

AN INVESTIGATION OF COMMONALITY OF ISSUES AT DIFFERENT PROJECT STAGES USING A THREE-STAGE PROJECT MODEL

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A requirement for a deeper understanding of the construction project as a concept has resulted in a study of project issues at various stages using a 'Three-Stage' project model derived from the literature on projects. The paper presents current research to determine whether similar generic issues occur at similar project stages, and therefore are predictable in nature and apply equally to construction, manufacturing or service-related projects. The study uses case study data processed by the 'Three-Stage' model to determine generalizations of recurring issues and allocates these issues to their appropriate project stages. Case study data is in the form of value management workshop reports which are auditable documents outlining the proceedings of workshops for a variety of projects at differing stages in their evolution. Research work has found that similar issues are recurring regardless of project type and therefore the application of value management would enhance the value of any project irrespective of type.

Keywords: case studies, grounded theory, projects, project models, workshops.

INTRODUCTION

Value management may be implemented as a project focused service and therefore it is important to define a project in the context of this paper. A project is defined by the Oxford English Dictionary (2001), as 'an enterprise carefully planned to achieve a particular aim.' Morris and Hough (1987) define a project as 'an undertaking to achieve a specified objective, defined usually in terms of technical performance, budget and schedule.' They also differentiate between two different types of project, 'those which are complete in themselves' and 'those which represent a series, or programme.' A comprehensive definition is given by Nicholas (2001) who differentiates between a project and core business. Some of the differences listed are that a project is 'unique and temporary to achieve a goal involving unfamiliarity and possessing elements of uncertainty and risk.' It is something that 'cuts across organizational lines and needs skills from multiple professions and organizations, where the organization usually has something at stake,' (Nicholas, 2001). This paper adopts the definition of a project as "an investment by an organization on a temporary activity to achieve a core business objective within a programmed time that returns added value to the business activity of the organization" and suggests that by initiating a project, the initiator makes an explicit statement to make a change. The paper reports current research work to determine whether similar project issues (such as problems, process etc.) at similar project stages are generic in nature. This paper illustrates the value management opportunities for a typical construction project and explains how a generic project model was developed for use in any industry sector. The research

progresses from that reported in Hunter and Kelly (2003) that involved the development of a ‘Three-Stage Project Model.’ This model is currently being used as a ‘sorting tool’ to categorize a number of case studies that are in the form of value management workshop reports. The focus in these case studies is the project issues where the grounded theory methodology is being used to generate a theory that may be applied to benefit future project work when implementing value management.

VALUE MANAGEMENT OPPORTUNITIES

There are different perceptions of the effective use of value management in terms of whether it is project based or can be implemented to review an ongoing process. A couple of examples of different viewpoints on the application of value management are that of Bone and Law (2000) who state that, ‘value management is a structured framework for reviewing any product, process, project or service.’ This is supported by Hamilton (2002) who also suggests that value management may adopt a continuous approach. The other view adopted by Kelly and Male (2002) is that value management is most effective when it is project focused. Male *et al.* (1998), highlights value points in the project life cycle of a typical construction project. Six value management opportunities were derived through a benchmarking study, discovered to be the most common points in the application of value management in a construction process (Figure 1). The Value Management Framework produced by Male *et al.* (1998) is primarily designed for use in construction projects where the RIBA Plan of Work (1991) has been used to define the project stages. The value management framework by Male *et al.* (1998) had been developed to be generic in nature for organizations’ specific construction project needs. The current research investigates commonality of issues across a diverse range of projects not specific to any particular industry sector. Consecutively, a generic project model has been developed termed the ‘Three-Stage Project Model’ (Hunter and Kelly, 2003) that is applicable across different projects irrespective of sector.

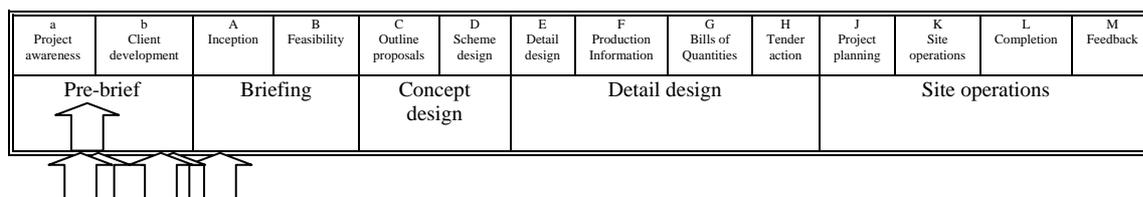


Figure 1. Value Management Framework, Male *et al.* (1998)

THE THREE-STAGE MODEL

A literature review on project stages highlighted a number of generic project stages that have been structured into the ‘Three-Stage’ model (Figure 2). The ‘Three-Stage’ model comprises of three primary stages in project development namely: (1) the Pre-Project stage which is primarily discussion and paper based involves users and planners (Nicholas, 2001) and concludes with the termination of the pre-project stage when full budgetary approval is given. This signifies the point when the initial concept becomes an identifiable project known as ‘project initiation’ (Woodhead, 2000), (2) the Project stage whereby a practical start is identifiable involves designers and builders, (3) the Post-Project stage where the project is absorbed into the organizations core business involves users and operators. The ‘Three-Stage’ model has fifteen sub-

stages plus the project bubble as shown in Figure 2. The model proposed from the above literature builds on the Value Management Framework developed by Male *et al.* (1998) in the sense that it may be more widely used for any type of project whether construction, manufacturing or service orientated. The model incorporates a number of detailed sub-stages within each of the three primary stages of a project making it easier to pinpoint exactly what stage the project is at. The model will be used in future research to investigate the most beneficial value opportunities for the service sector. However, current use will demonstrate how this model is to be used to determine generalization of recurring issues at various project stages. This paper reports on how the ‘Three-Stage Project Model’ is to be used as a ‘sorting tool’ to categorize project case studies into their project stages. An outline of the process undertaken and the methodology used will be explained as well as the preliminary findings for the current stage of the research.

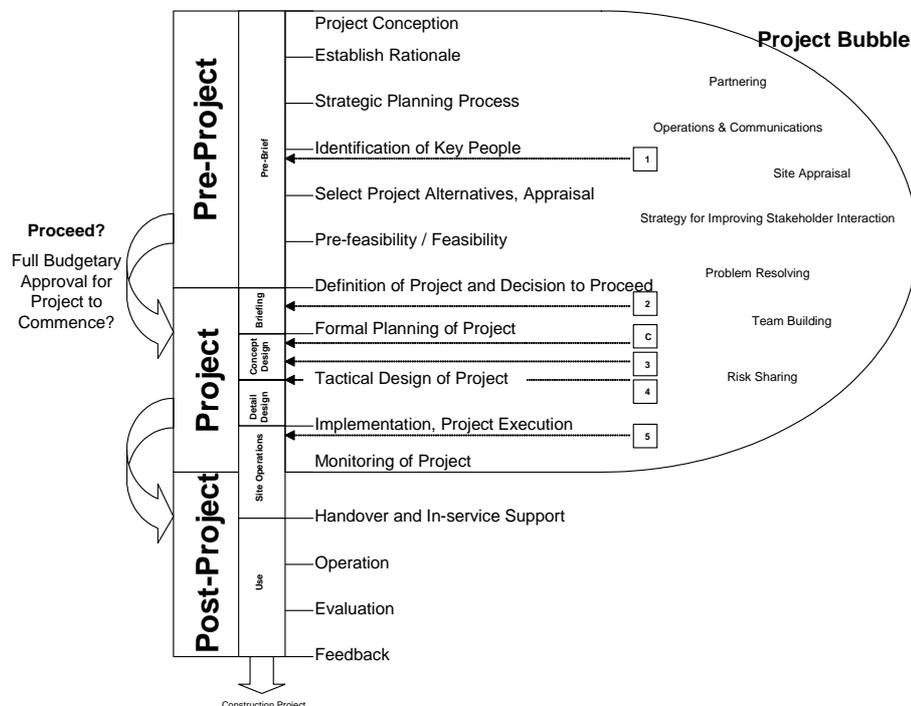


Figure 2: The Three-Stage Project Model with Project Bubble

The project bubble (Figure 2) arose from the realization that some actions lie outside the logical sequence of activities that progress from pre-project to post-project. These actions contribute to the outcome of the project and may occur at any stage within the project life cycle although they do not form generic project stages. Often they are brought about to satisfy the client or to resolve a problem that may have been identified throughout the course of the project. These project actions, or supplementary projects in their own right, are contained in a ‘project bubble’ and typically arise in the pre-project or project stages. The cost to implement any changes arising in the post project stage is high, as is the resistance to change (Male *et al.*, 1998) and therefore it is unlikely that there will be any supplementary projects in the post-project stage although this cannot be ruled out altogether. The case for ‘Three-Stage’ model appraisal for value management is strengthened by an ongoing review of the historical data of value management workshops where it is highlighted that value

management is conducive to all projects whether intervening in projects at particular stages in the project life cycle or in other projects such as team building or option appraisal to support the final outcome of the project.

PROJECT ISSUES ANALYSIS IN VALUE MANAGEMENT WORKSHOPS

As the focus of this paper is on the 'issues analysis' within the case studies it is important to outline the process by which an issues analysis is conducted in a typical facilitated workshop. In an issues analysis, workshop participants are asked to brainstorm issues, the result being a great number of issues on post-it notes that may be in the form of an acronym, one word, an abbreviated word, an adage or a sentence. Once the issues analysis is complete the issues will be sorted under headers provided by the facilitator which may have been taken from another source, for example Morris and Hough (1987) headers may be used (Male *et al.*, 1998) or they may be influenced by the proceedings of the workshop or in pre-workshop interviews at the information stage. The sorting ensures the issues are in their context in themes chosen by the workshop participants. For example project issues analysis undertaken by Morris and Hough (1987) outline several factors which contribute to the success or failure of a project. These include poor organization, political problems, lack of overall championing, ineffective budgeting, weak contracting arrangements, ineffective controls, design control difficulties, lack of top management commitment, quality management problems, industrial relations pressures, strong leadership, technical uncertainties, schedule pressure, detailed planning, good controls, careful technology management, and excellent communications. These factors appear several times for each of the eight projects studied suggesting that these are general factors which have an impact on the outcome of a project. The factors have been adapted by Male *et al.* (1998) in the value management toolbox to aid the information stage in a value study. The information stage may be pre-workshop involving interviews and discussion with the project team or whoever commissioned the study. The information stage also occurs during a workshop involving the use of a number of techniques by the facilitator, to draw out information from the project team. Male *et al.* (1998) use the Morris and Hough factors as they have been found to be generic across projects.

RESEARCH METHOD

Grounded theory has been used as the methodology in this study for the analysis of data through the constant comparative method. Esteves *et al.* (2002) highlight that there are three different types of grounded theory approach. These are; Glaser and Strauss (1967), Strauss and Corbin (1990) and Glaser's (1978, 1992) interpretation. This research adopts the Strauss and Corbin version as Glaser's approach predicates that there should not be a pre-conceived theory in mind which is not the case in this research. This research forming the basis for this paper was inspired by the research question which is 'do similar issues appear at similar project stages and are these generic in nature?' Strauss and Corbin (1998) highlight the requirement for a theoretical statement to enable an explanation or prediction of theory. The theoretical statement for this research is that similar issues occur at similar project stages irrespective of project type. The grounded theory as used in this research enables theory to be drawn from the data and not from speculation or preconceived ideas. A theory is built as opposed to being tested and offers an explanation of phenomena rather than just a set of findings (Strauss and Corbin, 1998).

Case Studies

The data for the study are collected from case studies. The purpose of case studies is to determine whether similar issues occur at similar project stages. The case studies are unpublished, secondary sources of data in the form of value management workshop reports. In effect, the workshop report is an auditable document (BRE, 2000) that outlines the proceedings of the workshop. The case studies used in the investigation may be termed ‘cumulative case studies’ as they contain information from several different projects collected at different times, ranging from the early nineties to the present year. It is thought that the past and current studies will allow for greater generalization to be made. Denzin and Lincoln (1998) highlight the importance of having case studies that have variety where it is felt that this has been met due to the large range of projects and intervention points at different project stages. These past studies allow for greater generalization without any additional time or cost being spent collecting new data. The case studies provide an excellent starting point for this research and as a basis for generalizations to be made in identifying the recurring issues. These can then be used to determine whether similar issues occur at different project stages, and whether these issues are generic in nature in the sense that they may be similar across a range of construction or service-related projects. The research accessed approximately thirty case studies, however a number were discarded due to the absence of an ‘issues analysis’ in the value management report produced for the project, leaving nineteen usable case studies for the study. The case study analysis presented in this paper uses eight of the fifteen sub-stages in the ‘Three-Stage’ project model plus the project bubble as presented in Table 1. This Table indicates the number of projects used for comparison where it is evident that only three stages and the project bubble may be used at this early stage in the research.

Table 1: Number of Case Studies at Project Stages

Project Stage	No. of Projects
Definition of project and decision to proceed	1
Establish rationale	1
Evaluation	1
Formal planning	4
Implementation, project execution	2
Pre-feasibility / feasibility	1
Strategic planning	1
Tactical design	4
Project bubble	4

The case studies used for this study involve qualitative data only. It is believed that the data available in the case studies is sufficiently rich to generate theory and therefore an existing theory does not need to be used. The process of data collection for the study commenced with theoretical sampling using value management workshop reports containing an issues analysis. Workshop reports were sorted in their project stages as outlined in the ‘Three-Stage’ project model, and inserted into a spreadsheet, being allocated to one column for each project. Microsoft Excel spreadsheets were used to store, sort and display the data in a matrix format. The issues were kept in context in the sense that they remained untouched under their project headers. Each additional project to the spreadsheet was put in a new column where similar headers

were placed alongside previous headers to allow for comparison. Therefore a column contained all issues with headers for a particular project and a row contained all similar headers for any number of projects; these could be described as the 'comparable groups' for horizontal analysis across the different case studies where the categories remained in blocks. The next stage involved looking for emergent theories, in this case; the search for similar issues. This was made easier by sorting the issues under each header in alphabetical order and colour coding the issues that were similar. Collection, coding and analysis are conducted as a parallel process. Denzin and Lincoln (1998) highlight that the concurrent process prevents the researcher 'drowning in the data.'

Data Analysis

The data analysis has been conducted in conjunction with the data collection to identify areas of interest early on and to ensure that the method used was well suited. The unit of analysis for this research is 'project issues,' defined by Yin (1994) as the unit of analysis is related to the research questions. The data have been analysed manually as it was felt that this was more appropriate for the nature of the information than using a specific content analysis software package. The reasoning for this choice was that it was felt that the content analysis packages would not pick up items that had similar meanings or confuse the meaning of issues that had similar wording. Scott *et al.* (2002) recognized that data could be programmed, however it was felt that this approach would act as a 'filter between the researcher and the data,' where it was feared that the richness would be lost from the data and therefore manual coding was chosen as the preferred method. This is supported in Cronholm (2002), who suggests that only a general analysis can be conducted using computer software. It is also suggested that manual coding permits the researcher to become more familiar with the data (Scott *et al.*, 2002). Coffey and Atkinson (1996) suggest that the use of computer software is more suited for storage and retrieval of information than for analysis. This study involves computer support for only those particular tasks; storage and retrieval of the case study data. Analysis has been done using comparative analysis which has been described as, 'a strategic method for generating theory' (Glaser and Strauss, 1967). Comparative analysis usually commences with sorting the properties into their categories. The workshop reports reflect sorting undertaken in the workshop by the delegates where the properties have been sorted in their context for analysis.

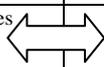
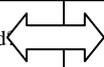
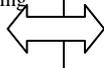
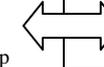
PRELIMINARY FINDINGS

The research data are currently being analysed as they are being collected. This paper reports the preliminary findings of the work undertaken to date. Many issues were found to be project specific and were not suitable for comparative analysis. For example some issues such as; the turtle season which involved a project based in Oman, the focus on particular construction materials, issues specific to a particular client organization which are all unlikely to reappear in another project. Other examples of issue headers unlikely to appear in other projects were 'animal care,' 'asbestos / artex,' 'pensions,' 'data ownership,' 'marina.' Other projects involved more detailed and specific issues, one project had 'site conditions' as an issue and another had more detail such as 'problems of land drainage' and 'boulder clay in adjacent site.' Therefore the level of detail chosen for identifying the issues is fairly general to ensure that there is openness towards interpreting the data as outlined by King (1998) cited by Scott *et al.* (2002).

Generic Issues within the Project Bubble

The projects compared in the project bubble were found to have very few comparable properties although there did seem to be a lot of similar headers used. This was to be expected as the projects in the project bubble are very diverse dealing with a whole range of supplementary projects to the prime project function focusing on items such as partnering, operations and adding value to the project process. Similarities were discovered in two partnering projects in the project bubble that identified four recurring issues of commitment, communication, disputes and trust; all significant elements of partnering. Other recurrences identified under the ‘Community’ header, used in two projects revealed two similar issues: access and opportunities for the community. ‘Finance,’ which is another header used revealed the recurring issue of cost control. ‘Time’ identified similar issues of deadlines and pressure on design. ‘Project management’ recurrences were the requirement for roles and responsibilities to be clarified.

Table 2: Budget / Cost / Funding / Finance Header Parallels

Formal Planning of Project	Tactical Design of Project	Project Bubble
<ul style="list-style-type: none"> ▪ Additional funding sources ▪ Achieving funding ▪ Availability of Funding ▪ Is there enough funding? ▪ Limit to funding ▪ Multiplicity of funding opportunities 		<ul style="list-style-type: none"> ▪ Availability of funding ▪ Funding of web sites
<ul style="list-style-type: none"> ▪ Current budget £20m ▪ What can the group afford 		<ul style="list-style-type: none"> ▪ Good cost control ▪ Cost control of interior fit out
<ul style="list-style-type: none"> ▪ Cost of maintaining building ▪ Maintaining systems and administration costs 		<ul style="list-style-type: none"> ▪ Cost limits ▪ Require cost certainty
<ul style="list-style-type: none"> ▪ Whole life costs ▪ Value for money ▪ Value of systems to Group business 		<ul style="list-style-type: none"> ▪ Cost in use ▪ Outside funding to cover operating costs
		<ul style="list-style-type: none"> ▪ Cost in design terms ▪ Cost reflecting design
		<ul style="list-style-type: none"> ▪ Inflation due to X programme ▪ Inflation
		<ul style="list-style-type: none"> ▪ Right price for job ▪ £200 per month for a site

Generic Issues at the Three Primary Stages and the Eight Sub-stages

It was evident from the research that similar headers were used for projects at different project stages supporting the work of Morris and Hough (1987). For instance, ‘Budget / Cost / Funding / Finance’ were all used as headers for various project sub-stages and the project bubble such as; ‘formal planning of project,’ ‘implementation / project execution’ and ‘tactical design of project’ sub-stages. Table 2 indicates the concurrency in recurring issues under this header (Budget / Cost / Funding / Finance) appearing at three project stages. The double headed arrows indicate where parallels can be drawn. Another example of concurrency of issues between ‘project bubble,’ ‘formal planning of project,’ and ‘implementation / project execution’ is shown in Table 3 for the ‘Community / Stakeholders’ header. Recurring issues are also evident under the ‘Time / Programme’ header for the four project sub-stages as outlined in Table 4. The issues have been sorted in their project sub-stages and bulleted in each of the three Tables (Tables 2-4).

It is evident from the Tables that the issues listed, apart from those that make a specific reference to construction or maintenance, are predominantly generic in nature and therefore could apply to construction, manufacturing or service-related projects.

Table 3: Community / Stakeholder Header Parallels

Project Bubble	Formal Planning of Project	Implementation / Project Execution
<ul style="list-style-type: none"> ▪ Ease of access to property ▪ Access to the beach 	 <ul style="list-style-type: none"> Public expectation Public expectations 	<ul style="list-style-type: none"> ▪ Client aspirations ▪ Feedback from clients committee for decisions
<ul style="list-style-type: none"> ▪ Employment opportunities ▪ Benefits and issues to the local community 	 <ul style="list-style-type: none"> ▪ More community involvement ▪ Community involvement ▪ Must be involved 	<ul style="list-style-type: none"> ▪ Factors out with control ▪ Committee control real or pretend vs. VA process
		<ul style="list-style-type: none"> ▪ Stakeholders (too many) ▪ User delight ▪ End user

Table 4: Time / Programme Header Parallels

Formal Planning of Project	Tactical Design of Project	Implementation / Project Execution	Project Bubble
<ul style="list-style-type: none"> ▪ Physical start ▪ Roll out October start date for the 'project' 	<ul style="list-style-type: none"> ▪ Commencement ▪ Lead-in times ▪ Lead-in time ▪ Start date 	<ul style="list-style-type: none"> ▪ Flexibility through time ▪ Time to go through motions 	<ul style="list-style-type: none"> ▪ Pressure of design due to tight time schedule ▪ If stage is delayed then not enough time for detailed design
	 <ul style="list-style-type: none"> ▪ Key programme dates Programme certainty 	<ul style="list-style-type: none"> ▪ Programming ▪ Pre-planning (full team) 	<ul style="list-style-type: none"> ▪ Keeping deadlines ▪ Control of design deadlines ▪ Holding to the overall completion date
	<ul style="list-style-type: none"> ▪ Procurement schedule ▪ Programme ▪ Approval times 	<ul style="list-style-type: none"> ▪ Speed of construction ▪ Speed of procurement 	
	 <ul style="list-style-type: none"> Water tight date Timescales 	<ul style="list-style-type: none"> ▪ Repercussions if not on time ▪ Inadequate time to explore fully to buildability etc. 	

CONCLUSIONS AND FURTHER WORK

A preliminary conclusion is that similar issues are recurrent at similar project stages irrespective of project type. However, it is also evident that these issues appear at different project stages suggesting that the issues may not have been addressed earlier on in the project life cycle. Thus this is mostly the case where the project has not had

an earlier workshop to provide a forum for issues identification. It is important to note that, although there were many recurrent issues, many issues were found to be project specific, particularly within the project bubble. Therefore these were not applicable for comparative analysis and will not contribute to the core theory. The research to date has highlighted that some issues are predominantly generic in nature for value management application and implementation to enhance the value of projects. A value management study will be undertaken in a later stage of the research using the theory generated from the case study data that will allow the value management facilitator to anticipate the likely issues to arise dependent on the particular project stage that the study intervenes. Further case study data for the research from value management workshops will be collected that have involved a number of value management interventions across the project life cycle. These will be compared to determine if the same issues are reappearing at different project stages, for instance, if similar issues are evident at both the feasibility and the project execution stages. If this is discovered not to be the case, it could then be concluded that the intervention with value management has benefited the project by highlighting and addressing issues early on before they pose difficulties further on in the project life cycle. This is an ongoing project at Glasgow Caledonian University towards an award of a PhD degree as part of the research to develop a generic framework for project issues appraisal. It is anticipated that the framework will permit a clearer understanding of various project issues at different project stages. In addition to this, the framework will be provided for use in future value management studies to assist the team in extrapolating the likely issues at the particular project stage and for use by the facilitator in leading the project team.

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