Improving megaproject briefing through enhanced collaboration with ICT

Jacky K.H. Chung [a,*], Mohan M. Kumaraswamy [a], Ekambaram Palaneeswaran [b]

[a] Centre for Infrastructure & Construction Industry Development, The University of Hong Kong, Hong Kong
[b] Senior Lecturer, Faculty of Engineering and Industrial Sciences, Swinburne Univesity of Technology, Hawthorn, VIC3122, Australia

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ABSTRACT

Aims: The paper reviews the development of information and communication technology in briefing and proposes a collaborative briefing framework to extend key stakeholder engagement, aiming to improve the efficiency and reliability of project briefing for megaprojects. *Scope:* Authors introduce an innovative collaborative approach to promote stakeholder involvement by enhancing the efficiency and effectiveness of managing a large group of stakeholders, harnessing collaboration technology. Drawing parallels with biological neural networks in humans, a conceptual collaborative briefing framework is proposed to demonstrate how briefing team members can work collaboratively as a virtual organisation through a shared digital workspace. This framework has five core elements: integrated briefing team, collaborative briefing job plan, computer supported cooperative work platform, requirements processing models and facilitation models. *Conclusion:* The proposed framework supplements face-to-face discussion with computer mediated discussion, depending on the type, flexibility and interaction needed for different aspects in briefing. This "hybrid briefing method" would maximise the benefits to costs ratio of expanded stakeholder engagement in project briefing. The framework is expected to promote the accuracy and transparency of 'requirements identification' processing, the effective engagement and appropriate integration of more stakeholder inputs and finally, to improve the efficiency and reliability of briefing outputs. Lastly, some framework limitations are discussed, aimed at further development and a computer prototype.

1. Introduction

1.1. Importance of briefing

"Briefing" can be considered almost synonymous with concepts of "Architectural Programming" as used in North America [1] and "Scope Management" as used in Australia [2]. Briefing is the first and most important process in project management, which a client either formally or informally informs others of his or her needs, aspirations and desires [3,4]. It identifies and analyses the needs, aims and constraints of the client and the relevant parties to formulate the design problem in a construction project [5,6].

In a broad sense, briefing develops an interface between the design process and the socio-political environment in construction. It is an iterative process involving regular feedback between stakeholders including clients, designers, project team members and end-users in a project [4,7]. At the pre-design stage, briefing helps clients to define their design problems by translating their needs into written project requirements such as functional performance criteria and quality standards etc. [8,9]. These requirements act as a basis for approaching designers [3]. At the design stage, these requirements provide guidelines on examining the developed design options so as to determine the optimal one, according to the defined design problem. At the post-design stage, these requirements help clients to review the selected design options during the construction and operation phases [1]. The "brief", which is the main product of briefing, is a document defining at any point in time the relevant needs, aims, and resources of the clients and users, the context of the project and any project requirements [5,6].

Presently, the terminology describing various types of briefing is inconsistent and different terms are used by different professions and for different project types in construction [10]. For example, outline brief and statement of goals may be used at planning stage; and detail brief, and functional brief at design stage. This paper adopts the terms of 'Strategic Brief' to describe the broad scope and purpose of the project and its key parameters including overall budget and programme; 'Project Brief' to describe the client's functional and operational requirements in the project [4].

1.2. Problems of briefing

Getting the brief right is crucial to the effective delivery of the project in time and within budget [11,12]. Briefing has been reported as a major problem area in construction. This is supported by the

* Corresponding author. Civil Engineering Department, The University of Hong Kong, Pokfulam, Hong Kong. Tel.: +852 9779 0709 (mobile); fax: +852 2559 5337.
E-mail addresses: jackychung@hku.hk, jackykh@hku.hk (J.K.H. Chung), mohan@hkucc.hku.hk (M.M. Kumaraswamy), palanees@cityu.edu.hk (E. Palaneeswaran).

Table 1
Common problems in briefing [19].

Problem	Reason
• Confusion within client organization over direction and aims of the project	• Internal fighting and hidden agendas within the client organization
• Inexperienced client has insufficient knowledge to decide how to proceed	• Refusal to commit finances to a phase that may seem unnecessary
• Focus of feasibility studies is limited mainly to financial considerations	• Time pressures and refusal to commit finances
• Unstructured approach/ lack of focus for whole project	• Does not have the support of all parties and dos not adhered to the project
• Unstructured approach to collecting client's requirements	• In order to be applicable to every project, may turn out to be too general to be useful for any given project
• Difficulty of trying to accommodate various needs of all users	• Failure of focus group representatives to consult/report back to user groups
• Contactor has no real understanding of client objectives	• Previously, unclear if such information would be useful to contractors, hence not provided

significant amount of research activities aimed at improving briefing practices (e.g.: [3,4,7,11,13–23]).

CIB advocated that clients should define and examine his or her needs carefully during the planning stage of a project [4]. However, there is a tendency for clients to leap to design solutions because of commercial pressure; and to start developing such design solutions without full examination of their needs [1,10]. In one example, the project brief for a multi-million pounds project was confined to three pages only [16]. It is concluded that the current practice of briefing is described as "inadequate" and has many limitations [24]. It usually reaches a satisfactory level rather than the optimal level [19]. A summary of common briefing problems is given in Table 1.

1.3. Collaborative approach for project briefing in megaprojects

Briefing requires a full understanding of the building and its operation to optimise the decision made [1]. Stakeholders could help to provide this important information and identify the project requirements from different views in project briefing. Moreover, briefing should also incorporate the key stakeholders' needs into project requirements [4–6] and thus, the engagement of stakeholders is very important in the briefing process.

A recent survey conducted in Hong Kong suggested that the briefing teams in both the public and private sectors are generally confined to a very small group of members (less than 10) mostly from client organisations. The teams include executives from project owners and sponsors, designers, and sometimes operators and end-users. It is very rare to have the contribution from contractors, suppliers, consultants, government departments, and professional institutions in briefing. In conclusion, the importance of stakeholders has been recognised in briefing but their participation is still very limited in practice.

This paper reports on on-going research to explore the use of collaboration technology, which is a branch of information and communication technology, to improve stakeholder management specifically in project briefing. It is assumed that stakeholder values generated by tacit knowledge and synergy are locked in briefing because of their limited participation. Authors argue that improvements in the efficiency and effectiveness of stakeholder management could unlock their latent values and finally improve the efficiency and reliability of briefing outputs. To achieve this, a collaborative approach is proposed so as to enhance the cooperation between stakeholders in project briefing.

Authors suggest that this collaborative approach is more suitable for large scale projects such as megaprojects or major infrastructure projects costing more than US $1 billion and attracting a lot of public attention [25,26]. This is because megaprojects are generally char-

acterised by huge construction cost, unique and complicated design, high risk, multiple project interfaces with complex contractual arrangements, strong economic and social impacts [27,28]. These characteristics result in demanding a higher level of stakeholder engagement, which generate more room for improvement in comparison with ordinary projects. The paper begins with a review of ICT applications in briefing and follows by a discussion about a conceptual collaborative briefing framework incorporating ICT.

2. Review of ICT applications in briefing

Information and communication technology (ICT) was introduced to tackle the technical design problems (computer-aided design) in construction in 1970s. The advances in communication networks enabled the integration of the design and construction processes in 1990s. Since then, ICT has been widely used in construction and extensive reviewing studies are reported [29–34].

Literature showed that the majority studies focused on computer-aided design and they included the topics of (i) computer mediated work [35–40], (ii) information and knowledge managing [41,42], (iii) object visualization [43–45], (iv) planning [46] and, (v) virtual prototyping [47–50].

Nevertheless, authors revealed relatively little of how these studies actually addressed and improved the briefing process. A summary of the ICT applications in construction briefing is presented in the following table.

Table 2 shows that most of these ICT systems were developed by Loughborough University and Salford University from the U.K. Their scope range from research prototypes developed by a single team such as ClientPro and SIGEP to large-scale systems jointly developed by research institutions and industry partners such as DIVERCITY, VALiD and Brief Builder System.

These system were generally developed based on some computer modelling techniques such as product knowledge modelling (PKM) for Brief Builder System [51], design performance measures (DPMs) for BriefMaker [52], client requirements processing model (CRPM) for ClientPro [53], analytical design planning technique (ADePT) for DePlan [54], and strategic needs analysis (SNA) for Strategizer [55]. These techniques facilitate input and manipulation of data so as to address the types of "what if" questions in briefing. For example, the 3-D modelling technique feature of DIVERSITY enabled users to define building layouts in a 3-D environment [56]. Moreover, the information database feature of Brief Builder System, CoBrITe, DIVERCITY and, Kman enhanced project information exchange among team members and provided up-to-date information for discussion in briefing. Moreover, the web-based design feature of Brief Builder System,

Table 2
A summary of the ICT applications in construction briefing.

System	Developed by	References
AutoBrief	Salford University	[65]
Brief Builder System	University College London/ Netherlands Research Group	[51,66]
Brief Development Manager	Loughborough University	[67,68]
BriefMaker	University of Strathclyde	[52]
ClientPro	Loughborough University	[20,21,53,69,70]
CoBrITe	Loughborough University/ Salford University	[71–73]
DePlan	Loughborough University	[54,74,75]
DIVERCITY	Salford University	[56,76–79]
Integral Value Engineering Toolbox	Loughborough University	[80]
KMan	University of Sheffield	[81]
SIGEP (Extranet)	Federal University of Paraná	[82]
Strategizer	The University of Melbourne	[55,63,83,84]
Team Thinking Tools	University of Cambridge/ University of Loughborough	[85]
VALiD	Loughborough University	[86]