Drivers for dynamic brief development in construction

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Keywords

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Abstract

Confining the development of the project brief to a certain stage hinders the interaction between the client and the designer. In addition, it inhibits the incorporation of the influential internal and external factors that may affect the project. In spite of the frequently adverse impact of change orders on project cost, time and quality, literature review and case studies showed that client organisations continue to use change orders to achieve their expectations and enhance their projects' performance principally because current construction management process instills an expectation that, change after a specified point is somehow outside the project brief rather than part of the ongoing development of that brief. This paper introduces the concept of dynamic brief development (DBD), a process that facilitates client satisfaction, meets the need to adapt to the brief developing factors for the benefit of the project and fulfils the desire to manage project change orders. In this paper, the need, aims and principles of the concept of DBD are explained and the factors driving brief development are identified. In addition, the rationale behind each factor is given and the case study sampling method is described.

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Introduction

The recognition that clients are the core of the construction process reveals the importance of achieving their satisfaction (Bennett *et al.*, 1988; Kamara *et al.*, 2000; Latham, 1994). Two objectives have to be met in order to achieve client satisfaction. First, the translation of client needs into a design, which specifies technical characteristics, functional performance criteria and quality standards; and secondly, the completion of the project within a specified time and in the most cost effective manner (Bowen *et al.*, 1999). Clients are most likely to be satisfied when the final product matches or exceeds their expectations (Ahmed and Kangari, 1995; Hudson, 1999). Smith and Wyatt (1998) state that the early stages in the development of a project are crucial to its success. This is because the significant decisions made during these early stages influence the characteristics and form of the project. Once these decisions have been made, by their very nature, they cannot be readily deleted or dramatically changed in subsequent stages. As a result, changing the project brief, after it has been established and in particular at later stages, has an impact on project cost, time and quality. Late changes to the brief are considered a major source of dispute and litigation globally throughout the construction industry (CIC, 1994; Kubal, 1994; O'Brien, 1998; Veenendaal, 1998). In an endeavour to eliminate brief changes during the construction process, the Royal Institute of British Architects (RIBA) Plan of Work, updated and approved by the RIBA Council in 1998, freezes the modification of the project brief after the detailed proposal stage (RIBA, 2000). This is not reflected in practice, however. Emerging client requirements, the construction industry's fragmented nature, long investment terms, risk exposure, time consumption and a myriad of other internal and external influences, may urge client organisations and construction professionals to change what was established at earlier stages. Literature review and an analysis of 36 case studies undertaken by the authors showed that many of these "late" changes have enabled client organisations to more fully achieve their emerging requirements, meet user needs, cope with regulation changes, exploit business opportunities, adapt to technology improvement, add more value and manage associated risks (Bates, 1996; Burati *et al.*, 1992; Chapman, 1997; Gardiner and Simmons, 1992).

The main aim of this paper is to introduce the concept of a dynamic brief development (DBD) process justified by the importance of achieving the client's needs (Latham, 1994) and the need to

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focus on the customer as a driver for enhancing the performance of the construction industry (Egan, 1998). DBD must also recognise the need to manage the drivers that affect the project brief for the benefit of the project and the desire to manage project change orders. This paper argues the need for permitting development of the project brief across the project life cycle and aims to establish the concept of DBD. The specific objectives of the research are:

(1) to define and identify the drivers for brief development,
(2) to establish the principles of DBD, and
(3) to define a time frame within which to manage the defined drivers.

Methodology

The aim and objectives outlined above called for a research strategy, which could gather data sufficiently rich to reveal the drivers for the definition of DBD. Two approaches were employed, namely literature review and case studies. The literature review was used to

(1) review the current theory relating to brief development, and
(2) identify the drivers of brief development.

The literature review resources depended on textbooks, academic and professional journals, conference and seminar proceedings, dissertations and theses, organisations and government publications as well as Internet and related Web sites. In order to validate the drivers identified from the literature review, field data from 36 construction projects were collected and analysed. The research, unusual in that access, was available to a very large number of construction projects. This sample was too large for analysis within the time scale available so a random sampling method was used to define the data set for the case studies (see below). These case studies comprised of recently completed projects and the information obtained was classified into two main types: the first being project information (e.g. project type, components, cost, duration, contract type and project quality); and the second concerned the development of the project brief (e.g. development type, driver, stage, effects on time, cost, quality and the steps adopted to manage the development). The use of case studies confirmed the identification of brief developing drivers and added new drivers which were not covered by the current literature. These new drivers were specific to the culture of the surveyed society.

The case studies comprised a detailed inspection of project files to collect information about the project history and the project brief at the end of the strategic briefing stage. Particular attention was paid to gathering information from the correspondence between the related parties (such as client-designer, client-funding bodies, designer-other consultants and designer-government authorities), minutes of meetings, internal memos, drawings and specifications. Following the examination of the project files, an unstructured interview was held with the project architect, when appropriate, to investigate the way in which the project brief was developed. By using more than one source of evidence (project documentation and the recollection of the project architect) it was possible to improve the validity of the collected brief developing drivers and increase background knowledge. In an effort to ensure the reliability of the data, data collection concentrated on facts and events, rather than subjective interpretations (MacPherson *et al.*, 1993; Yin, 1989). Literature review and case study resulted in the identification of 47 drivers of brief development. The work was reviewed and refined by the authors on a regular basis in order to omit repeated drivers and merge similar ones. The end result was the identification of 30 factors that can cause the project brief to change and develop.

Case study sampling

The objective of the case study sampling was to select a representative and non-biased sample of construction projects from which to identify the brief developing drivers. The survey was undertaken in Abudhabi, United Arab Emirates and information about the distribution of the districts surveyed was collected from the Department of Social Services and Commercial Buildings, UAE. The city was divided into 87 districts (DSSCB, 2000). Random number tables were used to select 45 districts, which represented 51.72 per cent of the total. Ten districts were excluded because of the difficulty in obtaining information about the projects in general and the brief development in particular due to national security matters. Buildings in each district were counted up and each building was given a unique number to form a table of 900 buildings. A systematic sample of 36 buildings (1 : 25) was used to select the case study sample. This sampling methodology effectively covered the surveyed city, so the identified brief developing drivers were extracted from different projects constructed in different districts, with different regulations, types, clients organisations, cost, time and quality, all of which contributed to the reliability and validity of the definition of the drivers of brief development.

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Current theory relating to brief development

Briefing in construction has become the focus of considerable attention in the post-Latham era, both within the research community and amongst industry professionals (Hassanen and Bouchlaghem, 1999). The following section is devoted to the definition of the terms used within this paper and to present the different approaches to brief development throughout the project life cycle.

Definitions

The "brief" is a formal document which is the medium for expressing or communicating the objectives and needs of the client (Bennett *et al.*, 1988; CIB, 1997; Goodacre *et al.*, 1982; Hellard, 1993). The brief contains information for project implementation and should include:

(1) the background, purpose, content and desired outcomes of the project;
(2) the functions of the intended facility and the relationship between them;
(3) cost and time target;
(4) instructions on procurement and organisation of the project; and
(5) site and environmental conditions, safety, interested third parties and other factors which are likely to influence the design and construction of the facility (Kamara, 1999).

To "develop" is defined as to unfold gradually, or in detail; to change from one state into another by modification, omission or addition to a project document, design, process or method approved or accepted earlier. Development is defined as an unfolding growth or progress (Gardiner and Simmons, 1992; Webster's Dictionary, 2000). Therefore, for the purpose of this paper, "brief development" is defined as a "detailed, gradual unfolding, growth, progress or change either by modification, omission or addition to the brief document contents that will affect the final product and hence affect the achievement of the client objectives, needs and satisfaction".
In addition, "drivers of brief development" is defined as the drivers that lead to unfolding, growth, progress or change of the project brief.

There appears to be a split in the approach to brief development. One approach considers the brief as an entity in itself, which should be frozen after a critical period (approach A). Decisions tend to be taken as early as possible, and briefing becomes a stage or stages in the design and construction process. The other approach (approach B) considers the brief as a live and dynamic document that develops iteratively from an initial global brief in a series of stages. Briefing is deemed as an ongoing activity that evolves during the design process (Barrett *et al.*, 1996; Kamara, 1999). This approach is emphasised by Barrett and Stanley (1999) who define the "briefing process" as the process running throughout the construction project by which means the client's requirements are progressively captured and translated into effect. These schools of thoughts are illustrated by the following examples.

The RIBA plan of work

The RIBA plan of work states that the brief is normally developed in three phases. In the first phase, the client establishes the need for the project objectives, perhaps by way of a business case. In the second phase, which is the most effective if carried out after completion of feasibility studies and/or option appraisals, the strategic brief is developed from the initial statement to provide sufficient information for the consultants to commence the design process.
In the third phase, the project brief is developed from the strategic brief in parallel with the design process during the work stages C and D, namely outline proposals and detailed proposal stages, respectively. The project brief is to be frozen at the end of the detailed proposal stage (RIBA, 2000).
The RIBA plan of work emphasises the need to produce an explicit and detailed brief at an early stage, and then to work to it as closely as possible (Barrett *et al.*, 1996) and is an example of approach A.

The process protocol

The process protocol is the result of collaboration between a number of like-minded organisations from various disciplines within the UK construction industry together with the research expertise of the University of Salford and Loughborough University in UK. The process protocol is a common set of definitions, documentation and procedures that provide the basis for a wide range of organisations involved in a construction project to work together seamlessly. It emphasises the need to improve coordination between different parties through the adoption of manufacturing industry perspective. The protocol presents a map for the construction process, where the project brief is finalised at the production information stage and places a soft gate between the production information stage and the construction stage. All solutions and various options and requirements are fixed for construction (Kagioglou *et al.*, 1998). The process protocol also leans towards approach A.

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The Netherlands approach

In The Netherlands, the brief is seen as a process and not an event. It is a process that not only starts early but also continues to inform all the technical work throughout the project. The brief is explicitly managed to evolve through various stages in parallel with the technical information till specification stage and could be extended through the construction stage. Continued interaction with the client is essential in this process, the underlying principle is to make as few decisions as possible at each stage. This means identifying the critical decisions and leaving flexibility on other issues for later consideration as more information becomes available (Barrett and Stanley, 1999). This follows approach B.

Learning from experience: applying systematic feedback to improve the briefing process in construction (LEAF)

LEAF is the title of 2 years research led by the University of Sheffield, UK with the collaboration of many partners. The theme of the project is the improvement of the client briefing and evaluation process by systematising the gathering and application of feedback to improve the industry productivity and user satisfaction. It states that the failure to learn from the accumulated wealth of experience from completed construction projects is both costly and unproductive (Phiri and Haddon, 2000). This does not follow either approach but emphasises the need to improve based on learning.

The need and aims of DBD

The importance of the DBD concept arises from two significant flaws in current practice, which are discussed below.

Deficiencies of the current briefing process in achieving client satisfaction

The RIBA plan of work limits the brief development to the detailed proposal stage. Barrett *et al.* (1996) state that there are a number of problems with this approach. Clients' ideas develop as the possibilities of a design unfold and a beneficial creative dialogue with the design team can occur. An insistence on adhering to a detailed early brief will inhibit such a dialogue occurring. Many client organisations are in a state of dynamic change. That is often why they need a new building in the first place. However, the rate of change may be such that their requirements change during the course of the project. A static brief will prevent these changes from being accommodated. Rezgui *et al.* (2001) state that clients prefer to consider the briefing process as extended until almost the final stage of construction to ensure that the final product meets their requirements and fulfils their objectives. On the other hand, consultants tend to consider the briefing as a limited process with a well-defined start and end to be able to claim fees for any extra work. In addition to this, neither the process protocol nor The Netherlands approach extend the briefing process to cover the after practical completion stage, where the lessons learned could be fed back to enable client organisations and construction professionals enhance the briefing process for new projects as promoted by LEAF.

Managing project change orders and adapting to the influential internal and external drivers

Very few projects are implemented without any change to the original scope of work (Hansen, 1994). Change orders are often taken as an indicator of someone's failure to fulfil his or her functions in the construction process. It is argued that no one benefits from change orders during the construction period. They are generally disruptive of the orderly progress of the work and are usually an economic burden on both client and contractor (O'Leary, 1992). Change orders are seen as a major cause of project delay and a source of many disputes in today's construction industry (Al-Khalil and Al-Ghafly, 1999; Hanna *et al.*, 1999; Mezher and Tawil, 1998; Zaimi, 1997). On the other hand (O'Brien, 1998; PMI, 2000), client organisations use change orders to achieve their emerging requirements and adapt to influential internal and external drivers, such as exploiting new business opportunities and installing an improved technological system not available during the brief and design stages. Smith and Wyatt (1998) state that external forces may drive changes and clients respond to these forces by demanding a design that is more effective and more efficient. Chapman (1997) emphasises that effective client organisations are those who adapt and change in response to their environment and markets. In addition, successful design practices are those who manage changes successfully. As a result, the more influential the internal and external drivers, the greater the use of change orders, in particular, during the construction and after practical completion stages. There is a need to decide on how to react to these drivers for the benefit of the project. This decision process should include the consideration of potential value and associated risk and be dynamic and ongoing.

The inability of the current briefing process in achieving client satisfaction and adapt to

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influential internal and external drivers for the benefit of the project as well as the need to manage project change orders, dictate the need for DBD. This concept will

(1) enable client organisations achieve their expectations,
(2) facilitate an innovative response to the drivers that may develop the project brief by unfolding, growing, progressing or changing its content for the benefit of the project, and
(3) manage project change orders minimising their impact on project cost, time and quality.

Factors driving brief development

In order to respond effectively to the brief developing drivers, these drivers have to be identified and 30 drivers within 13 categories were extracted from literature review and case studies. Table I lists the factors that drive project brief development and indicates whether the driver was identified from literature, case study or both. The concept of DBD extends the brief development throughout the project life cycle, therefore, the case studies covered all project stages from the appraisal stage till the after practical completion as shown in Figure 1. This figure shows that brief developing factors occur more frequently during the construction stage, where it is expensive and difficult to execute changes confirming the importance of understanding this.

The rationale behind the definition of the brief developing drivers

Many of the factors driving the development of the brief were identified from the literature review and confirmed by the analysis of the case studies as shown in Table I. However, the case studies revealed additional drivers not recognised earlier in literature, although the examples collected were from one city only, they do not appear to be particularly country/culture specific. Thirty drivers were identified and considered in 13 groups, the rationale behind their occurrence is given below by a summary of literature and/or specific case study examples.

Drivers relating to communication, clarity and understanding

Barrett and Stanley (1999) stated that very few buildings finish on time or at the right price and clients often criticise the fact that the finished building is not what they expected. Clients, particularly naive ones, may find it difficult to describe their objectives and operations to another party, which leads to the production of unclear and incomplete project brief. This becomes a greater problem when the designer is not skilled in the art of questioning. In addition, lack of presentation and visualisation techniques inhibit the client's understanding of project design and what the building will look like. It would appear that at one or more stages of the construction process there must be a lack of communication between the parties involved. Male *et al.*'s (1992) analysis of case studies showed that architects are more likely to gain kudos from peer approval than from the satisfaction of their clients and may ignore the role of the client and behave unilaterally. These are factors which have resulted in clients dissatisfaction and driven them to develop the project brief by changing, modifying, omitting and adding to its contents.

Drivers relating to feasibility studies

A Feasibility Study is defined as a study to determine the probability that a specific real estate proposal will meet the objectives of the developer and/or investor (Collins, 1999). De Valence (1999) states that there are numerous examples of projects proceeding to detailed design stage without proper feasibility studies. Improper feasibility studies and the absence of reasonable alternative options including a no-build option lead to the failure of the project and the project brief to meet the client objectives and market and business needs.

Drivers relating to value

Value Engineering is defined as the process of relating the function, the quality and the cost of the project in the determination of optimum solutions for the project (Omigbodun, 2001). Initiating value engineering changes contributes to the production of better and smarter designs (Stocks and Singh, 1999). This could be achieved through developing the project brief by improving functionality (AMEC, 1999), eliminating unnecessary costs (Dell'Isola, 1997), simplifying design, using substitute cheaper materials that have same or better quality, using substitute construction methods and equipment that have greater capacities, higher efficiencies, higher speeds and lower operating costs, for instance (Tenah, 1985).

Drivers relating to project users

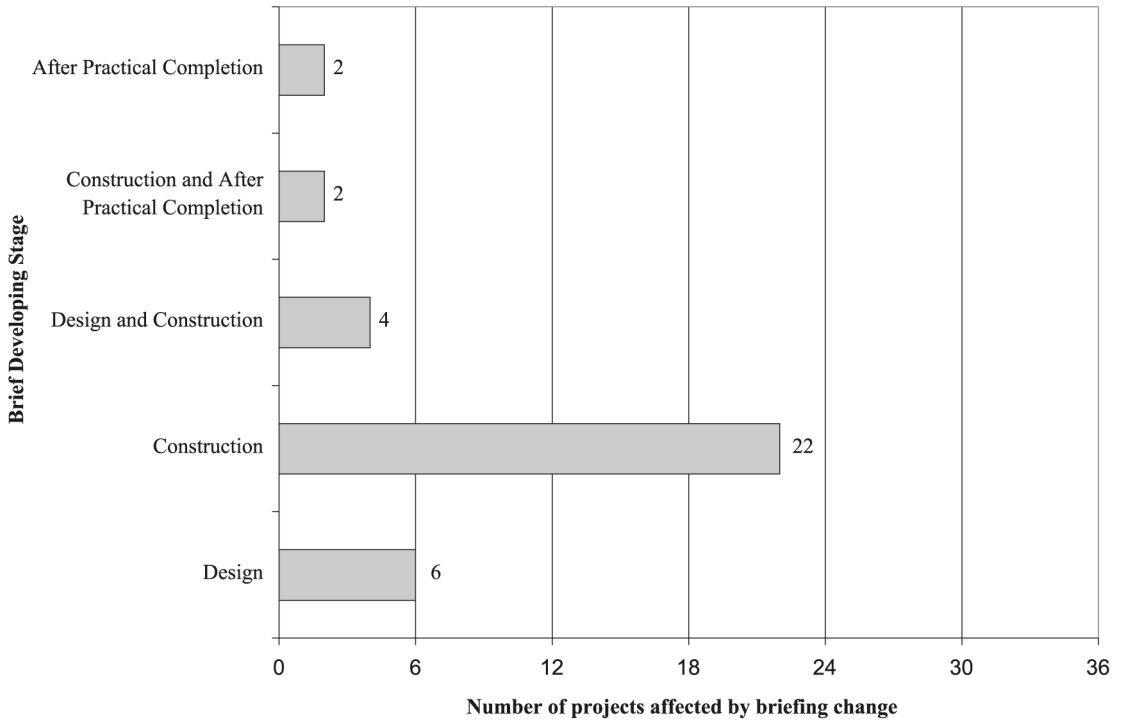
An example of this in the case study was identified in a housing project consisting of 400 houses designed by a foreign consultant, who did not

Table I The brief developing factors

No.	Brief development drivers	From literary review	From case study
Drivers relating to communication, clarity and understanding			
1.	Unclear and incomplete project brief (Barrett and Stanley, 1999)	×	×
2.	Inappropriate communication between client and designer (Barrett and Stanley, 1999)	×	×
3.	*Lack of understanding of the Client organisation*		×
4.	*Designers ignore the Client and behave unilaterally*		×
5.	Lack of presentation and visualisation of design (Barrett and Stanley, 1999)	×	×
Drivers relating to feasibility studies			
6.	Inappropriate feasibility studies (De Valence, 1999)	×	×
Drivers relating to value			
7.	Initiating value engineering changes (Stocks and Singh, 1999)	×	
Drivers relating to project users			
8.	Project users not involved in the briefing process (Kernohan *et al.*, 1992)	×	×
9.	*Lack of understanding of different users' culture and traditions*		×
Drivers relating to coordination and accuracy			
10.	Uncoordinated and incorrect construction documents (O'Leary, 1992)	×	×
Drivers relating to inadequate provision of information			
11.	Brief information still being given during later design and construction stages (Barrett and Stanley, 1999)	×	×
12.	Lack of consideration of environmental requirements (Best and Valence, 1999)	×	
13.	Lack of information provision (Barrett and Stanley, 1999)	×	×
Drivers relating to regulations and technology advancement			
14.	*Lack of regulatory updating*		×
15.	Changing government regulation and codes (O'Leary, 1992)	×	×
16.	*Meeting new technology changes*		×
17.	*Lack of communication and coordination between government authorities and design firms over planning and approvals*		×
Drivers relating to Quality and Sustainability			
18.	*Lack of functional, aesthetic, safety requirements and construct ability*		×
19.	Whole project life not considered (CIB, 1996)	×	×
20.	*Upgrading project facilities*		×
21.	*Eliminate proven poor quality materials and equipment*		×
Drivers relating to design cost and time			
22.	Inadequate available design time (ICE, 1996)	×	
23.	Restricted design fees (ICE, 1996)	×	
Drivers relating to unforeseen conditions			
24.	Unforeseen conditions (O'Brien, 1998)	×	
Drivers relating to market conditions and user demands			
25.	*Stakeholders change project requirements and have second thoughts at later stage*		×
26.	*Project users appear at later stages*		×
27.	*Users exaggerate their needs*		×
28.	Responding to market demand (Smith and Wyatt, 1998)	×	×
Drivers relating to lack of design expertise			
29.	Materials are no longer available in market or use of better/substitute materials (Tenah, 1985)	×	×
30.	*Lack of design experience*		×

Note: Please note that the factors in "italics" represent the factors for which there is no allowance under existing briefing systems and are extracted from case studies

Figure 1 Number of projects affected by briefing change vs project stage



adequately understand the culture and traditions of the end-users. After the practical completion stage of the project, the users implemented significant changes in order to meet their requirements such as privacy and the ability to add more rooms for future increase in their family sizes. Mustapha and Bintaher (2000) state that the needs of the occupants may change, therefore housing cannot be considered as a final product, but rather a process that needs to be continuously updated. The development of the project brief should highlight to the client organisation, the importance of involving project users in the briefing process and understanding their requirements, culture and traditions.

Drivers relating to coordination and accuracy

Changes in the scope or details of construction originate from various sources. One of the main sources is the faulty construction documents, which will generate the unexpected need for alternative materials or process (O'Leary, 1992). Uncoordinated and incorrect construction documents emerge from the unfamiliarity of the designer with the project, time shortage, misunderstanding, information overload, over manning, etc. (Wantanakorn *et al.*, 1999). This leads to develop the project brief in order to rectify the incorrect project documentation and resolve the contradictory between different documents such as, drawings and specification in an endeavour to make sure that the client requirements are correctly reflected in the project documents.

Drivers relating to inadequate provision of information

An example of this was seen in a case study project comprising a residential compound in the desert. It consisted of 35 buildings. The project cost was Dirhams (DHS) 53,760,000[1] and the construction period was 24 months. Because of the uniqueness of the project as it was the first of its kind to be constructed in that area, brief information was being delivered during later design and construction stages. Lack of information provision such as soil nature and electricity load of the project resulted in changing the structural design from shallow foundation to deep piles and changing the electricity connection cable to suit the project size, which delayed the project handover for 180 days. In addition, lack of considering environmental requirements urged the designer to change the design to suit the area weather and shift the water tanks from exposed to underground water tanks in order to protect them from hot climate and sand storming. The above drivers resulted in developing the project brief and increasing the project cost by DHS 5,692,813 and increasing the redesign and construction period by 255 days.

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Drivers relating to regulations and technological advancements

The case study project, best illustrating this, was a commercial complex consisting of basement floor (2 Cinemas), ground and mezzanine floors (showrooms), 12 typical residential floors, roof, swimming pool, health club, six lifts, four escalators, central gas system, central water filtration system and central dish antenna. The cost of the project was DHS 76,960,000 and the construction period was 20 months. Changing the government regulation and codes during the course of the project and the lack of the designer to update these changes, resulted in changing the purpose of the basement to be a shopping centre to suit the surroundings of the project and cover the shortage of shopping centres in that area. In addition, the lack of communication and coordination between the government authorities and design firms over planning and approvals resulted in modifying the brief by adding new spaces and equipment for future telecommunication connections. The brief development, according to the above mentioned drivers, resulted in 25 days extra for redesign and approvals and DHS 246,667 as extra design cost. In addition, these changes reduced the construction period by 60 days and reduced the cost by DHS 725,000.

Drivers relating to quality and sustainability

An example, from the case studies was a refurbishment project comprising the modification of an existing residential complex and the construction of new recreation area, fountains, swimming pool and car parking. The client's objective was to upgrade the project facilities and add new services in order to enhance the project performance, increase its rent and attract new tenants. Many of the materials and equipment used in the existing project such as finishes, sanitary ware, fire fighting systems and lifts were proven poor quality and the maintenance cost as well as the whole project life was not considered. In addition, lack of functional, aesthetic, safety requirements resulted in development of the original brief in order to meet the client's objectives. This development included redesign of flats and circulation areas, changes to internal and external finishing, the construction of new aesthetic facades, enhanced safety requirements, installation of high quality durable materials and equipment, for instance. In spite of the cost, time and effort spent in developing the original brief, client objectives and satisfaction were achieved increasing the annual income as well as enhancing the project performance.

Drivers relating to cost and time

Every architect, engineer and other professional has target dates by which their documentation must be delivered. Concern about meeting deadlines limits the time available for cost comparisons and value management.
An inadequate budget for completing a design properly encourages designers to take shortcuts in the design process and can adversely affect the completed facility (ICE, 1996). These are some factors that may drive the client and designer to develop the project brief in a later endeavour to achieve maximum value and complete the design properly.

Drivers relating to unforeseen conditions

Unforeseen conditions cause brief development when the conditions of the field do not match the contract documentation. This most often occurs with regard to underground conditions, such as uncharted utilities, uncharted existing foundations, rock or other strata at higher elevation than expected, high groundwater, and so on (O'Brien, 1998). Such conditions force the client and the designer to change and modify the project brief in an attempt to overcome these obstructions and deal with unexpected circumstances.

Drivers relating to market conditions and user demands

An example was found in a project designed to be a commercial building. After the design was completed and the building license was issued, the client received an offer to lease the building for 20 years, if the design was changed to a medical centre provided with the latest technological equipment and facilities. Because of the lack of market demand for commercial buildings and the business opportunity offered, the client decided to change the project design accordingly. This development of the project brief, which happened at the end of the pre-construction period, resulted in 100 extra days and additional cost of DHS 298,908 for redesign and approvals. A further 180 days was required to find a funding body to finance the extra DHS 2,104,318 for hospital equipment. The benefits that the client gained, however, far outweighed the increases in cost and time. The annual return for the commercial building was DHS 550,000, excluding the maintenance cost, which was the responsibility of the client, whereas the annual return of the medical centre was DHS 1,000,000, excluding the operation and maintenance cost, which was the responsibility of the medical centre.

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Drivers relating to lack of design expertise
An example from the case study was a luxurious office building. Its facades were covered with curtain walls and most of the specified materials were imported. Rapid material and technological improvement, coupled with the lack of designer experience to follow-up these improvements meant many of the specified materials were no longer produced or available in the market. As a result, the client had to change the design of the facades and decided to use locally made materials. This development of the project brief enhanced the project performance. First, the redesign of the project facades reduced the air-conditioning cooling capacity required and became more suitable for a country having a hot and humid climate. In addition, these developments to the project brief minimised the project duration by eliminating the time required to import material from abroad and reduced the project cost by using locally made materials (Tenah, 1985). The construction period was reduced by 90 days and the cost was reduced by DHS 380,000.

The definition and identification of the factors of drive brief development demonstrates the need to allow the brief to develop without confining this to a specific design or design stage. Facilitating brief development in this way will increase client satisfaction and reduce the number and improve the management of project change orders.

Principles behind the concept of DBD

The following underlying principles of the DBD concept have been identified within the research. These principles represent the basis that will facilitate the achievement of the concept aims.

(1) The briefing process has to be deemed as an ongoing process extending throughout the project life cycle, responding in an innovative manner to emerging client requirements, meeting user needs, coping with regulatory changes, exploiting business opportunities, adapting to technological improvement, adding value and managing associated risks. This flexible approach will contribute to the achievement of client expectations, adapt to the influential internal and external drivers for the benefit of the project and hence, avoid the consequences of change orders as a result of not considering these drivers.
(2) The project brief has to be considered as a live document, which needs to be continually developed throughout the project life cycle.
(3) Feed back to the client organisation as well as the design and construction team of the lessons learned and comments from the facilities management team and end-users will enhance the performance of the briefing process in future projects.
(4) A system to manage the brief developing drivers is required. This system must respond to these drivers in a way that adds value and reduces associated risk in an endeavour to achieve client satisfaction and manage project change orders.

Time frame/process stages

According to the RIBA plan of work, the work stages into which the process of designing building projects and administrating building contracts is divided into three main stages, namely feasibility, pre-construction period and construction period (RIBA, 2000). The DBD concept proposes five stages throughout the project life cycle during which factors influencing the development of the brief could occur. The completion of each stage provides a milestone indicating an opportunity to evaluate the progress of the brief development and its success in meeting client requirements. The rationale behind selecting these milestones is attributed to the following:

Milestone (1) comes at the end of one of the most important stages, the feasibility stage, where the client requirements are first identified, studies that enable the client to decide whether to proceed and select the probable procurement method are prepared and the strategic brief is identified. Evaluating the project brief at this milestone represents the basis to compare subsequently developed brief versions.

Milestone (2) evaluates the brief development at the end of the detailed proposals stage where the information becomes more concrete and the pace of change is reduced as well as the detailed proposals are prepared. This milestone should reflect the influence of internal and external drivers on design since clients' ideas develop as the design alternatives unfold.

Milestone (3) comes at the end of the tender action stage, which represents the end of the pre-construction period and the beginning of the construction period, the tender documentation is ready, potential contractors and/or specialists for the construction of the project are identified and evaluated. In addition, tenders are obtained, appraised and recommendations are submitted to client. Evaluating brief development takes a particular importance because the cost of change or modification after this stage is expensive.

Milestone (4) evaluates the brief development at the end of the construction to practical completion

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stage. Implications of the drivers that affected the project brief during construction in terms of cost, time and quality, should be reflected in the developed brief. Figure 1 shows that the construction stage represents the stage that witnesses most frequent development of the project brief. This can be attributed to the industry's fragmented nature, long investment term, risk exposure, time consumption, and myriad of other internal and external influences.

Milestone (5) comes at the practical completion stage, where the final inspections and settlement of the final account occur. Evaluating brief development at this milestone provides the client organisation, design team and construction professionals with learned lessons and feedback from the end-users and facilities management team, all of which play an important role in improving the briefing process for future projects.

Summary of findings and conclusion

This paper investigates the existing theory on briefing activities and seeks to identify the factors that drive the need to change and develop the original brief. Achieving client satisfaction implies that the final product matches or exceeds client expectation and that the final product should be a reflection of the requirements of the brief. Changing the project brief has, often negative, impact on project cost, time and quality, however, literature review and case studies showed that changing the project brief better enabled client organisations achieve their expectations and enhance the performance of their projects. Although the Process Protocol and The Netherlands approach extend the project briefing activities beyond the detailed design stage where the brief is frozen under the RIBA plan of work, they do not cover the stage after practical completion, where a wealth of learned lessons and feedback could enhance performance on new projects.

Literature review and case studies revealed 30 brief developing drivers within a broad classification of 13 categories, requiring the attention of client organisations and construction professionals throughout the project life cycle if client satisfaction is to be achieved, the number of project change orders minimised and these drivers adapted for the benefit of the project.

The failure of current briefing theory and practice to fully embrace the factors that drive brief development in order to achieve client satisfaction, coupled with the need to manage project change orders and the desire to adapt to the influential internal and external drivers, reveals a need to change the existing procedures. The concept of DBD would facilitate the incorporation of these fluctuating demands and relies on the following four underlying principles.

(1) The briefing process has to be deemed as an ongoing process extending throughout the project life cycle.
(2) The project brief has to be considered as a live document continually developing and adapting in an innovative manner to the influential internal and external drivers for the benefit of the project.
(3) Feeding back the client organisation and the design and construction team with learned lessons and comments of the facilities management team and end-users in order to enhance the performance of the briefing process in future projects.
(4) A system to manage the brief developing drivers has to be set out as early as possible.

Note

1 UAE dirham was valued at $0.27 US on 17 September 2003 by Expedia.com

References

Ahmed, S.M. and Kangari, R. (1995), "Analysis of client satisfaction drivers in construction industry", *J. Mgmt Eng., ASCE*, Vol. 11 No. 2, pp. 36-44.

Al-Khalil, M.I. and Al-Ghafly, M.A. (1999), "Important causes of delay in public utility projects in Saudi Arabia", *J. Constr. Mgmt Econ.*, Vol. 17 No. 5, pp. 647-55.

AMEC (1999), *Value Management: Capacity and Expertise*, The AMEC Group, Stratford-upon-Avon.

Barrett, P. and Stanley, C. (1999), *Better Construction Briefing*, 1st ed., Blackwell Science Ltd, Oxford.

Barrett, P., Hudson, J. and Stanley, C. (1996), "Is briefing innovative?", in Langford, D.A. and Retik, A. (Eds), International Symposium for the Organisation and the Management of Construction: Shaping Theory and Practice, Vol. 3, E&FN Spon, London, pp. 87-95.

Bates, G.D. (1996), "I don't believe in changes just for the sake of change", *J. Mgmt Eng.*, Vol. 12 No. 3, pp. 20-4.

Bennett, J., Flanagan, R., Lansley, P., Gray, C. and Atkin, B. (1988), *Building Britain 2001*, Centre for Strategic Studies in Construction, University of Reading, UK.

Best, R. and Valence, G. (1999), "Getting it right at the start", in Rick, B. and Valence, G. (Eds), *Building in Value: Pre-Design Issues*, Wiley, New York, NY.

Bowen, P., Pearl, R. and Edwards, P. (1999), "Client briefing process and procurement method selection: a South African study", *Eng. Constr. Archit. Mgmt*, Vol. 6 No. 2, pp. 91-104.

Burati, J.L., Farrington, J.J. and Ledbetter, W.B. (1992), "Causes of quality deviation in design and construction", *J. Constr. Eng. Mgmt*, Vol. 118 No. 1, pp. 34-49.

Chapman, R. (1997), "Managing design changes", *The Architects' Journal*, Vol. 205, pp. 47-9.

CIB (1996), *Towards a 30 per cent Productivity Improvement in Construction*, (Working Group 11), Construction Industry Board, Tomas Telford, London.

CIB (1997), *Briefing the Team*, (Working Group 1), Construction Industry Board, Tomas Telford, London.

CIC (1994), "Dispute Resolution", A report by the dispute resolution task force of the construction industry council which identifies the disputes that arise in the construction industry and existing methods of their resolution, Construction Industry Council.

Collins, T. (1999), "Feasibility studies", in Best, R. and De Valence, G. (Eds), *Building in Value: Pre-Design Issues*, 1st ed., Wiley, New York, NY.

Dell'Isola, A. (1997), *Value Engineering: Practical Applications for Design, Construction, Maintenance and Operations*, R.S. Means, Kingston, MA.

De Valence, G. (1999), "Project initiation", in Best, R. and De Valence, G. (Eds), *Building in Value: Pre-Design Issues*, 1st ed., Wiley, New York, NY.

DSSCB (2000), *Commercial Buildings Directory*, Al Wahdah-Express Printing Press, Abu Dhabi, UAE.

Egan, J. (1998), "Rethinking construction", Report of the Construction Task Force on the Scope for Improving the Quality and Efficiency of UK Construction, Department of Environment, Transport and the Regions, London.

Gardiner, P. and Simmons, J. (1992), "Analysis of conflict and change in construction projects", *Constr. Mgmt Econ.*, Vol. 10 No. 6, pp. 459-78.

Goodacre, P., Pain, J., Murray, J. and Nobel, M. (1982), "Research in building design", Occasional Paper No. 7, Department of Construction Management, University of Reading, UK.

Hanna, A., Russell, J., Nordheim, E. and Bruggink, M. (1999), "Impact of change orders on labour efficiency for electrical construction", *J. Constr. Eng. Mgmt*, Vol. 125 No. 4, pp. 224-32.

Hansen, F. (1994), "Change order management for construction projects", *Constr. Eng.*, Vol. 36 No. 36, pp. 25-8.

Hassanen, M. and Bouchlaghem, D. (1999), "Literature review report on briefing practices and links with other relevant projects", CoBrITe Interim Report.

Hellard, R. (1993), *Total Quality in Construction Projects*, Tomas Telford, London.

Hudson, J. (1999), "Briefing and design: the role of creativity", in Baldry, D. and Ruddock, L. (Eds), *The Challenge of Change: Construction and Building for the New Millennium*, COBRA 1999, RICS Construction and Building Research Conference, 1-2 September, University of Salford, UK.

ICE (1996), *Creating Value in Engineering: Design and Practice Guide*, The Institute of Civil Engineers, Thomas Telford, London.

Kagioglou, M., Cooper, R., Aouad, G., Hinks, J., Sexton, M. and Sheath, D.M. (1998), *A Generic Guide to the Design and Construction Process Protocol*, The University of Salford, UK, ISBN No: 0-902896-17-2.

Kamara, J.M. (1999), "Client requirements processing for concurrent life cycle design and construction", PhD thesis, The University of Teesside, UK.

Kamara, J., Anumba, C. and Evbuomwan, N. (2000), "Process model for client requirements processing in construction", *J. Business Process Mgmt*, Vol. 6 No. 3, pp. 251-79.

Kernohan, D., Gray, J., Daish and Joiner, D. (1992), *User Participation in Building Design and Management*, 1st ed., Butterworth-Heinemann Ltd, Oxford.

Kubal, M. (1994), *Engineering Quality in Construction*, 1st ed., McGraw-Hill, New York, NY.

Latham, M. (1994), "Constructing the team", Final Report on Joint Review of Procurement and Contractual Arrangement in the UK Construction Industry, HMSO, London, UK.

MacPherson, S.J., Kelly, J.R. and Webb, R.S. (1993), "How designs develop: insights from case studies in building engineering services", *J. Constr. Mgmt Econ.*, Vol. 11 No. 6, pp. 475-85.

Male, S., MacPherson, S. and Kelly, J. (1992), *The Briefing Process; A Review and Critiques*, The Royal Institute of Chartered Surveyors.

Mezher, T. and Tawil, W. (1998), "Cause of delays in the construction industry in Lebanon", *Eng. Constr. Archit. Mgmt*, Vol. 5 No. 3, pp. 252-60.

Mustapha, F.H. and Bintaher, N.A. (2000), "User satisfaction with public housing schemes in Abu Dhabi, United Arab Emirates", in Mustapha, F.H. and Sabouni, A.R. (Eds), *Challenges for the 21st Century: Proceedings of the XXV111 IAHS World Congress on Housing*, pp. 217-37.

O'Brien, J. (1998), *Construction Change Orders*, 1st ed., McGraw-Hill, New York, NY.

O'Leary, A. (1992), *Construction Administration in Architectural Practice*, 1st ed., McGraw-Hill, New York, NY.

Omigbodun, A. (2001), "Value engineering and optimal building projects", *J. Archit. Eng.*, Vol. 7 No. 2, pp. 40-3.

Phiri, M. and Haddon, C. (2000), *Learning from Experience: Applying systematic Feedback to Improve the Briefing Process in Construction*, Workshop, Briefing in Construction, 21 September, Loughborough University, UK.

PMI (2000), *A: Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, Project Management Institute, Newtown Square, Pennsylvania, PA.

Rezgui, Y., Body, S., Bouchlaghem, D., Hassanen, M., Cooper, G., Barrett, P. and Austin, S. (2001), "A proposed IT-based approach for managing the construction brief effectively", *Proc. of the CIB – W78 Conference*, South Africa.

RIBA (2000), *The Architect's Plan of Work*, Royal Institute of British Architects, London.

Smith, J. and Wyatt, R. (1998), "Criteria for strategic decision making at the pre-briefing stage", in Hughes, W. (Ed.), *Association of Research in Construction Management (ARCOM), Proc. of the 14th Annu. Conf.*, 9-11 September, Reading University, UK, pp. 300-9.

Stocks, S. and Singh, A. (1999), "Studies on the impact of functional analysis concept design on reduction in change orders", *Constr. Mgmt Econ.*, Vol. 17 No. 3, pp. 251-67.

Tenah, K. (1985), *The Construction Management Process*, 1st ed., Reston Publishing Company Inc., VA.

Veenendaal, J. (1998), "Analysing the impact of change orders on a schedule", *Cost Eng.*, Vol. 40 No. 9, pp. 33-9.

Wantanakorn, D., Mawdesley, M.J. and Askew, W.H. (1999), "Management errors in construction", *Eng. Constr. Archit. Mgmt*, Vol. 6 No. 2, pp. 112-20.

Webster's Dictionary (2000), *Merriam-Webster's Collegiate Dictionary & Thesaurus*, Fogware Publishing.

Yin, R. (1989), *Case Study Research: Design and Methods*, Sage Publication, London.

Zaimi, A.M. (1997), "Non-excusable delay in construction", PhD thesis, Loughborough University, UK.

Further reading

Othman, A.A.E., Hassan, T.M. and Pasquire, C.L. (2002), "Dynamic brief development: II analysis of brief developing drivers in the construction industry", *J. Constr. Eng. Mgmt*, (forthcoming).

Ribeiro, F.L. (1999), "Appraisal of value engineering in design in Portugal", in Hughes, W. (Ed.), Association of Research in Construction Management (ARCOM): *Proc. of the 15th Annu. Conf.*, 15-17 September, Liverpool John Moores, UK, pp. 277-86.