d: Better prioritisation of projects

11e: Better planning and co-ordination; reduction of work backlogs

11f: more efficient and cost-effective use of resources

11g: projects are driven by business needs rather than individual project manager's own agendas

11h: management problems are minimised at interfaces with other projects;

11i: effect of moving resources from project to project can be predicted.

From Table 5, it can be seen that overall, 61.9% (46.7+15.2) of the respondents agreed with the suggested advantages of MPM, 27.8% were neutral and 10.4% disagreed.

This shows that the respondents understand the advantages or benefits of MPM. 76.7% (50+26.7) of the respondents agreed that the most transparent benefit that could be gained from implementing MPM is 11b (*More comprehensive reporting of progress*). 73.4% agreed that other benefits such as 11f (*More efficient and cost-effective use of resources*) could also be enjoyed when implementing MPM.

Other significant benefits that score high agreement from the respondents include: 11h (*Management problems are minimised at interfaces with other projects = 70.0%*), 11d (*Better prioritisation of projects = 66.7%*), 11a (*Greater visibility of projects to senior management=63.3%*), and 11i (*Effect of moving resources from project to project can be predicted =60.0%*).

A few respondents include other advantages in their answers. They are: early identification of potential problems, overall efficiency and economy, and the ability to take a 'snap shot' of M-Ps at any specific time.

This result shows that the respondents were aware of the benefits or advantages of MPM. However, the lack of a MPM Benefits Plan being prepared in the early stage of the MPM shows that the respondents did not evaluate the benefits along the MPM life-cycle as suggested by many authors such as Becker (1997) and CCTA, (1996).

Comments regarding the impact of MPM on companies

A few respondents gave valuable comments on MPM. For example, one respondent stated that "*On any series of Projects, the question of whether to use MPM or not is a classic problem in optimisation of the advantages listed above. It must be demonstrated that the benefits outweigh the cost of setting up a lone team to manage the M-P that sits between the end client and the individual project teams.*" This statement shows that this respondent is aware about preparing the benefits plan for MPM.

CONCLUSION

From the first phase postal survey results, it can be concluded that:

- The definition of MPM is confirmed as:
"The management of a set of projects which are related in their objectives, clients, financing, resources, environment or operation".
- A large proportion of the participants was not aware of MPM.
- Many companies that are aware of MPM do not implement this approach because clients do not require it.
- Many of the companies that are currently implementing MPM are aware and have prepared many important documents related to this approach, except for a Benefits Plan. This shows that the respondents were not aware of the importance of this document.
- Almost all the companies questioned used their own approach to implementing MPM.
- Many of the companies that are currently implementing MPM agree that the advantages of MPM outweigh the disadvantages if managed systematically. This

shows that MPM is better than the traditional approach to project management and that it is worth implementing for managing M-Ps and increasing the success of M-P delivery.

- Last but not least, many respondents agreed that MPM is a good tool for managing M-Ps effectively. Elements of Total Quality Management such as leadership, commitment from all, teamwork and good communication are also vital to ensuring M-P success.

As mentioned before, findings presented in this paper prove that there is a need to establish best practice for MPM, which will provide guidelines on better management of construction M-Ps for clients and clients' representatives in the future. These investigations have been carried out in the third stage of the research and are beyond the scope of this paper.

Limitations of the first phase postal survey

The number of samples for the first phase of postal survey was limited to 155 companies only which were selected at random across the UK. 50 samples were taken from design and project management consultants respectively, 30 from construction companies and the remaining 25 from client companies. Only a limited number of companies were chosen from construction and client companies, because not many of these companies offer project management services. Due to this limitation, it was difficult to obtain a fair balance of responses for this survey.

Out of 80 respondents, only 31 companies were found to be currently implementing MPM in their companies. The limited number of companies, which are currently implementing a MPM approach and who were willing to participate in the next stage of the research, determined the choice of the research methods for the third stage of the research as described before.

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