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An Empirical Study of the Variables Affecting Construction Project Briefing/ Architectural Programming

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Abstract

Briefing is the process of identifying and articulating client requirements in the early design process of a construction project. It is crucial to the success of construction projects. The importance of effective briefing has been emphasised in many research studies during the past two decades. However, many problems still exist in current briefing practice. The inadequacy of briefing may be attributed to the lack of a comprehensive framework for identifying the requirements of clients. A more holistic approach to tackle the problems is required. The objective of this paper is to develop and validate a theoretical framework for construction project briefing. A questionnaire survey was conducted to investigate the significance of 13 variables identified in the research study and their related attributes to the briefing process. The survey results indicate that all these 13 variables which have an impact on the briefing process are significant. Major findings regarding the elements of briefing is that the client should determine the time at which the brief becomes fixed and secondly the brief should be fixed before detail design commences. Significant variables and attributes will be considered and used in drafting a comprehensive and practical framework for systematic identification and representation of client requirements in the briefing process.

Keywords: Construction project briefing, variables, attributes

1. Introduction

Briefing, a term commonly used in Hong Kong and the UK, is the process where client requirements for a construction project are defined, articulated, and significant decisions made. It is known as Architectural Programming in the USA. The briefing process is both critical to the successful delivery of construction projects and problematic in its effectiveness to achieve its stated objectives. Problems in buildings can often be traced back to the briefing process. The famous Pruitt Igoe project, which solved the financial and image problems of public housing, was demolished in 1976 because it did not respond to the behavioural and social needs of the users [1]. This incident illustrated very well that a systematic identification of client requirements is a prerequisite to project success.

The importance of effective briefing is examined in various research studies during the past two decades [2, 3, 4, 5, 6, 7, 8]. It is also reflected in the number of briefing guides [1, 9, 10, 11, 12, 13, 14]. Although many initiatives have been taken to investigate and improve the briefing process, current briefing practice is still considered “inadequate” and having many limitations [5, 7, 15]. The problems associated with briefing include lack of a comprehensive framework, lack of identification of client requirements, inadequate involvement of all the relevant parties of a project, inadequate communication between those involved in briefing and insufficient time allocated for the briefing [15]. These problems appear to suggest that a more holistic approach is required to tackle such inadequacies through examination and design the briefing framework.

This paper presents part of a research project conducted by the Hong Kong Polytechnic University and Glasgow Caledonian University to investigate the briefing process in the construction industry. The aim is to investigate whether a framework using the value management approach for the briefing process can (1) systematically identify and clarify client requirements, and (2) represent these requirements precisely and explicitly to facilitate the design process. In order to achieve this objective, major tasks to be undertaken include a) establishing, evaluating, and improving the framework for identifying and clarifying client requirements, b) developing a mechanism for precise and explicit representation of the requirements, and c) validating and verifying the approach and framework by implementing it in the briefing process for a number of real-life projects.

The objective of this study is to develop and validate a theoretical framework for construction project briefing which formed the basis of the research project. A questionnaire survey was conducted to investigate the significance of 13 variables identified in the research study and their related attributes to the briefing process. Based on the survey results, the significant variables and attributes will be evaluated and used in drafting the practical framework for systematic identification and representation of client requirements in the briefing process.

2. Different schools of thought on Construction Project Briefing/Architectural Programming

There are basically two schools of thought relating to construction project briefing. One approach considers the brief as an entity in itself, which should be frozen after a critical period; hence briefing becomes a stage or stages in the design process [6, 12,

15, 16]. In the USA, Hershberger [12] defined architectural programming as the first stage of the architectural design process in which the relevant values of the client, users, architect, and society are identified, important project goals articulated, facts about the project uncovered, and facility needs made explicit. It follows that the architectural program is the document in which the identified values, goals, facts, and needs are presented.

The second approach regards the brief as a live and dynamic document that develops iteratively in a series of stages from an initial global brief. Briefing is thus deemed an ongoing activity that evolves during the design and construction process [5, 8, 17, 18, 19]. In the UK, Barrett and Stanley [5] defined Construction Briefing as the process running throughout the construction project, by which means the client requirements are progressively captured and translated into effect. In the context of Blyth and Worthington [8], briefing is an iterative, creative process, a journey to support the client, design and construction teams in achieving the user's expectations.

3. Research Methodology

3.1 Brainstorming session and literature review

This research project was approached through an initial brainstorming session to identify factors likely to be significant in a theoretical framework for briefing. This session was carried out with three research team members, two Professors and a PhD student with ten years practical experience in the construction industry. They were encouraged to list and read aloud as many factors as they could. No criticism was allowed at this stage. This step was followed by a question and answer session to make sure that everyone fully understood each response. A subsequent comprehensive

literature review confirmed or rejected the factors as significant and highlighted other variables initially not included. As a result, 13 variables were identified as having an impact from a theoretical perspective and became the theoretical foundation for the project. The 13 variables were investigated in detail as a first stage in identifying their impact, if any, on the construction briefing process. They were written-up to form a working research document within which a description of each variable was given in detail [20]. This research document gives those inputs most likely to influence how the briefing process should be undertaken with the objective of developing a theory behind the factors involved. Figure 1 highlights the 13 variables input to the theoretical framework as the foundation for the overall methodology of the research project.

Insert Figure 1

3.2 Questionnaire Survey

A questionnaire survey was used to identify any missing factors and to validate the established theoretical framework. Questionnaires are widely used for descriptive and analytical surveys in order to find facts, opinions and views on what is happening, who, where, how many or how much. The questions were formed and questionnaire drafted with reference to the working research document described above [20]. The questionnaire contained four sections. The first involves the background information of the respondents. The second collects the respondents' opinion on the briefing process. The third tests the 13 variables and their related attributes. The fourth requests the respondents' opinions on critical success factors for briefing.

The survey was conducted in Hong Kong, the UK and the USA from where most briefing literature comes and effective channels to collect data have been established. Multi-methods were used to distribute the questionnaire to the subjects. A web-based questionnaire was used to administer the questionnaire survey in the UK and the USA. In Hong Kong, a postal questionnaire was used.

The targeted population of the survey includes client's project managers and architects in Hong Kong, the UK and the USA. In Hong Kong, the questionnaire was mailed and emailed to 150 experienced professionals including 21 public and quasi-public clients, 25 private clients and 104 architects. The target respondents were obtained from HKIA directory 2003 and Builder directory 2003. They are the representative and well known organisations in the Hong Kong construction industry. Three weeks after sending the questionnaire, a reminder letter was sent to those who had not returned the questionnaire. Subsequent telephone calls were also made to those who had not responded yet. As result, there were 51 valid responses out of 144 questionnaires (6 of the original 150 were "undelivered mail"), representing a response rate of 35%.

In the UK, 100 no. of ecards were sent to members of Royal Institute of Architects (RIBA) in different cities such as Cambridge, Eastbourne, Glasgow, London, etc. Their names and email addresses were obtained from the RIBA website. The 100 names were the director of the firm or fellow of the institute picked from RIBA's membership list. Initially, the e-cards were sent in two bulks and blind carbon copied for privacy. Three weeks later, the response rate was not satisfactory and therefore the first reminder letter was sent to the 100 RIBA members alerting them to the briefing

questionnaire web link. Five weeks later, the response rate was still disappointing and therefore the second reminder letter was sent to the 100 RIBA members with hard copy of questionnaire enclosed, giving them three options to complete the questionnaire: (1) to access web link, (2) to return the completed questionnaire by post, or (3) to fax back the completed questionnaire). As a result, there were 18 valid responses representing a response rate of 18%.

In the USA, 150 no. of e-cards were sent to the members of The American Institute of Architects (AIA) in different cities such as Atlanta, Chicago, Houston, New York, San Francisco, Washington, etc. Their names and email addresses were obtained from the AIA website. The 150 names were the director of the firm or fellow of the institute picked from AIA's membership list. Initially, the e-cards were sent in three bulks and blind carbon copied for privacy. Three weeks later, the response rate was not satisfactory and therefore 150 personal e-cards were sent to remind the AIA members to complete the questionnaire. As a result, there were 20 valid responses representing a response rate of 13%.

3.3 Statistical Analyses

The data collected was analysed using SPSS 12.0 Package to determine whether the respondents were in agreement with our theoretical framework. The Likert five-point scale was selected as it gives unambiguous results and has ease of use [21]. In this survey, all attributes representing the 13 briefing variables in the third section of the questionnaire were measured on an ordinal basis. The respondents' perceptions were measured using a five-point scale where 5 represented 'strongly agree', 4 represented 'agree', 3 represented 'neutral', 2 represented 'disagree' and 1 represented "strongly

disagree'. All attributes were first calculated and ranked according to their mean score ratings. The mean score rating was calculated using the following formula [21, 22]:

$$Mean = \frac{1(n_1) + 2(n_2) + 3(n_3) + 4(n_4) + 5(n_5)}{(n_1 + n_2 + n_3 + n_4 + n_5)} \quad (1)$$

where n_1, n_2, n_3, n_4, n_5 represent the total number of responses for attributes as 1 to 5 respectively.

In addition, the t -test analysis was employed to check whether the population would consider the attributes to be significant or otherwise, as follows:

The null hypothesis $H_0: \mu \leq \mu_0$, against the alternative hypothesis $H_A: \mu > \mu_0$, where μ is the population mean and μ_0 represents the critical rating above which the attribute was considered as most significant. The value of μ_0 was fixed at '3' because, by definition, ratings above 3 represent 'agree' and 'strongly agree,' the attributes accordingly to the scale. The decision rule was to reject null hypothesis (H_0) when the calculation of observed t value (t_O) (Eq. 2) was greater than the critical t value (t_C) (Eq. 3), as shown in Eq. 4.

$$t_O = \frac{\bar{x} - \mu_0}{S_D / \sqrt{n}} \quad (2)$$

$$t_C = t_{(n-1, \alpha)} \quad (3)$$

$$t_O > t_C \quad (4)$$

where \bar{x} is the sample mean, S_D the sample standard deviation, n the sample size (which was 89 in this case), $n-1$ the degree of freedom and α represents the significant level which was set at 5% (0.05) following the conventional risk level.

In this study, the significance of the attributes to briefing was tested using Eq. 4. If the observed t value of the statistic test of the mean ratings by the respondents is smaller than the critical t value ($t_O < t_C$), the null hypothesis that the attribute was ‘neutral’, ‘disagree’ and ‘strongly disagree’ only was accepted. However, if the observed t value is greater than the critical t value ($t_O > t_C$), $t_{(88, 0.05)} = 1.6649$ at 95% confidence interval, then null hypothesis (H_0) that the attributes was ‘neutral’, ‘disagree’ and ‘strongly disagree’ only was rejected and the alternative hypothesis accepted. It was therefore concluded that the attribute was significant as a contributor to briefing and the corresponding variable (from the 13 variables) was considered to have an impact on the briefing process.

A Mann-Whitney test was carried out to ascertain whether the two major groups of respondents, the client’s project managers and architect, have different views on the relative agreement of the attributes of the 13 variables. The Mann-Whitney test is an extension of the t-test for comparing the means of two samples. It is the non-parametric test used to detect differences among the means of the samples. The following two hypotheses were formulated and tested:

H_0 : Client’s project managers and architects share the same opinions with respect to the relative significance of an attribute of the 13 variables.

H_A : Client’s project managers and architects do not share the same opinions with respect to the relative significance of an attribute of the 13 variables.

At the 95% confidence interval, H_0 was rejected when the test significance level was less than 0.05. In this case, H_A was accepted, which means the client's project managers and architect have different opinions with respect to the significance of the attributes.

Similarly, Kruskal-Wallis tests were carried out to test whether other differences among respondents (in terms region, experience in briefing, sector and size of client's organisations) affect their opinions on the relative significance of the attributes of the 13 briefing variables. Kruskal-Wallis test is an extension of the t-test for comparing the means of more than two samples.

In addition, Spearman Rank Correlation tests were carried out to test the relationship between differences of respondents and the attributes of the 13 variables. It is the non-parametric alternative for testing ordinal data. It is also used to describe the strength and direction of the linear relationship between two variables. Correlation coefficients (r) range between -1 to +1 where -1 and +1 indicate high relationship. One the other hand, a correlation of 0, indicates no relationship between the two variables. The coefficient was used to test the null and alternative hypotheses: (H_0) that there is no relationship between the two variables or measures and (H_A) that there is a relationship between the two variables or measures.

4. The Thirteen Variables of Briefing

From the initial brainstorming and comprehensive literature review, 13 variables that have an impact on the briefing process were identified. It was realised that some of the variables require consideration at particular points in the briefing cycle whereas

others are present throughout the life cycle of a facility from the commencement of the briefing stage. The 13 variables are explained in the following sections.

4.1 Projects

A project is a change orientated event defined as ‘an enterprise comprising physical and non-physical activities that include a pre-project stage to ensure effective planning and a post project stage to ensure successful absorption into core business’ [23, 24]. Therefore a project is a separate, temporary activity from the organisation’s core business but one which will make a change in that business. A brief for a project requires the initiator of the brief to accept change. The brief is ideally compiled during the first stage of a project, pre-project planning and will encapsulate and make explicit decisions taken at the pre-project planning stage. It is important to spend time planning at the pre-project stage to ensure a comprehensive definition of the project as decisions made in the early stages will influence the rest of the project.

4.2 Stakeholder Management

Stakeholders are defined as ‘those groups or individuals with whom the organisation interacts or has interdependencies’ and ‘any individual or group who can affect or is affected by the actions, decisions, policies, practices or goals of the organisation’ [25]. In the briefing process, it is necessary to consider the interests of stakeholders, both primary and secondary, and maintain a balance between different stakeholder interests. Primary stakeholders have a legal contractual relationship to the project. This group includes the project owner, suppliers, functional groups, investors and those from the public domain (such as communities and institutions) that provide infrastructures and markets, whose laws and regulations must be obeyed, and to

whom taxes and other obligations are owned. Secondary stakeholders are those who influence, or who are influenced or affected by, the project but are not regularly engaged in transactions with it and may not be essential for its survival [26]. For instance, the media and special interest groups are secondary stakeholders who can mobilise public opinion in favour of or in opposition to the project's purposes and performance. In order to understand the various interested parties in the project, all types of stakeholders should be identified and represented during the early stages of the project. The stakeholders' commitment, interest and power should be assessed before the briefing exercise. Much time and effort should be devoted to the key players in the briefing process.

4.3 Teams and Team Dynamics

The briefing team is project focused and interacting, and comprised of individuals willing to sacrifice individualism for collectivism. An important objective of team building is to break down the barriers to effective communication, encouraging listening and understanding of the project [8]. Team membership should be effective and balanced as indicated by the ACID test. Members of teams should be chosen based upon their ability to contribute information, enable or undertake decision taking. The ACID test is a useful aid to selecting team members.

- A** Authorise – include those having the authority to take decisions during the workshop process.
- C** Consult – include those to be consulted during the workshop process and without whose consultation the workshop would be suspended.
- I** Inform – exclude those who merely have to be informed of the outcome of the workshop.

- D Do** – include those who have to translate the outcomes of the workshop into action.

4.4 Client Representation

A client is considered as the sponsoring organisation or the initiator, who is directly responsible for the production and development of the project [27]. There are many different types of clients: Large Owner/Occupier, Public Sector, Developer, Refurbishing Retailers and Small owner/occupier who all have different requirements and ways of going about projects. The client type will influence the decision to build as to whether it is part of a long term strategic plan, a response to unanticipated changes, or if it is opportunistic. Kelly et al. [4] identified that one of the problem areas of briefing was the representation of the client interest groups such as incomplete identification of all the interest groups and how they should be represented in the decision making unit. Therefore, it is important to ensure adequate representation of client groups to address client needs and to prevent distortion of the brief.

4.5 Change Management

Change management in this study refers to the task of managing change from a proactive posture in a project. A change project essentially involves three stages, understanding the status quo (as-is) situation, specifying the desired future (to-be) situation, and planning and implementing an effective migration path from ‘as-is’ to ‘to-be’. The client should, during the briefing process, be made aware of the impact of change during the design and construction process [28]. A project brief is a part of the client’s change management process involving planning, evaluating and implementing change. This implies that the briefing team should be aware of this process. The most

difficult change management occurs when change results from inaccuracies in design caused by incomplete, unclear or ambiguous project information generated at the early stage of the project process. This may result from, for example, the appropriate stakeholders' information not being incorporated at a particular stage in the development of the project [29].

4.6 Knowledge Management

Knowledge is defined as 'information interpreted by the individual and applied to the purpose for which it is needed' [30]. Knowledge management is an umbrella term for making more efficient use of human knowledge that exists within an organisation. Fundamental to briefing therefore is the mapping of individuals' contributions to organisational project knowledge in order to determine the membership of the project briefing team. Teamwork, collaboration, face-to-face contact and effective communication structures are essential in ensuring knowledge management is a success [31].

4.7 Risk and Conflict Management

The concept of risk is related to the activities that flow from decisions made by the client, where the outcomes of those activities may differ from expectations [32]. These differences are the result of uncertainties that are inherent in the formation on which the client bases his or her decision-making. It is widely accepted that it is during the initial appraisal phase that risk management is most valuable as a great deal of flexibility in design and planning remains that allows consideration of ways in which various risks might be avoided or controlled [33].

In the briefing process, conflict occurs whenever disagreements exist in a social situation over issues of substance or whenever emotional antagonisms create frictions between individuals or groups [34]. It is most beneficial to construct conflict management plans during pre-design stages of a project and such plans should incorporate preventative and reactive elements [32]. Collaboration and problem solving is preferred to gain true conflict resolution during the briefing process.

4.8 Post-Occupancy Evaluation and Post-Project Evaluation (POE and PPE)

POE has been defined as ‘a diagnostic tool and system which allows facility managers to identify and evaluate critical aspects of building performance systematically [35]. POE and PPE are management tools within the broader context of facilities management, aiming to improve the performance and quality of buildings. Successes, failures and past experiences of what does and does not work well should be used to inform better decision making in the briefing process of subsequent projects. The more detailed a post-occupancy evaluation or post-project evaluation, the more likely they will support and influence the decisions made in the briefing process.

4.9 Critical Success Factors and Key Performance Indicators (CSFs and KPIs)

Key performance indicators are the means by which an organisation can measure the progress being made to ensure that the critical success factors are being achieved. The critical success factors in the briefing process range from clear objectives and requirements of the project to trust and involvement of key stakeholders [10]. Key performance indicators include time, cost and quality as well as satisfaction of stakeholders.

4.10 Types of Business and Organisational Theory

The briefing process should take into account the composition of the team. The team may be formed of many different types of organisations with different success criteria. These success criteria are most influenced by stakeholder satisfaction. For example a government organisation or a not-for-profit organisation will differ greatly in terms of success criteria from those in the team who aim to make a profit from the project.

4.11 Decision Making

Briefing involves a lot of decision making by individual and by groups. Effective decision-making processes are the backbone of an effective briefing strategy. Knowing when and what kinds of decisions must be made are crucial to the success of any project [8]. A good briefing team should not limit themselves to just one decision-making method and they should operate in contingency fashion by changing decision methods to best fit the problem and situation at hand.

4.12 Communication

The briefing process is essentially a communicative act. Effective communications are needed between all parties in order to identify, clarify and represent the client requirements. It was found that the most important critical success factor of briefing was open and effective communication in the questionnaire survey of this study. Active listening should be encouraged in the briefing exercise to allow a free and complete flow of communication.

4.13 Culture and Ethics

In managing the briefing team, the influence of culture dimensions such as language, time orientation, use of space, religion, power distance, uncertainty avoidance, individualism-collectivism, masculinity-femininity, and long/short term orientation must be taken into account. The briefing team may also encounter ethical dilemmas which affect decision making in the briefing process. An ethical dilemma is a situation in which a person must decide whether or not to do something that, although benefiting them or the organisation, or both, may be considered unethical.

These 13 variables together with their related statements (attributes) formed the basis of the questions in the third section of the questionnaire. Table 1 indicates these 13 variables and their respective attributes to be validated through the questionnaire survey.

Insert Table 1

5. Research Findings

5.1 Characteristics of respondents

Of the 89 respondents, more than half were from Hong Kong (57%); the others were from the UK (20%) and the USA (23%). The majority were architects (62%), client's project managers (26%), architectural programmers, mainly from the USA (6%) and others (6%). Regarding the respondents' experience of briefing over the past five years (measured by number of projects), 16% of the respondents have both coordinated (written a brief) and contributed (have not written a brief), of this 47% have coordinated and 37% has contributed only in the briefing process. In addition, 40% of the respondents have coordinated in briefing and 21% of the respondents have contributed to briefing for more than six projects in the past five years. Furthermore,

thirteen of the respondents came from the public sector; 58% came from private sector and 29 % came from quasi-public or regulated private. In terms of the size of client organisations, 4 % came from firm size ranging from 1-5 staff; 34% came from firm size ranging from 6-50 staff; 17% came from firm size ranging from 51-200 staff and 45% came from firm size over 200 staff.

5.2 Results of one sample t-test

Respondents were asked to rate their agreement or disagreement to the attributes of the briefing process. They were also invited to add new variables and attributes if necessary, however no additional variables or attributes were suggested. The survey results are shown in Table 1. The one sample *t*-test of the means shows that each of the 13 variables has its respective attributes significantly agreed by the respondents. The ranking of the attributes for each of their respective variables are shown in the third column of Table 1.

5.3 Results of Mann-Whitney test and Kruskal-Wallis test

The results of the Mann-Whitney test on the difference in opinions between the client's project managers and architect are summarised in Table 2. H_0 was rejected when the significance levels for the attributes were less than 0.05. In these cases, H_1 was accepted, which means the client's project managers and architects have different opinions with respect to the agreement of the attributes nos. 8.2, 10.3 and 12.2 concerning POE and PPE, type of business and organisational theory, and communication.

Insert Table 2 here

The Kruskal-Wallis test shows there were many differences in opinions among the respondents from Hong Kong, the UK and the USA. This is a long story and the results as well as the discussion are recorded in a separated paper. Further Kruskal-Wallis test indicates there were also different in opinions among the respondents with difference in experience of briefing in past five years. These variables include stakeholder management, POE and PPE, decision making and communication. The respective attributes and the results are shown in Table 3. In addition, differences in opinions were found in attributes for client representation and knowledge management from different sectors of client organisations (Table 4). With respect to the size of client organisations, the respondents did not agree on three attributes regarding the variables of projects, teams and team dynamics and decision making (Table 5).

Insert Tables 3 to 5 here

5.4 Results of Spearman Rank Correlation test

Referring to Table 6, attribute nos. 2.5, 5.1, 8.3, 12.2, 13.1 and 13.2 are positively correlated to and statistically significant with the role of respondents. On the other hand, attribute no. 10.3 are negatively correlated to and statistically significant with the role of respondents. However, the relationships are not very strong since the correlation coefficients range from 0.221 to 0.353.

Insert Table 6 here

As shown from Table 7, attribute nos. 4.4, 8.3, 12.4 and 12.5 are positively correlated to and statistically significant with the experience of respondents in briefing in past five years. On the other hand, attribute nos. 2.5 and 9.3 are negatively correlated to and statistically significant with the experience of respondents in briefing in past five years. Among these relationships, there are reasonably strong relationships with respect to the attribute stating that only the requirements of client's stakeholders should be reflected in the brief ($r = -0.416$) and the attribute regarding consultation with facility managers and end-users benefits the briefing process ($r = 0.383$).

Insert Table 7 here

Table 8 shows that there are weak relationships between sector of client organisations and attribute no. 1.3, 4.5, 6.3, 8.1 and 13.1. With regard to variables of client representation, the relationship may be positively correlated while there are negative correlations with respect to variables of projects, knowledge management, POE and PPE, and culture and ethics.

Insert Table 8 here

Finally, with respect to the size of client organisations, there are one reasonable strong relationship ($r = 0.307$) concerning the attribute stating that effective decision making can only occur if the client representatives are senior managers. Other relationships are weak with correlation coefficients range from -0.237 to 0.279 .

Insert Table 9 here

6. Discussions

The following was found to be the most important variables and attributes of the briefing process with mean response greater than 4.

6.1 Client Representation

The attribute ‘it is necessary to ensure adequate representation of client groups to address client needs and to prevent distortion of the brief’ was found to be most significant. The mean response was 4.34. The corporate construction client is a complex entity and it is important to recognise responsibilities of stakeholders and decision-makers. Stakeholders feed information into the briefing process but the final approval of the strategic and tactical brief rests with the decision-makers. It is therefore important to identify and distinguish between these two groups [28].

It was further agreed that ‘strict control by the brief writer is needed to avoid the brief becoming a wish list’. The mean response was 4.06. It is clear that the briefing process should focus on the needs of the client and should avoid the wish list syndrome as identified by Kelly and Duerk [28]. It has been found that user groups tend to maximise their wish list in anticipation of being bargained down from this. The problem confronting the brief writer is then to understand the priorities of the user groups such that high-priority needs are not sacrificed for lower-priority wants.

One of the fundamental principles for briefing was established. The respondents supported the contentions that ‘the client should determine the time at which the brief becomes fixed (mean response = 3.54) and the brief should be fixed before the detail design commences’ (mean response = 4.03). 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, also suggests to freeze the modification of the project brief after the detail design proposal stage [16, 18]. Late changes to the brief have an impact on project cost, time and quality, which are considered a major source of dispute and litigation globally throughout the construction industry [36, 37, 38, 39].

6.2 Post-Occupancy Evaluation and Post-Project Evaluation

The respondents agreed that ‘consultation with facility managers and end-users benefits the briefing process.’ The mean response was 4.30. Blyth and Worthington [8] stated that feedback is vital both to the management of the building and the organisation. It is also important for understanding how to carry out such projects in the future as well as managing the briefing process itself. Successes, failures as well as past experiences of what does and does not work well would lead to better decision making in the briefing process of subsequent projects.

6.3 Knowledge Management

It was found that ‘successful briefing is dependent on understanding the client’s strategic goals’. The mean response was 4.26. Becker and Steele [40] stressed that the needs of the organisation are driven by its business goals, its business environment and its operating context, as well as the culture of the organisation. Different

stakeholders, from the main broad of a company through to individual staff and users of the buildings, have different perspectives and expectations. Balancing these interests involves understanding where the organisation wants to be and how it intends to get there [8].

6.4 Projects

It was also agreed that ‘a brief should be compiled, completed and agreed prior to design commencing of a project’ and ‘the brief should act as a reference document which should be available to all project parties.’ The mean responses were 4.09 and 4.20 respectively. It was generally accepted that briefing has two distinct stages: Strategic Briefing and Project Briefing [4, 10, 11, 17]. The Strategic Briefing stage is where the client’s needs, objectives and requirements are identified and clarified concerning a construction project, or projects, and the ‘decision to proceed’ can be made accordingly. At this stage, the decision making unit requires a broad understanding of the client organisation and only the most general advice on matters which relate to the building industry. It is a significant stage in the development process of a construction project, where the strategic brief - the foundation of the project is developed. The Project Briefing stage focuses on delivering the ‘technical project’; that is, the construction industry’s response to client requirements expressed in the strategic brief. The project brief translates the strategic brief into construction terms, specifying performance requirements for each of the elements of the project. It also includes spatial relationships. The project brief provides the basis on which design can proceed.

6.5 Change Management

The respondents agreed that ‘the brief writer must be able to understand the operation of the client business.’ The mean response was 4.15. Clients, particularly inexperienced ones, may find it difficult to describe their operations to another party, hence consultants should try to become skilled in the art of questioning. Consultants are there to interpret a client’s needs. It is also the client’s responsibility to impart as much relevant information as possible. In-depth discussions are needed between the client and the brief writer such that the brief writer may produce a clear and comprehensive brief which truly reflects the needs of the client organisation.

6.6 Communication

The respondents agreed that ‘communication among stakeholders is crucial to the success of the briefing process.’ The mean response was 4.03. This finding concurred with the study carried out by Blyth and Worthington [8] who clear and comprehensive communication is important to achieving briefing success. Successful briefing demands attention to communication and how information is structured and passed through the system. Defining a common language is a key to the briefing process. The lack of common language often leads to ambiguous statements which are misinterpreted through assumptions made about what is meant. A sharing understanding between users and designers will assist with communication.

In addition, it was agreed that ‘a structured or facilitated workshop will improve communication amongst stakeholders.’ This result is consistent with the following recommendations by researchers, governments and committee. In the UK, Kelly et al. [4] suggested using Value Management (VM), a workshop-based approach, for the

future development of the briefing guide. Green [41] considered the application of VM during the briefing and outline design stages of building developments and developed a SMART methodology for VM. The US Government requires the entire executive branch and federal agencies to establish and maintain cost-effective VM procedures and processes in all programmes and projects [42]. In Hong Kong, a technical circular was jointly issued by the Works Bureau and the Planning, Environment & Lands Bureau, which demands VM studies for major projects in the subordinate departments [43]. The Construction Industry Review Committee [44] has also recommended that VM should be used more widely in local construction, because VM can help the clients and the project team to focus on the objectives and needs of the project and all stakeholders in both the short and long terms. All these suggest that VM may be the solution for improving the briefing performance.

The two major groups of the respondents, client's project managers and architects seem to have no differences in their opinions on most of the attributes of the 13 variables. The exceptions were the attributes concerning POE and PPE, type of business and organisational theory, and communication. Firstly, the architects disagreed that incorporating the results of a POE of another client's project is hazardous (the mean response was 2.74) while the client's project managers were neutral to this statement (the mean response was 3.13). It seems that architects are more envisage the importance of POE to the briefing process than client's project managers. Secondly, the client's project manager (3.39 out of 5.00) viewed the consideration of the stakeholder group may be formed of many different types of organisations with different success criteria less significantly compared to the architects (3.78 out of 5.00). It seems that architects are more aware of the differences

among the stakeholders in the briefing process than client's project managers. Thirdly, the client's project manager agreed that clients should appoint internal project managers to manage the briefing process (the mean response was 4.09) while the architects are neutral to this attribute (the mean response was 3.57). This is not a surprising result. The results of the correlation tests further support the first and third of these results.

The respondents who have written a brief (coordinated only) agreed that stakeholder management is important. They believed that it is necessary to assess the individual stakeholders' commitment, interest and power prior to the briefing process and to consider and balance the interests of all stakeholders. They have experience in the briefing process and it is not surprisingly they got these viewpoints. In addition, those respondents who have both contributed and coordinated in briefing stressed that the stakeholder group must be empowered to make decisions as a team in the briefing process. Furthermore, respondents who have coordinated, and both contributed and coordinated in briefing believed that communication among stakeholders is crucial to the success of the briefing process and a structured or facilitated workshop will improve communication amongst stakeholders.

The clients from the private sector opined that the client should determine the time at which the brief becomes fixed. This may be attributed to the fact that private clients would like to have more return from their investment, thus avoiding duplicate works and reworks in the design process while public clients would emphasise on accountability and try to get the right solutions even though at the cost of reworks in design. While larger size of client organisations tend to neutral to the attribute stating

the construction project is an indication of change in the client's business, smaller size client organisations disagreed with this statement. This may be probably that smaller size clients require a construction project because of their own needs rather than changing their business. The large size clients agreed that understanding of team dynamics is crucial for working effectively within the stakeholder group in the briefing and effective decision making can only occur if the client representatives are senior managers. This is logical because their organisations involve larger groups, more levels, and teamwork becomes significant in their firms.

The correlation tests seem to support the above findings. The correlation coefficients are not very high, ranging from 0.2 to 0.4. The strong relationship is between the sector of client organisations and the attribute stating only the requirements of client's stakeholders should be reflected in the brief. A negative correlation was found which means that public clients tend to disagree that only the requirements of client's stakeholders should be reflected in the brief. This result seems reasonable because it is necessary to consider other stakeholders' needs including the public who are also interested in a particular project.

7. Conclusions

This paper presents the development and validation of the 13 variables of briefing which formed the theoretical framework of this research project. A questionnaire survey was conducted to investigate the significance of the 13 variables and their related attributes to the briefing process. One sample t-test was used to test whether the respondents were agreed with the respective attributes of the 13 briefing variables.

From the analysis, the most significant variable of briefing was 'Client Representation.' It is necessary to ensure adequate representation of client groups to address client needs and to prevent distortion of the brief. Strict control by the brief writer is needed to avoid the brief becoming a wish list. The brief should be fixed before detail design commences. The second most significant variable was 'Post-Occupancy Evaluation and Post-Project Evaluation.' 'Consultation with facility managers and end-users benefits the briefing process' was ranked as the most important attribute under this variable. The third most significant variable was 'Knowledge Management.' It was agreed that 'successful briefing is dependent on understanding the client's strategic goals.' The fourth most significant variable was 'Project'. It was suggested that 'a brief should be compiled, completed and agreed prior to design commencing of a project' and 'the brief should act as a reference document which should be available to all project parties.' The fifth most significant variable was 'Change Management'. The respondents opined that 'the brief writer must be able to understand the operation of the client business.' The sixth most significant variable was 'Communication'. It was agreed that 'communication among stakeholders is crucial to the success of the briefing process' and 'a structured or facilitated workshop will improve communication amongst stakeholders.' In the summary, the *t*-test of the means shows that each of the 13 variables has its respective attributes significantly agreed by the respondents. It was concluded with 95% confidence interval that all 13 variables examined in the study appear to have impact on the briefing process.

The two major groups of respondents, the client's project managers and architects seem to agree with most of the attributes except those concerning 'Post-Occupancy

Evaluation and Post-Project Evaluation’, ‘Type of Business and Organisational Theory’ and ‘Communication’. Other differences in opinions have been highlighted in this paper and the findings are logical. The correlation tests support the above findings in general although the correlation coefficients are not very high. This study identified the significance of the 13 briefing variables. It also provides construction professionals with a better understanding of the variables affecting construction project briefing.

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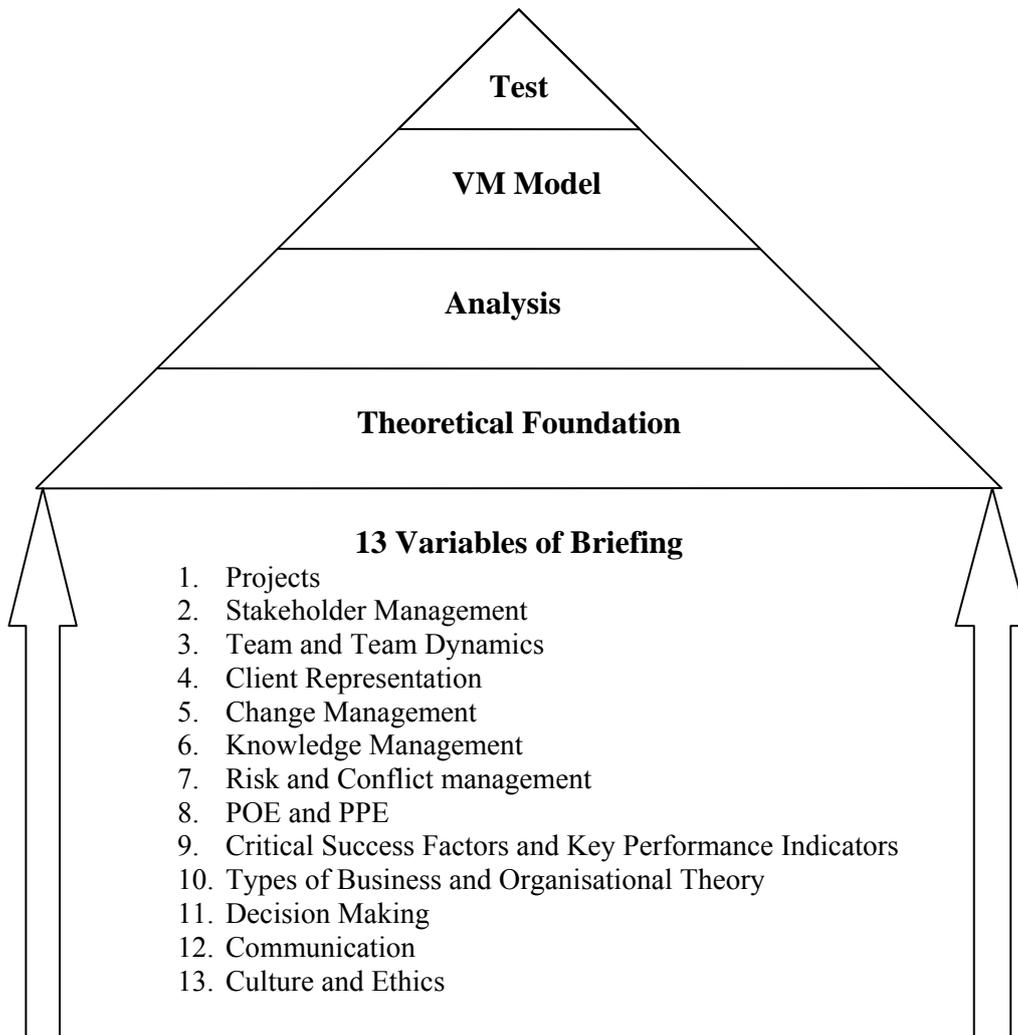


Figure 1 – Thirteen variables of briefing

Table 1 – Results of T-Test on the thirteen variables of briefing

		Mean	Standard Deviation	Rank	t-value
1. Projects					
1.1	A brief should be compiled, completed and agreed prior to design commencing of a project	4.09	0.858	2	11.875
1.2	Briefing is a process which continues until the completion of the sketch design	3.88	0.895	3	9.175
1.3	The construction project is an indication of change in the client's business	2.98	0.944	5	-0.231*
1.4	The brief should act as a reference document which should be available to all project parties	4.20	0.814	1	13.928
1.5	The brief should contain details of the procedures necessary to facilitate the absorption of the project into the clients' core business following completion	3.37	0.875	4	4.020
2. Stakeholder Management					
2.1	Briefing is an investigation of the individual requirements of stakeholders	3.72	0.839	3	8.084
2.2	Briefing is a facilitated meeting which inputs the requirements of stakeholders	3.93	0.809	1	10.875
2.3	The individual stakeholders' commitment, interest and power should be assessed prior to the briefing process	3.70	0.858	4	7.658
2.4	Briefing should consider and balance the interests of all stakeholders	3.89	0.845	2	9.907
2.5	Only the requirements of client's stakeholders should be reflected in the brief	2.61	0.874	5	-4.244*
3. Teams and Team Dynamics					
3.1	The stakeholder group is a temporary team formed for the project only	3.26	0.851	4	2.881
3.2	The client should define the composition of the stakeholder group	3.70	0.871	3	7.543
3.3	The stakeholder group should be empowered by the client within precisely defined limits	3.71	0.791	2	8.403
3.4	Understanding of team dynamics is crucial for working effectively within the stakeholder group in the briefing process	4.03	0.775	1	12.578
4. Client Representation					
4.1	It is necessary to ensure adequate representation of client groups to address client needs and to prevent distortion of the brief	4.34	0.563	1	22.407
4.2	Strict control by the brief writer is needed to avoid the brief becoming a 'wish list'	4.06	0.876	2	11.321
4.3	The brief should be sufficiently flexible to reflect changing client requirements	3.83	0.882	4	8.892
4.4	The brief should describe the contribution of the project to the clients core business	3.42	0.889	6	4.409
4.5	The client should determine the time at which the brief becomes fixed	3.54	0.918	5	5.544
4.6	The brief should be fixed before sketch design commences	3.24	1.012	7	2.201
4.7	The brief should be fixed before detail design commences	4.03	0.976	3	9.938
5. Change Management					
5.1	A brief for a construction project implies change in the client organisation	2.74	0.828	3	-2.979*
5.2	The brief writer must be able to understand the operation of the client business	4.15	0.847	1	12.768
5.3	The brief should describe the potential changes to the client organisation resulting from the construction project	3.26	0.936	2	2.605
5.4	The brief documents is for use by the design team only	2.55	0.965	4	-4.392*
6. Knowledge Management					
6.1	The brief is the primary vehicle for knowledge sharing amongst the project team	3.59	0.967	3	5.735
6.2	Successful briefing is dependent on understanding the client's strategic goals	4.26	0.652	1	18.147
6.3	Briefing is the integration of the skills, knowledge and experience of different stakeholders	3.94	0.768	2	11.448
7. Risk and Conflict Management					
7.1	Anticipating and recording risks to the project is an important part of the briefing process	3.81	0.771	1	9.817
7.2	Consensus building is a vital component of the briefing process	3.81	0.908	1	8.336

		Mean	Standard Deviation	Rank	t-value
8. Post-Occupancy Evaluation and Post-Project Evaluation					
8.1	The briefing process should review the findings of a POE of the clients last project of a similar type	3.75	0.699	2	10.066
8.2	Incorporating the results of a POE of another client's project is hazardous	2.92	0.715	3	-1.044*
8.3	Consultation with facility managers and end-users benefits the briefing process	4.30	0.664	1	18.311
9. Critical Success Factors and Key Performance Indicators					
9.1	The construction brief should include the key performance indicators by which the success of the project will be measured	3.78	0.794	1	9.209
9.2	The success of the project as a business unit is the sole responsibility of the client	2.76	0.922	2	-2.427*
9.3	The design team is only responsible for the technical performance of the project	2.62	0.948	3	-3.803*
10. Type of Business and Organisational Theory					
10.1	Each stakeholder should have an equal input to the briefing process	2.62	0.875	3	-4.020*
10.2	Client input should be given a greater weighting than other project stakeholders	3.72	0.816	1	8.232
10.3	The briefing process must take into account that the stakeholder group may be formed of many different types of organisations with different success criteria	3.69	0.701	2	9.280
11. Decision Making					
11.1	Effective decision making can only occur if the client representatives are senior managers	3.57	1.052	2	5.093
11.2	The brief writer should determine the appropriate decision making method in the briefing process	3.44	0.856	4	4.858
11.3	The brief writer makes decisions based on information received from the stakeholders	3.51	0.791	3	5.967
11.4	The stakeholder group must be empowered to make decisions as a team in the briefing process	3.73	0.754	1	9.049
12. Communication					
12.1	Effective briefing is only possible if the client understands the construction process	3.24	0.947	4	2.364
12.2	Clients should appoint internal project managers to manage the briefing process	3.75	0.715	2	9.837
12.3	The brief writer should operate within strict project constraints set by the client	3.53	0.816	3	6.142
12.4	Communication among stakeholders is crucial to the success of the briefing process	4.03	0.765	1	12.683
12.5	A structured or facilitated workshop will improve communication amongst stakeholders	4.03	0.738	1	13.067
13. Culture and Ethics					
13.1	The brief writer has to manage the different cultural and ethical characteristics of the individual stakeholders	3.69	0.764	1	8.517
13.2	It is important that the stakeholder group be comprised of individuals of common cultural and ethical outlook	2.65	0.854	3	-3.847*
13.3	Culture and ethics affect decision making in the briefing process	3.60	0.822	2	6.836

Remark: - * represents the t-values that is less than cut of t-value (1.6649)

Table 2 Results of Mann-Whitney Test on variables of briefing with respect to role of respondents

		Mean		Z	p-value
		Client's PM	Architect		
8.	Post-Occupancy Evaluation and Post-Project Evaluation				
8.2	Incorporating the results of a POE of another client's project is hazardous	3.13	2.74	-2.298	0.022*
10.	Type of Business and Organisational Theory				
10.3	The briefing process must take into account that the stakeholder group may be formed of many different types of organisations with different success criteria	3.39	3.78	-2.822	0.005*
12.	Communication				
12.2	Clients should appoint internal project managers to manage the briefing process	4.09	3.57	-2.851	0.004*

* represents the p-value is less than 0.05

Table 3 Results of Kruskal- Wallis Test on variables of briefing with respect to experience in briefing in past 5 years

	Mean			Chi-Square	p-value	
	Contributed only	Coordinated only	contributed and coordinated			
2. Stakeholder Management						
2.3	The individual stakeholders' commitment, interest and power should be assessed prior to the briefing process	3.47	3.97	3.64	6.431	0.040*
2.4	Briefing should consider and balance the interests of all stakeholders	3.78	4.15	3.50	6.262	0.044*
2.5	Only the requirements of client's stakeholders should be reflected in the brief	3.03	2.35	2.21	15.910	0.000*
8. Post-Occupancy Evaluation and Post-Project Evaluation						
8.3	Consultation with facility managers and end-users benefits the briefing process	4.03	4.36	4.71	12.408	0.002*
11. Decision Making						
11.4	The stakeholder group must be empowered to make decisions as a team in the briefing process	3.59	3.64	4.21	6.400	0.041*
12. Communication						
12.4	Communication among stakeholders is crucial to the success of the briefing process	3.71	4.15	4.36	8.989	0.011*
12.5	A structured or facilitated workshop will improve communication amongst stakeholders	3.77	4.15	4.38	7.967	0.019*

* represents the p-value is less than 0.05

Table 4 Results of Kruskal- Wallis Test on variables of briefing with respect to sector of client organisations

		Public	Mean Quasi- Public	Private	Chi- Square	p-value
4.	Client Representation					
4.5	The client should determine the time at which the brief becomes fixed	3.00	3.63	3.73	9.483	0.009*
6.	Knowledge Management					
6.3	Briefing is the integration of the skills, knowledge and experience of different stakeholders	4.29	3.82	3.83	6.864	0.032*

* represents the p-value is less than 0.05

Table 5 Results of Kruskal-Wallis Test on variables of briefing with respect to size of client organisations

		Mean				Chi-Square	p-value
		1-5	6-50	51-200	201+		
1. Projects							
1.3	The construction project is an indication of change in the client's business	2.00	2.77	3.36	3.05	7.893	0.048*
3. Teams and Team Dynamics							
3.4	Understanding of team dynamics is crucial for working effectively within the stakeholder group in the briefing process	4.00	3.72	4.07	4.24	7.944	0.047*
11. Decision Making							
11.1	Effective decision making can only occur if the client representatives are senior managers	3.33	3.28	3.15	4.00	9.498	0.023*

* represents the p-value is less than 0.05

Table 6 – Results of Spearman Rank Correlation Test with respect to role of respondents

		Role of respondents	
		Correlation Coefficient	Significance
2.	Stakeholder Management		
2.5	Only the requirements of client’s stakeholders should be reflected in the brief	0.282**	0.007
5.	Change Management		
5.1	A brief for a construction project implies change in the client organisation	0.230*	0.032
8.	Post-Occupancy Evaluation and Post-Project Evaluation		
8.3	Consultation with facility managers and end-users benefits the briefing process		
10.	Type of Business and Organisational Theory		
10.3	The briefing process must take into account that the stakeholder group may be formed of many different types of organisations with different success criteria	-0.241*	0.024
12.	Communication		
12.2	Clients should appoint internal project managers to manage the briefing process	0.302**	0.004
13.	Culture and Ethics		
13.1	The brief writer has to manage the different cultural and ethical characteristics of the individual stakeholders	0.221*	0.039
13.3	Culture and ethics affect decision making in the briefing process	0.218*	0.040

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Table 7 – Results of Spearman Rank Correlation Test with respect to experience in briefing in past 5 years

		Experience in briefing	
		Correlation Coefficient	Significance
2.	Stakeholder Management		

2.5	Only the requirements of client's stakeholders should be reflected in the brief	-0.416*	0.000
4. Client Representation			
4.4	The brief should describe the contribution of the project to the clients core business	0.228*	0.034
8. Post-Occupancy Evaluation and Post-Project Evaluation			
8.3	Consultation with facility managers and end-users benefits the briefing process	0.383**	0.000
9. Critical Success Factors and Key Performance Indicators			
9.3	The design team is only responsible for the technical performance of the project	-0.229*	0.033
12. Communication			
12.4	Communication among stakeholders is crucial to the success of the briefing process	0.320**	0.003
12.5	A structured or facilitated workshop will improve communication amongst stakeholders	0.331**	0.002

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Table 8 – Results of Spearman Rank Correlation Test with respect to sector of client organisations

		Sector of client organisation	
		Correlation Coefficient	Significance
1.	Projects		
1.3	The construction project is an indication of change in the client’s business	-0.234*	0.034
4.	Client Representation		
4.5	The client should determine the time at which the brief becomes fixed	0.292**	0.006
6.	Knowledge Management		
6.3	Briefing is the integration of the skills, knowledge and experience of different stakeholders	-0.217*	0.045
8.	Post-Occupancy Evaluation and Post-Project Evaluation		
8.1	The briefing process should review the findings of a POE of the clients last project of a similar type	-0.227	0.034
13.	Culture and Ethics		
13.1	The brief writer has to manage the different cultural and ethical characteristics of the individual stakeholders	-0.244*	0.023

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Table 9 – Results of Spearman Rank Correlation Test with respect to size of client organisations

		Size of client organisations	
		Correlation Coefficient	Significance
2.	Stakeholder Management		
2.4	Briefing should consider and balance the interests of all stakeholders	0.215*	0.049
3.	Teams and Team Dynamics		
3.4	Understanding of team dynamics is crucial for working effectively within the stakeholder group in the briefing process	0.279*	0.01
11.	Decision Making		
11.1	Effective decision making can only occur if the client representatives are senior managers	0.307**	0.005
11.3	The brief writer makes decisions based on information received from the stakeholders	-0.237*	0.032

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)