THE RELATIONSHIP BETWEEN THE MANAGEMENT OF DESIGN PROJECTS AND IMPROVED PERFORMANCE IN THE BUILDING SERVICES SECTOR OF THE CONSTRUCTION INDUSTRY

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In today's increasingly competitive market within the construction industry, there is intense pressure to deliver client satisfaction. Never before has client loyalty been so hard to maintain and professional expertise so intensely scrutinized.

The principles underlying the management of design provide a vehicle on which a model has been developed which can be applied to projects at all stages of their development; from assembling the clients priorities in the early stages of design, right through to analysing the results post project completion. The data for the model has been derived from two active case study projects. The literature review and survey research provides an analytical framework on which the model is based. A close correlation has been found to exist between effective management and project performance.

It is hoped that this research will help manifest an efficient, successful and profitable working environment where Engineers are better able to bridge the gap between management theory and practice so as to achieve improved performance, and ultimately achieve competitive advantage.

Keywords: client satisfaction, project management, building services, competitive advantage, design

INTRODUCTION

According to the Building Research Establishment (BRE 1987), "two-thirds of 501 examples of poor quality observed on site were caused by design faults. Of these, 130 were caused by unclear or missing project information. Other causes were, lack of design co-ordination, poor constructability, and poor design". This demonstrates that the lack of competent, coherent information flow and poor co-ordination between participants seriously affects quality of design and construction.

The participants of a National Workshop on Best Practice (Chase and Manning 1990) identified three important problems facing the construction industry as follows:

Lack of teamwork
Poor communication; and
Inadequate planning and scheduling

A decade on, the Latham Report (1994), and more recently the Egan Report (1998) still focus on these issues but have established best practice ideals to redress these.

So why then are these benchmarks not being achieved? Observations within a building services team of a multi-disciplinary consultancy, supported by articles within

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industry journals, indicate that whilst solutions appear to be relatively simple in their conceptualization, they are difficult to implement.

Reasons for this dilemma are wide ranging but perhaps one of the most poignant factors is as that described in a statement by Duffy (1992), "everyone in the construction industry is fighting amongst themselves instead of serving the needs of the client. This lack of synchronization generated the conception of the following hypothesis.

> *"If Client's requirements are competently specified and interpreted at key project stages, this enhances the chances of improved performance and ultimately gains competitive advantage."*

THE CONSTRUCTION PARTICIPANTS AND PROCESSES

Various authors have tried to categorize the construction participants and relationships involved in the construction process. Austen and Neale (1986) categorize the participants into five groups; the Client; the User; the Designer; the Executor and Public Authorities.

Austen and Neal (1986) have also divided construction projects into the following five key project stages: briefing, design, tendering/procurement, construction and commissioning.

Using the above classification of participants and project stages, a consulting Engineer falls into the design category, and this role centers on the briefing and design stages of a project lifecycle. Consulting engineers do, however, also get involved in the other stages, but to a lessor extent. As engineering is a specialist discipline, as are many of the other disciplines within the construction process, there is a tendency for the design team to be fragmented. Thus there is a need for a more integrated approach throughout all stages of a project lifecycle.

Often, a fragmented team structure is inherent by virtue of the "procurement" route selected in which the contractual relationships between clients, consultants and contractors are established. The growing complexity of project requirements necessitates Consultants to offer a variety of procurement choices producing a variety of contractual relationships between the Client and Consultants, and functional relationships between Consultants and Contractors (CIBSE: 1999).

According to BSRIA (CIBSE: 1999), procurement strategies fall into four main types: separated systems (traditional method of dividing the design and construction activities); integrated systems (design and build activities); management orientated systems (Construction management/management contracting) and product based systems (PFI and Design-Build-Operate). In addition to these, however, there is also the choice of Partnering.

Whilst the approaches of the different procurement methods all have the following constraints: design/construction integration; achievement of constructability; and design/construction overlapping, the traditional, more common procurement choice implicitly fails to address the people aspects such as sharing of ideas, common interests, objectives, commitment and close involvement of participants.

The Design and Build and Partnering procurement routes are more favourable to redress these failings. The Design and Build Contract aims to eradicate the entrenched views on the development of a project where there is a clear distinction

between design and construction processes. Similarly, Partnering unites the sponsoring, design and construction teams and endeavours to drive them forward with a common purpose; thereby facilitating interaction between design and construction teams until the project is completed.

It can therefore be seen that procurement strategy, through the choice of contract, is one of the single most important elements that underpin a successful project. Not only does procurement establish the functional relationships, particularly those of design responsibility and management, but it also dictates the way risk is apportioned between the parties and transferred from the client.

CASE STUDY ORGANIZATION

The fragmentation derived from the more traditional forms of procurement has seemingly ingrained a divide between design disciplines. This fragmentation is experienced in many companies, albeit to different degrees. For the purpose of this research paper, the case study Company is a multi-disciplinary consultancy with its main discipline being Architecture. It has a geographical spread throughout Europe formed through joint ventures and partnerships with other architectural practices.

The organization has a good Client base but in recent years, the delivery of projects to those Clients has begun to waiver. Through a series of interviews and surveys, the main cause is attributable to the lack of good management. The organization is under increasing pressure to change its' culture by the recent signs of high staff turnover, loss of business and an unwelcome reputation within the industry through adverse publicity.

At team level the organization embraces a matrix structure centred on architectural teams, which enlist the secondary services of either structural, or services engineers. This creates imbalances in the work environment, at the outset of projects, whereby engineers are not at the forefront of the briefing and conceptualization stages.

Therefore, in this case study company, the predominant purpose of the service engineering team is to provide engineering support and information to the other teams, OR, provide engineering expertise for specific multi-discipline projects. Engineering is not the mainstream portfolio discipline. This often leads to a clash in resources and beliefs amongst the professionals with true value and worth being questioned amongst the engineering team.

A SWOT analysis of the service engineering department was undertaken in which several Engineers participated and revealed that the organization's strengths lie in its ability to geographically expand within Europe identifying opportunities within Eastern European countries whilst retaining a property developer and corporate Client base. It also revealed, however, that the existing portfolios are being neglected in terms of investment and organic growth of a resource base. Fundamentally though, the organization shows weaknesses in managing projects from start to finish, communication and integration between the different departments.

BEST PRACTICE AND COMPETITIVE ADVANTAGE

It was briefly mentioned above that the case study Company has experienced problems in delivering projects to some long-standing clients. This could in the future lead our Clients to appoint our competitors to undertake projects that we would ordinarily have been considered for. This highlights that clients largely perceive who

within the industry has the leading edge and who should be appointed to implement their projects. Herein lies the trump card for affirming reputation and respectability. Clients demand continuous results, results that can only be achieved by in-house "evolving" of Best Practice management.

The contextual term, Best Practice, is a very broad subject area - somewhat of a 'holistic' approach to organizational management. The purpose of Best Practices is not merely to find the perfect solution, but rather to provoke new ideas and insights into management within the company. "All creative ideas and insights have their origin in the mind of people dissatisfied or puzzled by what they encounter in their world. This cognitive dissonance demands a resolution to problems, simple or complex," (Hiebeler, R. *et al.*).

Competitive advantage centres on what new opportunities can be identified and how services can be improved and developed so as to maintain client loyalty. It is therefore very important that there is clarity about the needs of clients and successful management of projects to deliver client satisfaction and hence, breed competitive advantage.

MANAGEMENT OF DESIGN PROJECTS

Traditionally, project management has centred on tools and techniques to deliver a project from start to finish. This, however, fails to address the organic development and culture of a project, for example, it fails to consider the following issues.

Establishing the strategic and technical brief of the project and the continual management as it develops.
Proactive management of the interaction between the brief and the external forces of political, economic, social and technological issues.
Cultivating a good culture between all construction participants to deliver success.

The above list of issues affirms that traditional Project Management grossly over simplifies the concept of a design team containing a few consultants for the duration of the project (Gray, Hughes and Bennett, 1994). Within the realms of traditional project management, design engineers have little control and influence on the wider issues. A more suitable term is 'the management of design projects', as this envelopes a more holistic approach to managing projects.

Design engineers do have a role to play in thinking about this broader framework such that they can understand the "whole" that their enterprise involves and the part that their efforts play in that totality. The management of design projects encourages innovative and/or creative solutions to cultural problems, strategic and interactive management. The depth of involvement of the project team members' changes at each of the project stages, following the shift in nature of the tasks and project criteria.

This wider framework of management needs to be applied at each of the project key stages discussed earlier. Importantly though, perhaps the most significant stage is the briefing stage as it paves the way for early interaction and harmonization with the Client's ideas.

THE SURVEY QUESTIONNAIRE AND RECURRENT THEMES

Using the five key project stages discussed above and the wider framework of "the management of design projects", a survey has been compiled which has been

distributed both in-house and to external Clients to assess both "anticipated" and "achieved" performance of two projects.

The survey comprises five parts which detail a series of questions relevant to the five stages of a project life cycle. Whilst it is not the intention to enumerate each question within the survey here, the questions relate to management issues, some of which, are recurrent throughout all five stages. Survey responses are measured using the Likert Scaling technique, with the opportunity for the reader to list any further topics considered to be relevant.

A discussion of some of the issues, on which the survey questions are based, now follows as a means to provide an insight into the survey issues that the graphical model represents.

Establishing Client's Requirements
It is important to establish the client's requirements, as comprehensively as possible at each key stage, but particularly at the project outset. These requirements include defining project parameters, apportioning risk and boundaries of responsibility etc.

Communication
Better communication and understanding of project delivery, leads to efficient management of designs and construction implementation.

Knowledge Management
Knowledge, whether explicit or tacit, needs to be managed within and between all the members of design and contractor teams so as to attain client satisfaction and industry reputation. Westwood (2001) captures this in the following statement, "It is now widely accepted practice that the effective management of knowledge contributes to competitive advantage for organizations in the future".

Attitudes and Leadership
Communication and knowledge can only be effectively utilized if the proper attitudes exist. Unless there is a major commitment and enthusiasm towards making the project a success, the chances of success are substantially diminished. In part this is generated through leadership.

It is particularly important that there is commitment and support at the top, however, it must be commitment to viable ends. Project leaders need to welcome criticism to ensure objective feedback.

Integrated Involvement of the Contractor
According to Westwood (2001) most professionals now accept that they need to work in concert with other professionals to allow them to have the resources and information that they need to properly perform. Integrating a contractor into the design process at an early stage has benefits because it enables the contractor to identify difficulties that may be encountered during implementation.

Evaluating the Project Following Completion
Consultant designers are generally, at any one given time, designing more than one project concurrently with little break before starting new designs. There is a real need to evaluate success and failure at all key stages or milestones to gain a full appreciation of the project performance and also to ascertain how the organization

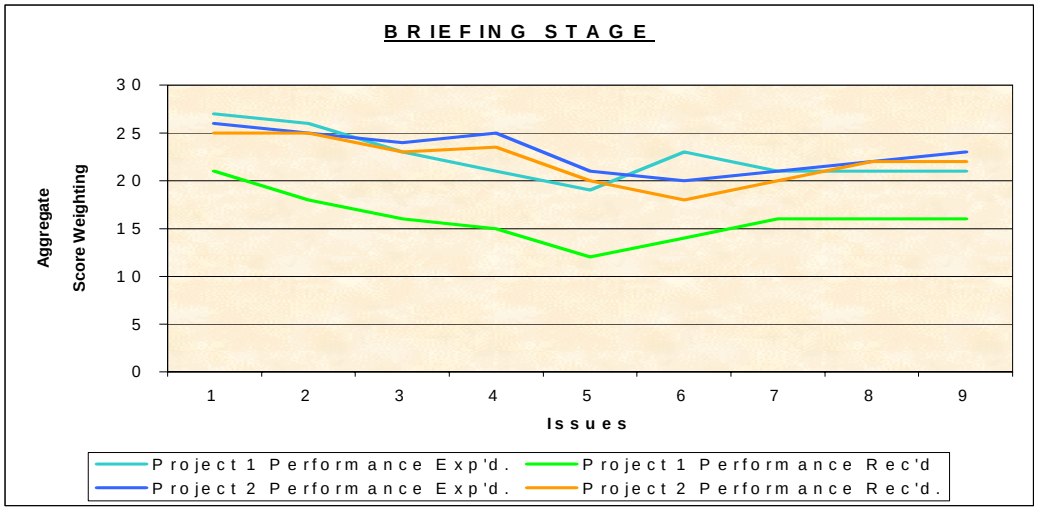
performed. It is appreciated however, that evaluation exercises do take time, but there are clear benefits in learning from past mistakes.

THE MODEL

The model comprises of a graph for each of the five respective key project stages. Essentially, each graph illustrates the “anticipated” and “received” performance of two projects; one that was perceived to be successful, and one that was not as successful. Thus, two profile lines are represented for each project in each graph.

From the profile lines representing project 1 for each of the five project stages, it was observed that there was a close alignment between the “anticipated” and “expected” performance; however, the correlation between the “anticipated” and “expected” performance for project 2 indicated a more distant alignment. All the graphs for the two respective projects follow this pattern. For this reason, only the Briefing Stage graph is illustrated in Figure .

Key - Questions relate to the following issues:



1. Requirements
2. Parameters
3. Appointment
4. Responsibility boundaries
5. Contractor Involvement
6. Communication
7. Tailoring
8. Brief Decision Making
9. O&M Strategy

Project 1 Perceived ‘unsuccessful’ project.
Project 2 Perceived ‘successful’ project.

Figure 1: Performance Correlation At The Briefing Stage For Two Projects

MODEL ANALYSIS

With reference to the profile lines on the above model, the successful project is the one where the lines show little disparity between issues, as this shows a close collaboration with what the client prescribed and required. Conversely, the non-aligned set of profile lines represents a project that has not performed as well in the client's eye.

To expand on this, a few observations are detailed as followed:

Firstly, considering the profile lines for the successful project:

Communication achieved a near similar weighting for expected and received values between Client and Engineer. This contributed towards all issues, at the Briefing Stage, being discussed with similar thinking and little conflict between Client and Engineer. This enabled efficient management of the design and construction implementation, as further results for the remaining stages (not shown) indicate.

Conversely, considering the profile lines for the less successful project:

Communication received disparate weighting for expected and received values between Client and Engineer. Discussion and thinking on all issues was therefore disparate as the graph shows. This indicates a need for early involvement of designers in establishing a comprehensive project brief and similar thinking on all issues of the project. Therefore communication is key.

Consideration to contractor involvement was not given the importance expected. Therefore problems encountered during the construction stage adversely affected the time and cost parameters of the project.

When analysing this graphs for the briefing stage in conjunction with the graphs for the other stages, an overall observation was made as follows. The disparity between the "anticipated" and "achieved" profile lines which represent the briefing stage, set the tone for the subsequent project stages. This highlights that the later project stages are dependent on how the initial stages are managed.

The above list of observations is not exhaustive, but is indicative of how the model can be use to establish client benchmarks, evaluate successes and failing, identify problems and create harmonious working relationships.

CONCLUSION AND RECOMMENDATIONS

The message of this paper is, in short, that a competitive advantage can be gained by improving efficiency and successful delivery of projects, thereby gaining a distinguished reputation within the industry. Direct involvement with the client can help the delivery of improved results and hence increase client satisfaction. Repeat business and good reputation leads to competitive advantage.

By not clearly defining the project's objectives, or considering the longer term strategic management of a project, including effective communication and agreement, the chances of a project's success will be compromised.

All the issues should be considered from the earliest stages of the project and should be kept in review as the project develops, receiving particular scrutiny at the major life cycle change points.

To maintain strategic effectiveness, the management team must meet frequently to celebrate progress, analyse problems and modify goals. They should continuously establish new action plans to formulate ways of sharing good news and bad within the organization. It is important to manage professionals by establishing their trust and respect through an "open-door", "open-mind" attitude between all professionals. They should be involved in discussions about the values of the organization.

Pressure to change should be seen as a powerful opportunity to expand the skill and resource base. People need to be supported and managed through their natural reluctance to alter their established ways of working. They need to work in partnership.

REFERENCES

Austen, A.D, and Neale, R.H., (1986) *Managing construction projects*. International Labour Office**,** Geneva, Switzerland.

BRE (Building Research Establishment), (1987) *In achieving quality on building sites***.** NEDO Report, London, UK.

Chase, G., Manning, C. (1990) *TQM in buildings and construction*, Iowa, USA.

CIBSE/BSRIA Various authors (1999-2000) *Construction Best Practice Series***,** London, UK.

Duffy, F. (1992) *Finding fault*, in: Alastair Steward report, Building, UK.

Egan, Sir J. (1998) *Rethinking Construction***,** – The Report of the Construction Industry Task Force, London, UK.

Gray, C., Hughes, W.P. and Bennett, J. (1994) *The Successful Management of Design*. Centre for Strategic Studies in Construction, Reading, UK.

Hiebeler, R., Kelly, T., Ketteman, C. (1998) *Best Practices***,** UK, London.

Hoise, J. (2001) Egan's View on Contracts. *IEE Engineering Management Journal*, London, UK.

Latham, Sir M. (1994) *Constructing the Team*, London, UK.

Morris, P, Hough, G. (1987) *The Anatomy of major projects***,** Chichester, UK.

Spiegel, M.R. (1994) *Theory and problems of Statistics*, 2nd Edn, USA.

Turner, A. (1990) *Building Procurement*, London, UK.

Westwood, F. (2001) Achieving Best Practice – Shaping Professionals for Success**,** Maidenhead, UK