

IMPROVING THE BRIEF THROUGH INFORMATION AND PROCESS MODELLING

Improving the brief through modelling

F. YUSUF

Department of Quantity Surveying, School of Architecture, Planning & Surveying, Mara Institute of Technology, Shah Alam, Malaysia.

M. ALSHAWI

Department of Surveying, Bridgewater Building, University of Salford, Salford, UK.

Durability of Building Materials and Components 8. (1999) *Edited by M.A. Lacasse and D.J. Vanier.* Institute for Research in Construction, Ottawa ON, K1A 0R6, Canada, pp. 2651-2663.

© National Research Council Canada 1999

Abstract

Due to the vast amount of information and knowledge involved in construction projects, clients often have difficulties in identifying and communicating their actual requirements. In order to address this information effectively during the briefing process, such information is modelled into structured data models using EXPRESS-G technique. The processes involved during the development of the brief, however, are modelled using IDEF0 technique.

The developed models establish the foundation for the development of a computerised system, which utilise an object oriented environment. The implemented object oriented data models then form the framework for the presentation of the client's brief. These models, when implemented into the computerised environment, will significantly enhance the communication channel between the various parties involved from a very early stage of a construction project. The outcome is an improved brief, which fulfils the client's budgetary constraints.

Keywords: Brief, briefing process, computerised environment, information modelling and process modelling

1 Introduction

1.1 Background

Previous studies conducted by Graham (1983), Hudson *et al* (1991), Barrett and Stanley (1996), Barrett *et al* (1996), and others suggests that the client's brief is often inadequate, poor or not sufficiently explicit. Furthermore, it may not truly reflect the client's requirements. This may be due to a lack of experience on the part of the client with respect to construction projects, or his inability to identify



and convey his actual needs accurately to the project team. Another contributory factor could be the lack of mutual understanding or trust, and common objectives between the parties involved. Most crucial, however, is the immense magnitude of project information that needs to be considered during the briefing process.

The situation can be improved by encouraging clients to participate fully or to a greater extent during the briefing process. This can be achieved by increasing the client's level of awareness through effective presentation and manipulation of the project information and the associated processes. The client's knowledge of the entire briefing process can then be enhanced considerably. Clients and other project participants can then work together harmoniously, both to identify a clear range of opportunities available for the development and to highlight any possible problems, which require a solution (Gray *et al* 1994). Through such discussions, a closer rapport between the parties involved will be established. This will lead to an increase in understanding and sympathy for each other's objectives. On this basis, it is presumed that the communication channel between the client and other projects participants, in particular the designer, can be improved significantly. This will ultimately pave a way towards better briefs to support the clients' requirements.

1.2 The brief

The *brief* documents the client's perceived needs and requirements and the feasibility of the proposed venture within overall budgetary constraints. The brief can be expressed as a definitive written statement prepared during the briefing process, which sets out the client's requirements for a construction project. It specifies at any point in time the relevant needs and aims, the resources of the client and user, the context of the project, and any appropriate design requirements within which all subsequent briefing and designing can take place (BSI 1995).

1.3 The briefing process

The *briefing process* refers to either:

- a) A stage or stages in the design or construction process, or as part of the overall life cycle of the project.
- b) A systematic method of enquiry by which client's requirements are made explicit. It is the process of eliciting or "brief-taking" (Barrett and Stanley 1996) the information or requirements from clients. Briefing is defined by the British Standards Institution (1995), as a process of identifying and analysing the needs, aims and constraints (the resources and the context) of the client and the relevant parties, and formulating any problems that the designer is required to solve. The briefing process, thus, involves the gathering, organising, analysing, identifying, interpreting, compiling, and documenting or presenting all the essential information required for a construction project.

This paper adopts the second reference of the *briefing process* and considers the *brief* as the output of the briefing process.

2 Sources of information

A set of relevant documents, which support the briefing process and/or contains recommendations on the constituents of the brief has been examined. Such documents include O'Reilly (1987), Duerk (1993), BCO (1994), Gray *et al* (1994) and BSI (1995). From the analysis, the majority of the selected publications were found to contain valuable and vital information for the formulation of the brief. However, none of the sources was found to be flexible enough to allow information to be articulated precisely enough to facilitate the process of information modelling. As such, more than one source of information or publication is necessary.

Useful and relevant information were extracted from the selected publications with the aim of reproducing a set of information which not only represents that essential for inclusion in the brief, but is also flexible enough to be modelled. A structured framework for the presentation of the brief is established, which will also aid the process of information modelling. The framework contains robust information that is common to most of the reviewed guidelines, which demonstrate the client's genuine requirements.

The structured framework is divided into five main sections: 'Project Identification', 'Project Aims', 'Project Resources', 'Project Context' and 'Design and Performance Requirements'. The titles of these main sections have been adapted from the selected publications. Each section reflects its own individuality that will allow a more flexible and manageable approach to the process of modelling the information. Further more, the identity of each section will be better defined in terms of assisting clients to distinguish and identify the needs and requirements of a project. Table 1 depicts the structured framework of the brief presentation

Table 1: Structured framework of the brief presentation

| | | |
|--|--|---|
| <p>Project identification</p> <ul style="list-style-type: none"> • Project identity • Project purpose • Project scope • Identity of project participant organisations • Identity of related group organisations <p>Project Aims</p> <ul style="list-style-type: none"> • Intended effects of the project | <p>Project Resources</p> <ul style="list-style-type: none"> • Financial • Time • Project management <p>Project Context</p> <ul style="list-style-type: none"> • Intended occupancy in detail • Regulatory issues • Background and historical influences • Site and surrounding influences • Client's future enterprise | <p>Design and performance requirements</p> <ul style="list-style-type: none"> • Site and surroundings • The building as a whole • Building fabric • Spaces in detail • Grouping of spaces • Plant, equipment and furnishings |
|--|--|---|

3 Information modelling

The EXPRESS-G modelling technique (Schenck and Wilson 1994) has been adopted for the purpose of modelling the entities, which correspond to the contents of the brief along with their attributes and relationships.

3.1 Context diagram

Figure 1 portrays a framework for the brief presentation. It illustrates that the brief, represented by the 'Brief' entity, is a statement, which describes a construction project. The project, being represented by the 'Project' entity, has specific relationships with the main entities; namely 'Project Identification', 'Project Resources', 'Project Aims', 'Project Context' and 'Design and Performance Requirements'. These five entities represent the information essential for inclusion in the brief, and correspond to the five main sections of the structured framework shown in Table 1.

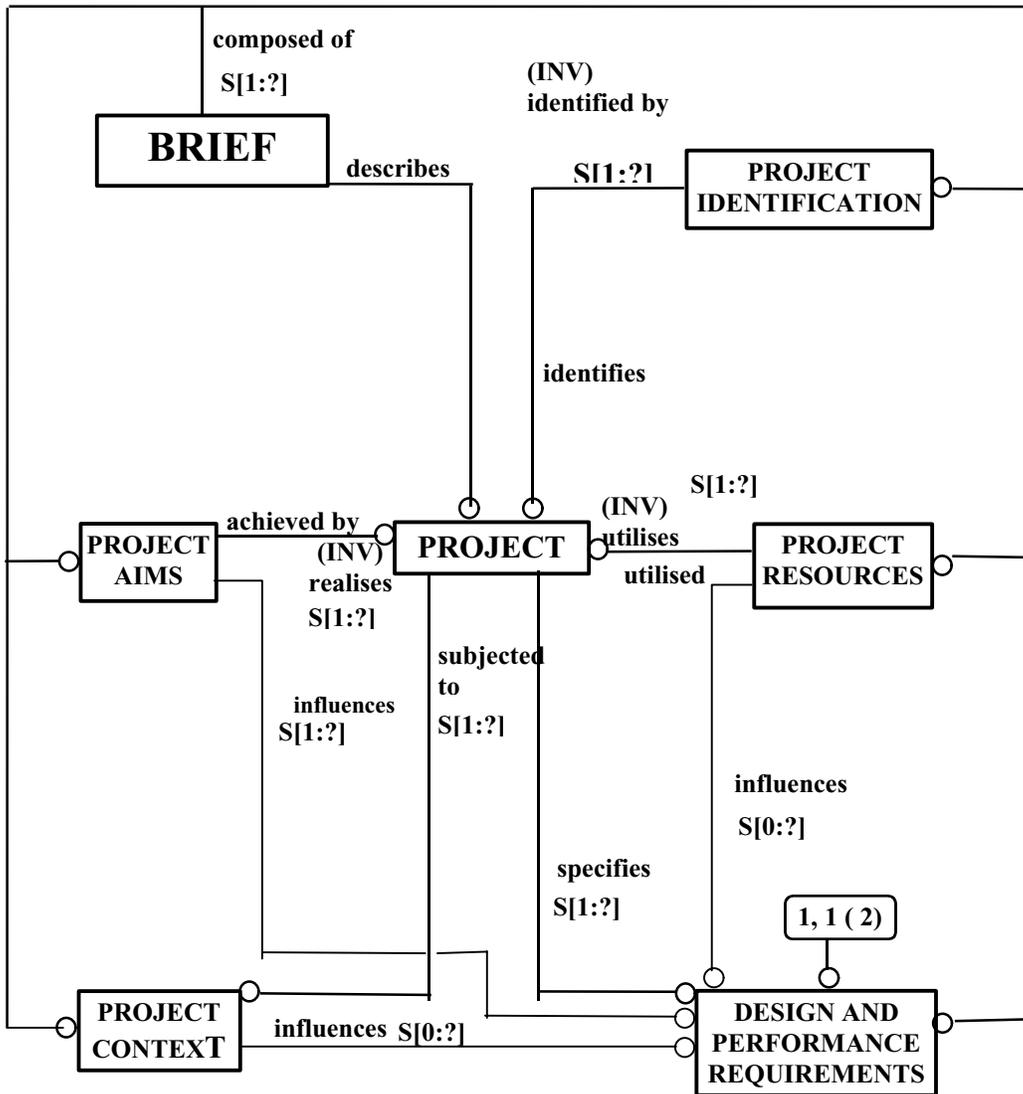


Fig. 1: Framework for the brief presentation
(EXPRESS-G diagram 1 of 3)

3.2 Lower level diagrams

The information modelling process proceeds by decomposing the context diagram into lower level diagrams. This involves breaking down the entities by sub classifying them into their subtypes or relationships with other entities. A level 1 and a level 2 diagrams are portrayed in this paper to illustrate the modelling concept.

Figure 2 depicts the subtypes of the ‘Design and Performance Requirements’ and the entities linked to it. Figure 3 illustrates the entities and attributes linked to the ‘Building as a Whole’ subtype depicted in Figure 2.

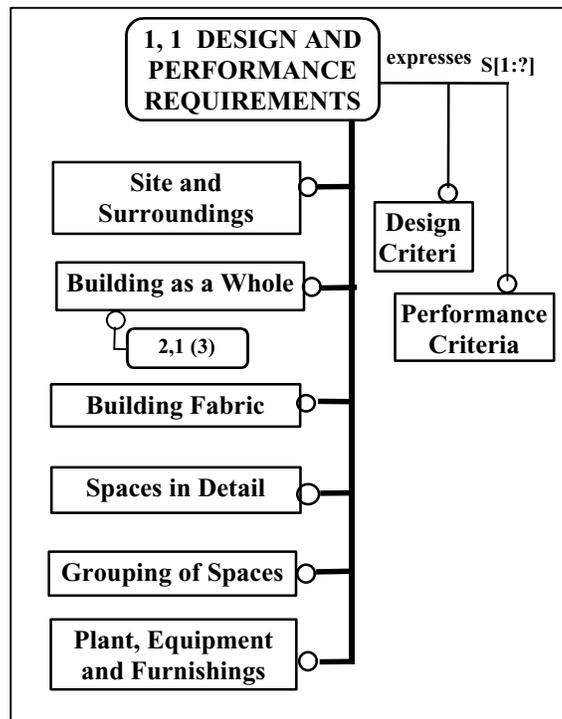


Fig. 2: The ‘Design and performance requirements’ entity (EXPRESS-G diagram 2 of 3)

4 Process modelling

For the purpose of modelling the brief development process, the IDEF0 modelling technique (Ross and Schoman 1977; Ross 1977; Sanvido 1990) has been adopted. A top down approach has been conducted where high level processes are modelled first, followed by low level decomposition of the relevant activities. IDEF0 diagrams have the extra edge of not only portraying the main activities involved during the development of the brief, but also identifying the data constraints between these activities in the form of inputs and outputs, the controls and the mechanisms required to carry out these activities.

The activities have been identified within the context of the development of the prototype computer environment with respect to two viewpoints. These include the system architecture of the prototype, and the information to be acquired at every stage of the development of the brief to suit the structured framework of the brief presentation.

4.1 Context diagram

Figure 4 shows the A-0 diagram for 'Develop Brief'. This is the topmost level of the IDEF0 diagrams. The 'Client Requirements' and the 'Construction Industry Know-how' represent the input. 'Client's Requirements' refer to all the

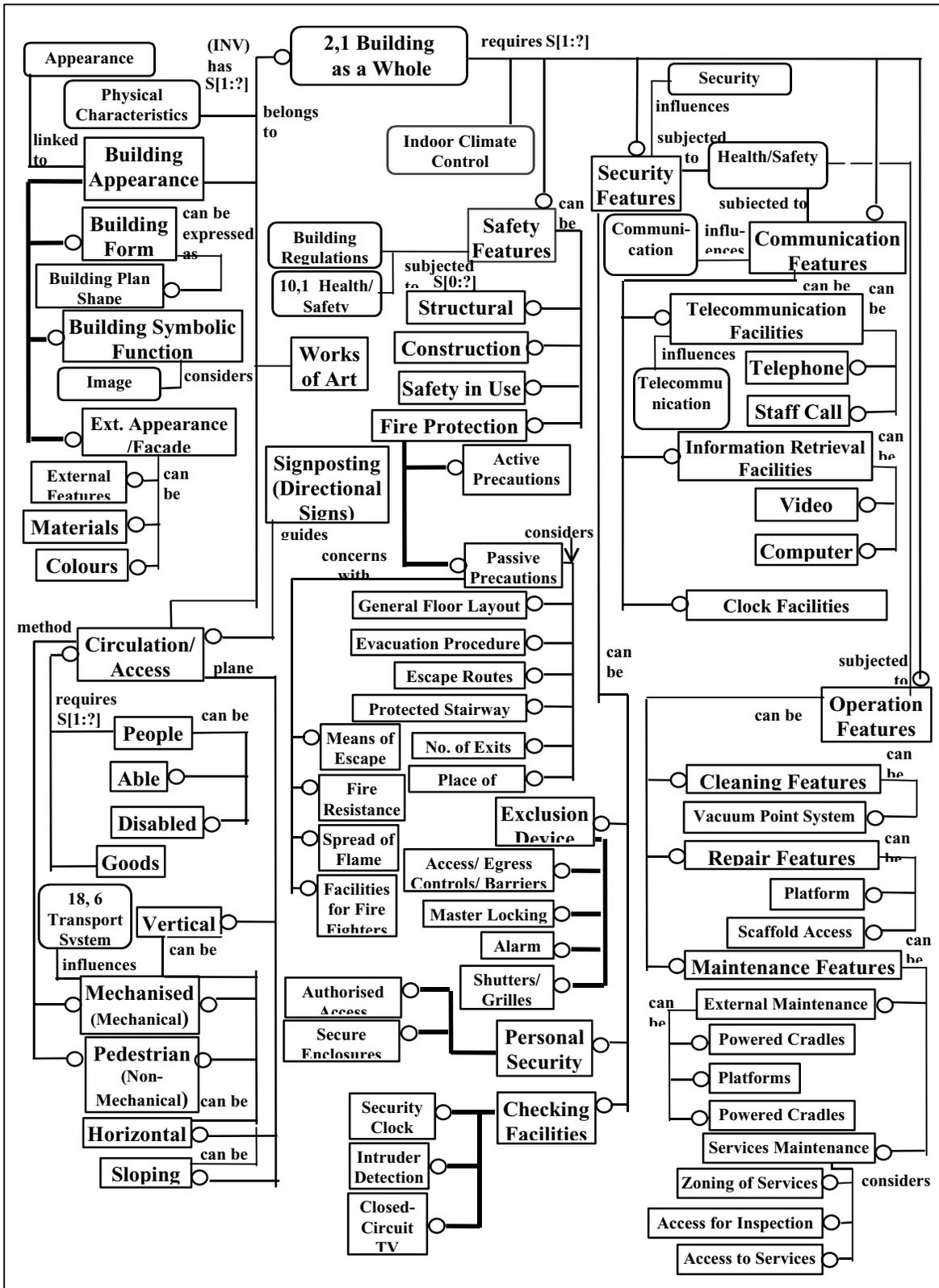


Fig. 3: The ‘Building as a whole’ subtype (EXPRESS-G diagram 3 of 3)

needs and requirements of the client with respect to the project while ‘Construction Industry Know-how’ refers to project related information (supporting information) available within the construction industry. The controls consist of the ‘Brief Domain’, the ‘Data Models’ used to build up the knowledge representation within the prototype, and any ‘Technology Limitation’ associated with the mechanisms used, such as the ‘Software Applications’ and the ‘Multimedia Tools’. The client, any member of the design team, or others, may represent the third mechanism, the ‘User’. Finally, the output of the process, is the ‘Brief’ that can be presented in various forms.

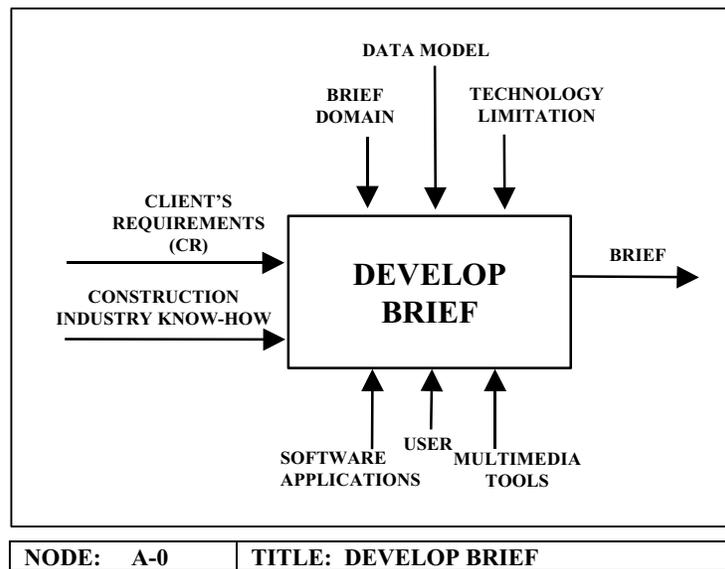


Fig. 4: A-0 diagram for ‘Develop Brief’ process

4.2 Lower level diagrams

Further decomposition of the ‘Develop Brief’ process have been carried out based on the two stated viewpoints until the achieved level of detail is considered sufficient for the application of the model for the prototype development. The level 1 diagram for the system architecture viewpoint is shown in Figure 5 .

The level 1 diagram for the information viewpoint, on the other hand, models the activities associated with the overall compilation of information for the brief development. Further diagrams at lower levels of abstractions are then produced (the diagrams are not shown in this paper). This aims to illustrate the related sub-processes further down the hierarchy and to visualise the actual flow of information at every stage of decomposition. This is an essential procedure which serves to establish the kind of information that needs to be presented to the client and indicates how and from where this information can be obtained quickly and efficiently.

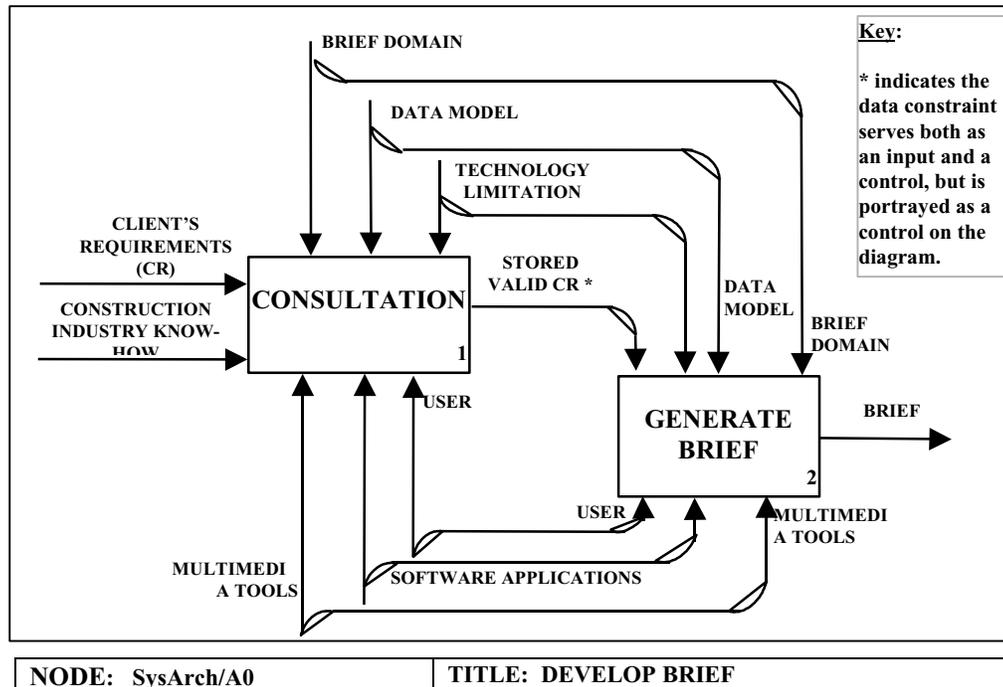


Fig. 5: SysArch/A0 diagram for 'Develop Brief' (System architecture viewpoint)

5 The implemented computerised environment

The models developed above play an important role in establishing a conceptual model for a computerised system since they can be mapped directly onto an object oriented environment with multimedia support. In such an environment, information can be manipulated and presented to users in a timely and effective manner. Such a system can operate as an intelligent mechanism for capturing the client's requirements, interpreting them, retrieving and presenting the necessary information required for the decision making process. A system architecture for the developed computer prototype is depicted in Figure 6. The system architecture comprises the Core Engine, the Interface and the External Resources.

The Core Engine which is an object oriented development environment, contains all the necessary information which is required by the brief, as represented by the developed data models. Using the EXPRESS-G data models, entities and their subtypes will represent objects within the object oriented environment while their attributes will be represented either by the attributes of the data model or their attributes' subtypes. The relation between the various aspects of the brief's data will be drawn from the data models, as represented by the relationships between the entities. On the other hand, the developed process models will provide the necessary procedures that are required by the system. By incorporating the data models with the process models, the total behaviour of the system can be defined. The external response to user requirements can be monitored and controlled intelligently by the data models, while the internal

reaction to the various input criteria can be dictated by methods/production rules attached to the objects.

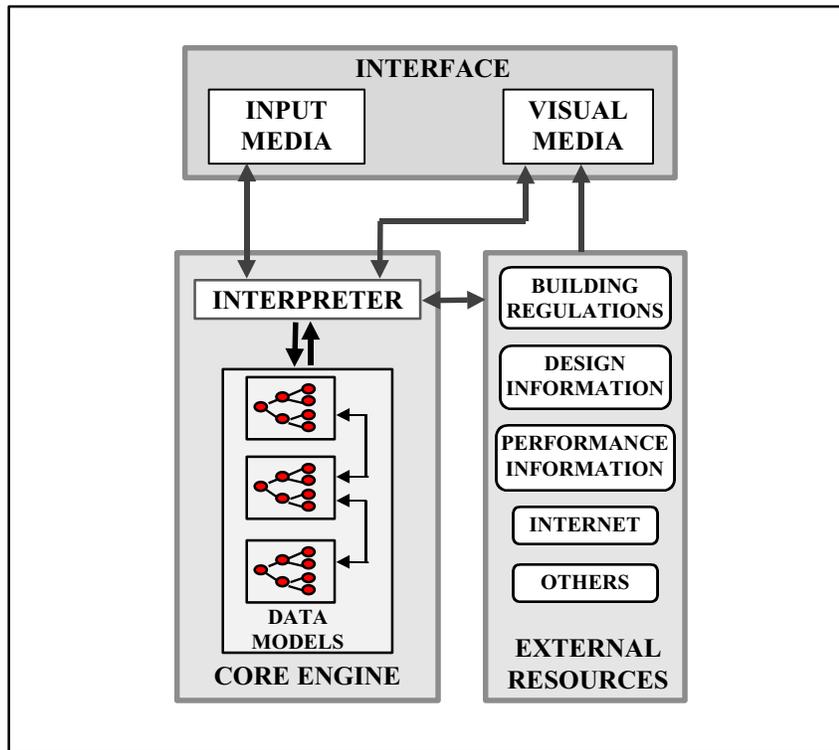


Fig. 6: System architecture for the computerised environment

The internal behaviour of the system is vital to the briefing process because of the diversity of the briefing process and the related information. For example, when the data models are supplied with project information, say the design criteria, the attribute values of each 'Design Criteria' will be checked to ensure its compatibility with the relevant 'Performance Criteria' attribute and vice versa. So, if a curtain wall is selected for a specific design criteria, the system will automatically ensure that this solution will not conflict with previously defined performance criteria such as maintenance and energy loss. Not only will this allow the relations between various entities of the brief to be easily controlled and monitored during the briefing process but it will also have a significant impact on maintaining consistency and accuracy between the various parts of the brief.

Multimedia technology (Burger 1993; Luther 1994; Bunzel and Morris, 1994) is used to control the way in which information is displayed in the Visual Media part of the Interface, which serves as the second component of the system architecture. Video clips, images, sound, and so on, can support objects in the data model, which are accessed as and when required. If, for example, the Core Engine recognises a specific data input as a request for presenting other information which is required for the decision making process, the necessary functions will be triggered within the Core Engine. This results in the retrieval of the required information. This information will then be displayed in the appropriate media through the Visual Media. These processes may interrogate internal and/or external resources such as databases as well as accessing on-line

services or the Internet, thus allowing users to retrieve up-to-date information during the briefing process. This presentation of information not only increases the users' knowledge and level of awareness but also improves the users' understanding which, in turn, has an impact on the decision making process.

6 Discussion and conclusions

This study has modelled the vast amount of information essential for the development of the client's brief. Information has been classified and the relationships between various entities established. The main processes involved in the development of the brief have also been identified and modelled. The data and process models have then been used to establish the system architecture for a computerised environment to support the briefing process. Multimedia technology is utilised for the presentation of project information, thereby serving as an effective means of communication between clients and designers. Thus, the data and the process models, together with the prototype development, create a situation that serves to overcome the deficiencies of existing briefs by producing a comprehensive brief that reflects the client requirements.

Through more individual input and participation on the part of the client, and by being able to acknowledge and visualise the essential information required for a project, the client's understanding can be improved. The client will be able to identify and convey his or her true requirements in a more effective manner. This enables the designer to interpret the requirements effectively in the form of a well-defined brief, which will provide the basis of an appropriate design solution. Value for money can be attained in the form of a design solution that satisfies the client's requirements within the budgetary constraints.

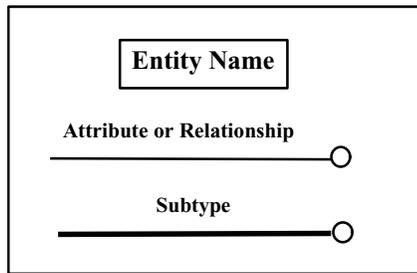
In conclusion this research makes a significant contribution to the construction industry by combining data and process modelling to establish the platform for a computerised environment as a means for improving the brief. The system architecture implemented into the prototype enables it to provide on-the-spot advice, consultancy and visualisation of project information to clients or other users during the briefing process. The prototype can also be considered as a comprehensive and an intelligent front end to commercially available CD ROM products. With more refined testing and further development, it not only has the potential to serve as an essential part of the briefing process, but would also widen the market for these products to cover clients, designers, and other construction professionals who might be involved in any aspect of the brief. This could narrow the gap between clients and designers, thereby eventually improving the effectiveness of the communication channel between them. Moreover, the computerised system would also ensure consistency in the interpretation of the brief amongst construction professionals. The improved brief will play a major role in facilitating the entire briefing process, which will ultimately lead the way towards greater client satisfaction.

7 References

- Barrett, P. (1993) *Profitable Practice Management, For the Construction Professional*, E and FN Spon, London.
- Barrett, P.S. and Stanley, C. (1996) *Construction Briefing: Getting Beneath the Surface*, International Journal of Architectural Management Practice and Research, No.11, P. Nicholson (Editor), SAAM, pp. 1-13.
- Barrett, P.S., Hudson, J. and Stanley, C. (1996) *Is Briefing Innovation?*, The Organization and Management of Construction, Shaping Theory and Practice, Volume 3, Managing Construction Information, D.A. Langford and A. Retik (Editors), E & FN Spon, London, pp. 87-95.
- BCO (British Council for Offices), (1994) *Specification for Urban Offices*, BCO, Reading, U.K.
- BSI (British Standard Institution), (1995), *Performance Standards in Building - Checklist for Briefing - Contents of Brief for Building Design*, BSI, London. ISO 9699 : 1994, BS 7832 : 1995.
- Bunzel, M. J. and Morris S. K. (1994) *Multimedia Applications Development, Using Indeo TM Video and DVI R Technology*, Second Edition, Mc Graw Hill, London.
- Burger, J. (1993) *The Desktop Multimedia Bible*, Addison-Wesley Publishing Company, U.S.A.
- Duerk, D.P. (1993) *Architectural Programming, Information Management for Design*, Van Nostrand Reinhold, New York.
- Graham, P. (1983) *Reading the Clients Mind*, Building, 30-9-1983, pp. 22-23.
- Gray, C., Hughes, W. and Bennett, J. (1994) *The Successful Management of Design*, A Handbook of Building Design Management. Centre for Strategic Studies in Construction, University of Reading.
- Hudson, J., Gameson, R.N. and Murray, J.P. (1991) "The use of computer systems to improve communication between clients and construction professionals during the briefing process" in Barrett and Males (1991), pp.175-181.
- Luther Arch C. (1994) *Authoring Interactive Multimedia*, AP Professional.
- O'Reilly, J.J.N. (1987) *Better Briefing Means Better Buildings*, Building Research Establishment (BRE) Report.
- Ross, D.T. and Schoman, K.E. (1977) *Structured Analysis for Requirements Definition*, IEEE Transaction on Software Engineering, Vol. SE-3, No. 1, January, pp. 6-15.
- Ross, D.T., (1977) *Structured Analysis (SA): A Language for Communicating Ideas*, IEEE Transaction on Software Engineering, Vol. SE-3, No. 1, January, pp. 16-34.
- Sanvido, V.E. (1990) *An Integrated Building Process Model*, Computer Integrated Construction, Technical Report No. 1.
- Schenck, D. and Wilson, P. (1994), *Information Modeling the EXPRESS Way* Oxford University Press, Inc.
- Yusuf, F. (1998), *Modelling of Information and Processes for IT Implementation at the Brief Development Stage*, Second International Conference on Construction Project Management, Critical Issues and Challenges for the Next Millenium, February 1998, Singapore, pp. 334-342.

Appendix A

Legend for Figures 1, 2 and 3:



Legend for Figures 4 and 5:

