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A Typology of Operational Approaches for Stakeholder Analysis and Engagement for Practitioners

Abstract: Stakeholder analysis and engagement are the main tasks in stakeholder management. To identify operational approaches for stakeholder analysis and engagement, six interviews and a questionnaire survey were conducted in Hong Kong, and an additional fifteen interviews were held in Australia. The main finding is a typology of practical approaches for practitioners in construction. A total of thirty approaches are comprised in the typology, and they are classified by application. To test the usefulness of the typology, action research is applied to two real-life projects in Australia. The implication is that the selection of the approaches is an art and a contingency approach as well, requiring practitioners' judgements. Each approach has its strengths and limitations, so the most appropriate way for effective stakeholder management is to use a combination of elements from each approach as circumstances dictate. This study can serve as a reference for the systematic consideration of the project management team about the operational approaches for stakeholder management in construction projects.

Keywords: Stakeholder analysis, Stakeholder engagement, Contingency.

Introduction

Stakeholders are individuals and organisations "who are actively involved in the project, or whose interests may be positively or negatively affected as a result of project execution or successful project completion" (Project Management Institute, 1996). Since the nature of construction projects is uncertain and complex, stakeholder analysis and engagement in this environment is extremely important for project teams. As Chinyio and Akintoye (2008) stated, to achieve project objectives, it is essential to formulate a process for stakeholder management and to identify effective approaches for stakeholder analysis and engagement.

However, as Reed et al. (2009) indicated, few studies have attempted to consolidate operational approaches that can be used for stakeholder analysis and engagement, except Chinyio and Akintoye (2008), PMI (2008) and Reed et al. (2009). These studies had limited scope: Chinyio and Akintoye (2008) focused on stakeholder engagement approaches in construction in the United Kingdom; PMI (2008) proposed approaches, which are either too general to be used in practice (for example communication methods) or actually activities and critical success factors for stakeholder management (for example resolving conflicts); and Reed et al. (2009) discussed the approaches for stakeholder analysis used within natural resource management research activities. These studies identified and proposed a range of approaches that have helped the practitioners to manage stakeholders. However, their limited scope means that they do not represent the complete picture. It is thus necessary to expand Chinyio, Akintoye, PMI and Reed et al.'s work. The investigation of operational approaches for stakeholder analysis and engagement is introduced in this study. It should be noted that since the findings in this study are based on a literature review, interviews in Hong Kong & Australia, and a survey in Hong Kong, they may also be considered limited in scope. Nevertheless it contributes to the body of knowledge about stakeholder management, especially the practical approaches for stakeholder management.

To achieve its purpose, this study is organized in the following manner:

- Firstly, definitions of 'stakeholder analysis' and 'stakeholder engagement' are provided;
- Secondly, a review of approaches in previous studies is conducted;
- Thirdly, the methods for the investigation of the operational approaches for stakeholder analysis and engagement in construction are set out;
- Fourthly, the findings from the empirical studies are set out;
- Fifthly, a typology of approaches, based on the findings in the literature review and the empirical studies, is described;
- Finally, two case studies are presented to illustrate the application of the approaches for stakeholder analysis and engagement, and the outcomes in the case studies are discussed and summarized.

Definition of Stakeholder Analysis and Stakeholder Engagement

A practical working definition is that a stakeholder is any individual or group who has an interest in the project or is impacted by the project (Bourne, 2005). Based on this understanding of 'stakeholder', a large number of stakeholder studies have been conducted. 'Stakeholder analysis' is a necessary part for successfully managing stakeholders (Olander, 2006). Varvasovszky and Brugha (2000) considered 'stakeholder analysis' is related to identify stakeholders and their interests, and assess stakeholders' influence and relationships. Similarly, Reed (2008) separated the stakeholder analysis process into three steps, namely, (1) identifying stakeholders; (2) differentiating between and categorising stakeholders; and (3) investigating relationships between stakeholders. According to the studies of Varvasovszky and Brugha (2000) and Reed (2008), during the interviews and survey in this study (described in Section 3), approaches for stakeholder management were also collected following three steps of stakeholder analysis: (1) identifying stakeholders and their interests, (2) analysing stakeholders' relationships; and (3) assessing stakeholders' influence.

Comparing to stakeholder analysis, stakeholder engagement is to communicate with, involve, and develop relationships with stakeholders (Greenwood, 2007; and Chinyio and Akintoye, 2008). Stakeholders should be engaged as early as possible, and this has been considered as essential for stakeholder analysis and decision making (Chess and Purcell, 1999; and Reed et al., 2006). Some of the approaches for stakeholder engagement, such as workshop, and interviews (Ballejos and Montagna, 2008), could be used to involve the stakeholders to identify others or do analysis (Reed, 2008), especially in the context of complicated environment, such as construction projects.

Approaches in Previous Studies

Various approaches potentially useful in stakeholder management as proposed in the literature are listed in Table 1. Although these scholars do not represent a complete picture of operational approaches for stakeholder management, these approaches do provide new perspectives in the process of stakeholder management, and could facilitate the process.

(Insert Table 1 here)

The ten approaches in Table 1 include three key ones, i.e. power/interest matrix, Stakeholder Circle methodology and Social Network Analysis. These three approaches are important for the following reasons:
(1) The power/interest matrix is a common means proposed or modified by many scholars (Newcombe, 2003; Olander and Landin, 2005). In the power/interest matrix, stakeholders are categorised by their levels of power and interest in the project. The project management team has to pay different attention to each type of stakeholder and apply different engagement approaches (Newcombe, 2003). Several approaches in Table 1, such as the stakeholder influence matrix, the stakeholder impact index, and stakeholder interest intensity index, were proposed and developed based on the rational of the power/interest matrix. Therefore, though there are many variations of the power/interest matrix, this matrix is the fundamental one.

(2) The Stakeholder Circle methodology is a relatively systematic method for stakeholder management. It provides a means for the project team to identify and prioritise a project's key stakeholders, to develop an appropriate engagement strategy and communications plan to ensure that the needs and expectations of these key stakeholders are understood and managed, and to measure the effectiveness of the communication (Bourne, 2005). Most importantly, it is applied in practice and proved to be useful. This is indicated by an interviewee during the empirical studies in Australia, which will be described in the "Findings from the interviews in Australia" section.

(3) In contrast to the power/interest matrix, the Stakeholder Circle methodology and other traditional social science focusing on the attributes of stakeholders, the information used in Social Network Analysis focuses on the relationships between pairs of stakeholders in a network. A construction project is a non-linear, complex, iterative and interactive project system environment (Bourne and Walker, 2006; and Pryke, 2006), so it is likely that the relationships among stakeholders will be complicated and dynamic, and take the shape of a network rather than spokes in a wheel. Traditional research only analyses the relationship between project managers and stakeholders (Pryke, 2006), and ignores the interaction among stakeholders. Since a social network is defined as a specific set of linkages among a defined set of persons (Mitchell, 1969), the stakeholders in the network can be viewed as "interdependent rather than independent, autonomous units" (Wasserman and Faust, 1994). Social Network Analysis interprets the project environment as a system connected by various relationships, and can be used for mapping the interrelationship among stakeholders and the social behaviour of the persons involved. The usefulness of Social Network Analysis is validated in the case study section described later.

Since these three approaches are important, they will be included in the typology of approaches with the findings from empirical studies in Hong Kong and Australia. Besides the approaches in Table 1, Chinyio and Akintoye (2008) and PMI (2008) also proposed collections of approaches for stakeholder management, and made classifications on the approaches they identified. However, these studies have limitations and are difficult for practitioners to use as direct approaches for stakeholder analysis and engagement.

In Chinyio and Akintoye's study (2008), they classified the approaches into 'overarching approaches' and 'operational approaches'. Regarding the 'overarching' type, the approaches are actually activities or critical success factors for stakeholder management. For example, 'responding to power-interest dynamism' has been indicated by Elias (2002) as a step for stakeholder management; 'providing top-level support' is proposed as a key indicator to

evaluate the maturity of stakeholder management by Bourne (2008). Regarding the approaches in the 'operational' type, 'effective communication' is also considered as a factor contributing to the success of stakeholder management by Cleland (1996); 'people management skills' is a collection of methods, rather than one approach, so it is difficult for practitioners to use it directly; 'incentives' and 'concessions' are strategic approaches to deal with stakeholders, but in order to implement the 'incentives' and 'concessions' strategies, practitioners still need to identify approaches to engage stakeholders.

In PMI's study (2008), approaches were classified into 'communication methods', 'interpersonal skills' and 'management skills'. Although this classification is different from the one above in Chinyio and Akintoye's study (2008), similar problems exist. For example, 'resolving conflicts', as indicated by Freeman (1984), is an activity; 'building trust', as indicated by Bourne (2005) and Karlsen et al. (2008), is critical success factors for stakeholder management. Except these problems, the classification itself may confuse practitioners, because the 'presentation skills', 'writing skills' and 'public speaking' in the 'management skills' group are actually also 'communication methods', which is named as another group according to the classification.

Therefore, approaches are classified in this study based on their applications (stakeholder analysis or stakeholder engagement), rather than their attributes. In other words, approaches to be identified in this study are operational ones which can be actually used in the activities during the stakeholder management process, and by applying which, project management teams can achieve effective communication, build trust with stakeholders, or etc. By using the potential typology in this study, practitioners can pick up suitable approaches easily when they conduct stakeholder management, such as identifying stakeholders, analysing their relationships, and communicating with them.

Therefore, the approaches in previous studies will be selectively included in the typology in this study by discussions with practitioners in empirical studies about whether they are operational approaches or not. The process of empirical studies is described in the next section.

Research Method

The identification of the approaches, employed in stakeholder management practice in combination with those proposed by other scholars to develop a typology of approaches for stakeholder management, is described in this section. The research began with six semi-structured interviews with an aim of identifying orperational approaches in Hong Kong. The six experts were selected because they all had more than 10 years' experience in stakeholder management on construction projects, had different roles in projects (Client, Consultant and Contractor), and were from different types of organizations (Government, Education, and Company). A semi-structured approach was adopted in the interviews. Questions used in the interviews include but were not limited to:

- How do you identify project stakeholders and their interests?
- How do you analyse the interrelationship among stakeholders?
- How do you identify which stakeholders are more important than others? and
- What approaches do you use to engage project stakeholders?

Content analysis was used for "extracting and corroborating meaning from the interviews" (Chinyio and Akintoye, 2008). An initial list of approaches for stakeholder analysis was synthesized, and the first version of the survey questionnaires was developed after these interviews.

Prior to sending questionnaires, a pilot study was conducted to pre-test the suitability and comprehensibility of the questionnaire. Two project managers, a client representative and a contractor, were asked to complete the preliminary questionnaire. Their suggestions were incorporated into the final version of the questionnaire. The main part of the questionnaire rated the effectiveness of each approach identified for stakeholder analysis and engagement according to a five-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree). The full-scale survey was conducted in Hong Kong in August 2008, and its respondents were project managers selected randomly from different organisations in the construction industry. A total of 183 completed questionnaires were received consisting of 81 respondents from client organisations, 45 from contractor companies, and 57 from consultant organisations. The response rate was 28%, which was consistent with "the norm of 20-30% with most questionnaire surveys in the construction industry" (Akintoye, 2000). The outcome of this survey is rankings of the effectiveness of the identified approaches.

In order to identify practical approaches in a place with a different culture from Hong Kong, and compare & evaluate the results with those obtained in Hong Kong, fifteen interviews were conducted in Melbourne, Australia. The same method, i.e. interview, is used in Australia as in Hong Kong, because interview is a good way to get detailed comments and opinions from practitioners. The fifteen experts, whose experiences on stakeholder management ranged from 11 to 20 years, worked for governments, education organizations, companies or Non-Government Organizations. They were not only from the construction industry, but working for general management, community relationships, and business. Experts from different areas were chosen because stakeholder management in construction is high related to general management and community engagement; this would be useful for identifying more effective approaches than if the focus was only on construction. The same questions were used during the fifteen interviews as those in Hong Kong, but all the identified approaches were listed under each question for the interviewees' comments and references. Several additional approaches and suggestions for stakeholder analysis and engagement were synthesized to revise the list of practical approaches. It should be noted that due to limited time, questionnaire survey for evaluating the effectiveness of the approaches is not conducted in Australia. This is a limitation of this study, and is described in the conclusion section. Based on the revised list and the literature review, a typology of approaches for stakeholder analysis and engagement in construction was developed.

Research Findings

Findings from the empirical studies in Hong Kong

Several approaches for analysing and engaging stakeholders were identified during the interviews and the questionnaire survey in Hong Kong (Table 2). The effectiveness of the identified approaches was explored based on the mean values of the responses. Kendall's Coefficient of Concordance was calculated for measuring the agreement of respondents on their rankings of the approaches.

(Insert Table 2 here)

In terms of 'identifying stakeholders and their interests', 'personal past experience' is ranked higher. This indicates that the experience of project managers is important. This finding is in line with the study conducted by Chinyio and Akintoye (2008), as they identified 'intuition' as an important approach for stakeholder management. It is interesting that 'asking the obvious/identified stakeholders to identify others' is also considered an effective approach for identifying stakeholders. This approach is also called 'snowball sampling' (Patton, 1990). Its aim is to make use of stakeholders' knowledge about those who have skills or information in particular areas. 'Focus group meeting' is ranked highest for identifying stakeholders' interests. Focus groups aim to discover the key issues of concern for selected groups (Dawson et al., 1993), and may also be used to discover preliminary issues that are of concern in a group or community (Victorian Government Department of Sustainability and Environment, 2005). Approaches for stakeholder identification also include: 'guidelines in the organisation, professional services, directed by higher authorities, interviews, public consultation, formal memos, and questionnaire'. Though these approaches are not ranked high, the results of the surveys show the mean values of 3 (Neutral) or larger.

The next step for stakeholder analysis is 'analysing stakeholders' relationships'. Jergeas et al. (2000) consider that "efficient management of the relationship between the project and its stakeholders is an important key to project success". Similarly, Hartmann (2002) considers that successful project relationships are vital for successful delivery of projects and meeting stakeholder expectations. Several approaches for relationship analysis were identified in the interviews. According to the results of the questionnaire, 'personal past experience' is ranked highest, followed by 'workshops', 'interviews', and other 'public engagement approaches'. On one hand, this finding confirms the importance of project managers' experience; on the other hand, it seems that there is no effective approach which has been used in practice to help project managers analyse stakeholder relationships.

Regarding 'assessing stakeholders' influence', many scholars have proposed different kinds of approaches, such as Olander and Landin's (2005) 'Power/Interest matrix', Mitchell et al.s' (1997) 'Power, Urgency and Legitimacy' model, and Bourne's (2005) 'Stakeholder Circle methodology'. However, during the six interviews in Hong Kong, none of the interviewees used, nor had heard of these approaches. These interviewees implied that they prioritized stakeholders based on their experience and the directives from higher authorities. This finding indicates the low level of stakeholder evaluation in construction. In order to identify the important stakeholder attributes for prioritisation, stakeholders' power, urgency, legitimacy and proximity, which are identified by Mitchell et al. (1997) and Bourne (2005), were introduced to the interviewees. The interviewees confirmed the importance of stakeholders' power and the urgency of their requests, and they recognized that they do consider these attributes in practice, but in an unstructured way. In terms of 'legitimacy' and 'proximity', the interviewees thought that the attribute of legitimacy is imprecise and difficult to operationalize, and they all preferred using the attribute 'proximity', which is easier to explain. In addition, the interviewees, especially those working as contractors in projects, insisted that 'the directives from higher authorities' is important for their decision making. Therefore, 'stakeholders' power, the directives from higher authorities, the urgency of the stakeholders' requests, and stakeholders' proximity' are included in the questionnaire to evaluate their importance for stakeholder estimation. According to the results in Table 2, 'stakeholders' power', which means the ability to "control resources, create dependencies, and support the interests of some organisation members or groups over others" (Mitchell et al., 1997), is considered to be the most important. This finding is in line with many previous studies, such as

Newcombe (2003), and Bourne and Walker (2005). 'The directives from higher authorities' are ranked second as the results. The reason for this may be because more than half of the respondents (102 of 183) were contractors and consultants, and their clients' requirements were important for them. Since the mean values of the four factors are larger than 3 (Neutral), they all are important for 'assessing stakeholders' influence'.

Some of the approaches identified for 'stakeholder analysis', such as workshops, interviews, and surveys, constitute communication with and engagement of stakeholders. The interviewees in Hong Kong were asked to summarize their approaches for 'stakeholder engagement'. Seven approaches (Table 2) were identified with all mean values larger than 3 (Neutral). All kinds of meetings and workshops are regarded as the most common approaches for engaging stakeholders. Negotiations can also be categorised as communication with stakeholders, especially settling disputes and problems. Similar studies in UK, Chinyio and Akintoye (2008) also emphasized the importance of workshops, meetings and negotiations. An interesting finding is that the interviewees in Hong Kong proposed not only formal engagement approaches (e.g. interviews and surveys), but also an informal approach, i.e. 'social contacts'. As the interviewees acknowledged, this approach is usually used in the private sector, but it is an effective approach for establishing and maintaining relationships with some stakeholders.

To examine whether the respondents ranked the approaches in a similar order, Kendall's Coefficient of Concordance was calculated (Table 2). The Kendall's Coefficients of Concordance are statistically significant at 1% level, which indicates that there is a general agreement among the 183 respondents on ranking of these approaches. However, when looking at the values of the last column in Table 2, all of the Kendall's Coefficients of Concordance are relatively small. This implies that though the respondents consider all of the approaches to be important, the approaches for stakeholder analysis and engagement may vary depending on different situations. As Reed et al. (2009) stated, "choice of approaches will depend on the purpose of the stakeholder analysis, the skills and resources of the investigating team, and the level of engagement". This finding is also confirmed during the interviews in Australia, which will be discussed in the next section.

Findings from the interviews in Australia

Although most of the interviewees agreed that the identified approaches from the empirical studies in Hong Kong were critical and comprehensive, they also shared their valuable experiences in stakeholder analysis and engagement. Some interviewees suggested a software tool (Darzin) and the Stakeholder Circle methodology for stakeholder management, and a further two suggestions for stakeholder engagement were also synthesized based on the interviewees' comments.

Darzin, which was suggested by three interviewees, is a data analysis software solution, created specifically for stakeholder engagement and community consultation (Darzin, 2009). This web based software is used to record project communications, stakeholder contact details and issues, and analyse this information qualitatively and quantitatively. The 'centralised' nature of the database ensures project team members can work from a range of locations to enter information about specific engagement activities and stakeholders. This software also has an automated reporting function to map issues throughout the project, ensuring all information is managed consistently and can be shared across a large project team. The interviewees consider this software acts as a register

to monitor emerging issues, which can provide a historical log on key stakeholders, their issues over the course of the project and how they have been managed / resolved during this time.

Regarding the Stakeholder Circle methodology, an interviewee thought that this approach implemented a straightforward methodology that allowed her team to make a meaningful assessment of the stakeholders and understand their relative power and influence. She recommended the researcher to include this methodology in the typology of approaches

Both the Darzin and Stakeholder Circle software tools were recommended by the interviewees. While Darzin focuses on recording and analysing stakeholder engagement activities, Stakeholder Circle offers a mechanism for assessing the relative influence of each stakeholder and tracking the progress of the relationship over time. They will be explained in details in the case study section. Besides the Darzin and Stakeholder Circle, other important suggestions were raised by the Australia interviewees.

First, several interviewees proposed that 'public engagement approaches' is a broad term and includes different kinds of approaches. One interviewee (3rd of the interviewees), who works for government in the sustainability and environment area, introduced about seventy approaches for stakeholder consultant and engagement. In order to identify the public engagement approaches commonly used in construction, the interviewees were asked to specify the public engagement approaches in the following interviews, and emails were also sent to the first two interviewees to ask for their answers. Twenty three different engagement and consultant approaches, including but being not limited to newsletters, forums, fact sheets, and walking tours, were proposed by the interviewees. The interviewees also indicated that there is no single, most effective approach to involve stakeholder; the selection of approaches depends on situations and stakeholders; and usually a number of alternative approaches are combined to engage stakeholders. These comments confirmed the finding in Hong Kong, which is implied by the small values of the Kendall's Coefficients of Concordance. Since many approaches for stakeholder analysis and engagement were identified, the interviewees also suggested that a list, interpreting the use of the approaches, as well as their constraints, should be made available and form decision-making criteria for project managers' benefit when making choices about appropriate approaches.

Second, two interviewees, one from the construction sector and one working on community relationships, suggested that the stakeholder engagement approaches need to match the level of engagement. This suggestion is in line with Reed's finding (2008). Reed (2008) conducted a literature review, and suggested that for best practice of stakeholder participation, "methods should be selected and tailored to […] an appropriate level of engagement". The interviewees also recommended an engagement spectrum, which is developed by the International Association for Public Participation (IAP2). Five engagement levels, viz. inform, consult, involve, collaborate, and empower, are comprised in the engagement spectrum (Victorian Government Department of Sustainability and Environment, 2005). Though several scholars, such as Pretty (1995), Rowe and Frewer (2000), and Richards et al. (2004), have proposed different engagement levels, the five levels are used in this study, because the interviewees in Australia accepted them as being a standard, and one of the interviewees from the construction sector had applied this spectrum in his work and proved its effectiveness. As one interviewee stated, "this spectrum can be used to ensure

a common understanding of 'stakeholder engagement' ". According to this suggestion, the identified approaches for stakeholder engagement were matched to the IAP2 spectrum in the typology section.

The findings in Australia, namely the Darzin software tool, the Stakeholder Circle methodology and the two suggestions above, are used to enhance the findings in Hong Kong. A typology of approaches for stakeholder analysis and engagement in construction is thus developed by synthesizing the findings from Hong Kong and Australia with the outcomes in previous studies, and described as follows.

A Typology of Approaches

A typology of approaches for stakeholder analysis and engagement is synthesized in Table 3. The strengths and limitation of each approach and engagement levels that each approach corresponds to are described in Table 4. To execute the typology, project managers should choose approaches corresponding to the stakeholder management process. First, to identify stakeholders and their interests, project managers can use approaches under the "identifying stakeholders and their interests" column in Table 3 by considering their strengths and limitations listed in Table 4. Then, based on the stakeholders' interests, project managers can apply approaches in Table 3 to assess stakeholders' influence and analyse stakeholders' relationships. Finally, according to the stakeholders' interests and priority, project managers can decide the engagement level of each stakeholder, and engage stakeholders by using the approaches corresponding to the engagement level in Table 4. Therefore, according to the strengths, limitations and applications of each approach in the typology (Tables 3 and 4), project managers can pick up suitable approaches easily when they conduct stakeholder management.

It should be reiterated that the thirty approaches, their descriptions, strengths, and limitations are developed based on not only the findings of the empirical studies in Hong Kong and Australia, but also several previous studies, including Patton (1990), Newcombe (2003), Bourne (2005), Foster and Jonker (2005), Victoria Government Department of Sustainability and Environment (2005), Olander (2006), Pryke (2006), Chinyio and Akintoye (2008), PMI (2008), Darzin (2009) and Reed et al. (2009). It also needs to be reiterated that there is no stand-alone approach, and most of the approaches should be combined with other approaches. For example, the Stakeholder Circle must be accompanied by workshops, meetings or other means of joint data collection to identify and assess the nature of relationships with stakeholders; Social Network Analysis usually collects information with the help of surveys, emails, or interviews. The approaches selection should take into consideration not only the social and cultural context of the analysis but also the time limits and resources that can be reasonably allocated to this activity. To discuss how the approaches for stakeholder analysis and engagement were applied, and to illustrate the rationale behind the choice of approaches, five projects in Australia and Hong Kong were used as case studies. At the end of each case study, project management teams were asked to complete a feedback questionnaire for evaluating the usefulness of the typology of approaches according to a five-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree). Descriptions in the questionnaire and analysis results are shown in Table 5. Due to the space limitation, only two case studies are explained in the next section.

(Insert Table 3 here)

(Insert Table5 here)

(Insert Table6 here)

Case studies

Project 1 – A school building project – T College

T College is a unique tertiary institution that provides a diverse range of high-quality academic and extra-curricular programs for talented students from across Australia and around the world. The project was the construction of a new building to provide new classrooms and facilities for the college's theological school. The project was relatively small with the contract price of AU$2 million, and the construction stage was the focus of this case study description. The project manager, who was also a T College employee for more than ten years, had direct responsibility for buildings, grounds and infrastructure projects in the campus. He reported to the Director of Finance & Administration, the chief financial officer who was also a member of the senior management team in the college. The financier/sponsor of this project was a large private company that finances ecclesiastical projects.

Since this project was small and the project manager and the Director of Finance & Administration had extensive experiences in campus development, the stakeholders and their interests were identified during a meeting with the project manager and the Director of Finance & Administration, and stakeholder profiles and the stakeholders' interests were developed during that meeting. The project manager and the Director of Finance & Administration were then asked to prioritize all the stakeholders using their knowledge of all the stakeholders identified and their experience in managing relationships in this environment. The Stakeholder Circle was used for this identification and prioritisation process. Stakeholders' power, proximity and urgency were evaluated by the project manager and the Director of Finance & Administration. The priority list is as follows:

1. Manager Buildings, Grounds & OHS
2. Director of Finance & Administration
3. Architectural firm
4. Warden
5. Director of the Theological School
6. City Council
7. Contractor
8. Consultants
9. Sub-contractor
10. Suppliers
11. Financier
12. External consultant
13. Students/Staff
14. Family and representatives of the ashes in the landscape

In order to analyse stakeholders' relationships, a survey for Social Network Analysis was developed by one of the authors and the project team. Two questions to determine the nature of the information exchange and influence networks were included in the survey. They are as follows:

- Please nominate groups or individuals, or choose those from the following list (please refer to the list in Table 5) with whom you typically exchange information regarding the project. (Direction: 1 = Provide information/advice to; 2 = Receive information/advice from; 3 = Both provide and receive. Frequency: 1 = Seldom; 2 = Sometimes; 3= Often; 4= Very often.)
- Please nominate groups or individuals, or choose those from the following list (Please refer to the list in Table 5) who changed or influenced your activities related to the project in the construction stage and to what extent? (1 = To some extent; 2= To a considerable extent)

The questions were sent out by the project management team via email. One additional stakeholder, i.e. College Board Members, not identified during the meeting was nominated by the Warden. It should be noted that not all the sixteen stakeholders (including subcontractors, consultants and suppliers), were themselves surveyed, owning to time and resource limitations. However, the project was a usual design-build case, and it can be assumed that the project management team had a good understanding of the relationships between these non-surveyed stakeholders and the others. The data gathered from the survey was analysed by a Social Network Analysis tool, NetMiner (Cyram, 2009). Figure 1 is the map of the networks in the project. Three network indices are used for analysis: density, cohesion, and status centrality (Wasserman and Faust, 1994; and Parise, 2007).

(Insert Figure 1 here)

Density and cohesion are two network measures that are more descriptive of the entire network rather than of individual nodes. Density in the information network is defined as the ratio of existing information ties in a network to the maximum number of ties possible if everyone in the group shared information with everyone else (Wasserman and Faust, 1994; and Parise, 2007). Network density ranges between 0 and 1. The higher the density, the more frequent information sharing is in the network. The mean network density in Figure 1(a) is 0.667, which indicates a high frequent information exchange in the project (Parise, 2007). Cohesion measures "the distance, or the number of links, to reach nodes in a network", and it is based on the shortest path (Parise, 2007). For an information network, the lower the cohesion number, the better, because this indicates that there is a shorter distance for information to be disseminated in the network. Cross and Parker (2004) consider an average cohesion number of around 2 to be acceptable for an information network. The average cohesion in the information exchange network of this project is 2.596, which indicates the average distance to share information from one stakeholder to the others is between 2 and 3. As shown in Figure 1(a), the Warden was the person who brought together disconnected segments, i.e. Family and representatives of the ashes in the landscape and Board, in the network. The Warden was the only one who linked with these stakeholders, and thus he was an important person in the network.

To estimate the prominence of stakeholders in the influence network (Figure 1 (b)), several centrality measures are available such as degree, betweenness, closeness, status and power centrality (Cyram, 2009) in social network theory. Status centrality was used for analysis in this study as this centrality considers every connection (even up to infinite length connections) between focus node and pair nodes (Cyram, 2009). If a focus node has more connections, it may have larger centrality value. As the length of a connection increases, so influence decreases exponentially by the attenuation factor (value is 0.5 in this study). In-status centrality indicates to what the extent a stakeholder is affected by others; whereas, out-status centrality indicates the extent that a stakeholder can affect others (Katz, 1953). Regarding the influence of a stakeholder, the out-status centrality is used as the outcome

measures. The higher the out-status centrality values, the more important the stakeholders are. The status centrality value for each node is shown in Table 6.

(Insert Table 6 here)

The outcomes from the Stakeholder Circle and Social Network Analysis were shown to the project management team in a following meeting. The team was satisfied with the current collaborations in the network (Network density is 0.0667, and Cohesion is 2.596). By comparing the outcomes of stakeholders' priority between Stakeholder Circle (SC) and Social Network Analysis (SNA), the main differences were identified as the priorities of 'Warden' (SC 4, SNA 2), 'Financier' (SC 11, SNA 7), 'Family and representatives of the ashes' (SC 15, SNA 11), and 'Board' (SC N/A, SNA 12). Those numbers in brackets are priority numbers with different methods, namely, Stakeholder Circle (SC) and Social Network Analysis (SNA). It can be found in Figure 1(a) that 'Financier', 'Family and representatives of the ashes', and 'Board' all share information with 'Warden', so a meeting was then conducted with the Warden by the project manger and one of the authors. The warden indicated that he was friends with the financier and some benefactors (Family and representatives of the ashes), and communicated with them about the project periodically. Although these two groups were less involved in the construction stage than in the briefing stage, they did care about the status of the project, particularly the budget (for Financier) and the landscape (for benefactors). With respect to the data about the Board, the Warden explained that it was his responsibility to report to the board members monthly and their satisfaction was important. Therefore, these three groups, namely, 'Financier', 'Family and representatives of the ashes', and 'Board', should be paid attention to. After the meeting with the Warden, the project management team re-thought the ranking list generated via Stakeholder Circle, and re-ordered stakeholder list is as shown in Table 7.

(Insert Table 7 here)

Comparing with the order in the priority list generated via Stakeholder Circle, the Warden was ranked from fourth to second because as seen in Figure 1(a) he was the only one person who communicated with the Board and the Family and representatives of the ashes in the landscape, and also he communicated with relatively extensive stakeholders in the network. Contrarily, the City Council was ranked lower (from sixth to eighth) in the re-ordered list; this is reasonable as the project manager stated that the responsibilities of the City Council were to approve the construction of the project and monitor the construction under the legal requirements; as the project had been approved and was being constructed regularly, the City Council had less influence on the project at that time. In addition, according to the Warden's suggestions (in the last paragraph), the rankings of the Financier and the Family and representatives of the ashes in the landscape were higher in Table 7 than in the priority list (generated via Stakeholder Circle). It should be noted that no approach for identification and prioritization is perfect and that the use of the Social Network Analysis is to help the project team to see anomalies and make the necessary corrections.

The project management team then assessed the current communication with all stakeholders (Step 4 in Stakeholder Circle). The results showed the attitudes of all stakeholders were satisfactory. Finally, the project developed an engagement plan for further application, based on the typology in Tables 3 and 4. The engagement levels and approaches for each stakeholder were developed (Table 7). It can be seen that the engagement level basically increases along with the stakeholders' priority.

At the end of this case study, the project management team was asked to complete a feedback questionnaire. The details will be described in the discussion section. Basically, the project management team considered the typology is useful, and will adopt it as a reference for future work.

Project 2 – Urban renewal (CI) – Council 1

The CI project represents the potential for as much as AU$1 Billion in new investments in a district of the city over the years leading up to 2020. The district was located 8 km north of the city CBD and was a vibrant and diverse community that includes a busy central retail hub. The study area for the CI project was approximately 35 hectares in size, of which Council 1 controls 12 hectares. The CI project evolved from a government plan, itself the product of five years' consultation with associated communities, traders, landowners, state government agencies and other stakeholders. It focuses on new connectivity between people and their places of work, culture, sport and leisure. The main goal of this project was the reinvigoration and renewal of the district.

The project started in 2006, and at the time of writing was at the design stage. More than 400 stakeholders were identified in the project based on all kinds of engagement approaches. Since the project manager was involved in the project from the start, he was asked to review the typology in Table 3 and indicate the approaches for stakeholder analysis and engagement in the CI project. The main approaches were:

Inform: newsletters, postcard series, feedback bulletins, displays, Darzin, media management, fact sheets;

Consult: hotline, focus groups, surveys, walking tour, website, online community forum, listening posts, interviews;

Involve: community champions, community forums/speak out, meetings;

Collaborate and empower: communication café, workshops, community infrastructure reference group.

Most of the approaches were identical to those in Table 3 though some had different names. Since there was a large number of stakeholders and their interests in the project, Darzin was high regarded by the project manager. About 80 stakeholders' interests were classified in Darzin by the project manager team based on the engagement with stakeholders. Stakeholders' information and all kinds of communications can be documented in the Darzin software. Based on the records, all communication activities, actions, and issues related with every stakeholder can be easily identified; and the content of the meeting can be indexed according to the classification of stakeholders' interests.

In order to prioritise the stakeholders, the Stakeholder Circle software was used during a workshop with the project management team. A sample of 29 individuals or groups was chosen from the full list for analysis due to the limited time available. The stakeholders in order of priority are listed in Table 8. The project director and manager thought that the use of Stakeholder Circle for analysing stakeholders' influence added value to their organisation, and said that they would like to apply the outcomes to their communication process. The opinions of the project management team about the typology of approaches were obtained by a feedback questionnaire and are described in the next section.

(Insert Table 8 here)

Discussions

The analysed results in Table 5 indicated the project management teams considered the typology of approaches was useful, and it should be used as a supplement to a systematic process of stakeholder management. Comments were also given by the project management teams. Based on their experiences in stakeholder management, although the approaches in the typology can cover different methods in general, the management teams may name them differently, or combine different approaches in practice. For example, in the CI project, the project management team applied "online community forum", which is a combination of "forum" and "website". From this point of view, it is hard to say the typology includes all methods for stakeholder management. Nevertheless, the project management teams do think this typology is a relative comprehensive collection of approaches and they may develop their own approach profile based on the typology according to the resources in projects and organisations.

The case studies also confirm the findings from previous empirical studies that the selection of approaches should be suitable for a particular situation and depend on resources of the project, the nature of the project and the aims and objectives of the engagement.

In the first project, Social Network Analysis is shown to play a valuable role as an evaluation tool for the estimation of 'whole-of system' stakeholder relationships. However, in the second project, the project management team preferred not to use it with two considerations: (1) the project includes numbers of sub-projects, and involves substantial stakeholders, so it would take a very long time to collect data for Social Network Analysis; (2) most of the stakeholders were external stakeholders, and the respondent rate, if a SNA survey was conducted, could not be guaranteed. Although these considerations are reasonable, the authors consider the main reason that the project management team hesitated to use Social Network Analysis in the project is this approach was in its infancy in the construction industry, and the practitioners had not fully understood its significance.

Similarly, because of the different resources and natures of the two projects, the Darzin software may not be appropriate for the first project. The first project was a relatively small project with less than 20 stakeholder groups, so the approaches for stakeholder analysis and engagement were simplistic and conventional. It may waste of time and money for the project management team to use the software. However, a formal memo like Table 8 would be more useful for the team's information.

A comparison of the engagement approaches used in the two projects reveals that more types of engagement methods were applied in highly complex projects. For example, in the CI project, not only meetings, interviews and surveys were conducted, but also a hotline, newsletters and website were established for the government departments and public's information. In contrast, in the T College project which was considered to be medium complexity projects, only the basic engagement approaches (e.g. meetings, and interviews) were used. Thus, based on these two projects, it can be assumed that the complexity of projects and the experience of the project management teams are contributory to the importance that is attached to stakeholder management.

Besides the considerations in the approach selection, the case studies also confirm that there is no single, most effective approach, and usually a number of alternative approaches are combined to analyse and engage stakeholders. A more obvious example is the combination of the outcomes from Stakeholder Circle and Social

Network Analysis for re-prioritizing stakeholders in the first project. This is also suggested by Chinyio and Akintoye (2008) in their studies in UK that "the respective approaches supplement each other and can be drawn or activated from a pool".

Conclusions

The main focus of this study is the development of a typology of approaches for stakeholder analysis and engagement. A typology is developed based on a literature review, and empirical studies in Hong Kong and Australia. A total of thirty approaches, their strengths and limitations are comprised in the typology. These approaches are classified based on their applications during the stakeholder management process. According to the strengths, limitations and applications of each approach in the typology, practitioners can pick up suitable approaches easily when they conduct stakeholder management. Findings show that the success of a particular approach depends on internal and external factors, such as the nature of the project, the resources in the organisation, and the communication environments. No approach for stakeholder identification and prioritization is perfect. Combining several approaches when necessary is the best way to manage stakeholders.

The typology is a relative comprehensive collection of approaches. Project managers may develop their own approach profile based on the typology according to the resources in projects and organisations. The empirical studies were conducted in Hong Kong and Australia, so the findings may mainly reflect the stakeholder management environments in these two regions. However, as the development process of the typology is rigorous, with circumspect modifications, project managers in other regions may also use it as a reference in their practice.

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Table 1 Approaches proposed in previous studies

Authors	Approaches	Purposes
Rowley (1997)	Social Network Analysis	Analysing stakeholder relationships
De Lopez (2001)	A two-dimensional matrix (the potential of stakeholders and the influence or power of stakeholders)	Classifying stakeholders; Identifying stakeholders influence
Winch and Bonke (2002), Olander (2006), Olander and Landin (2008), Chinyio and Akintoye (2008), Reed et al. (2009)	Power/Interest matrix	Classifying stakeholders; Analysing stakeholders influence; Analysing the change of stakeholders
Newcombe (2003)	Power/predictability matrix and Power/Interest matrix	Classifying stakeholders; Analysing stakeholders influence
Bourne (2005)	The Stakeholder Circle methodology	Classifying stakeholders; Prioritise stakeholders; Visualising stakeholders; Developing strategies; Monitoring effectiveness
Young (2006)	The stakeholder influence matrix	Analysing information of stakeholders; Identifying stakeholders influence
Olander (2007)	The stakeholder impact index	Analysing stakeholders influence
Jepsen and Eskerod (2008)	Stakeholder-commitment matrix	Analysing stakeholder commitment; Analysing the change of stakeholders
Walker et al. (2008)	Stakeholder interest intensity index	Analysing stakeholders influence

Table 2 Practical approaches for analysing and engaging stakeholders in Hong Kong

Purposes			Approaches preferred by the respondents	Mean	Kendall's W [a]
Stakeholder analysis	Identifying stakeholders and their interests	Stakeholder list	Personal past experience	4.15	0.094
			Asking the obvious/identified stakeholders to identify others	3.70	
			Guidelines in the organisation	3.61	
			Professional services	3.55	
			Directed by higher authorities	3.52	
		Stakeholders' interests/information	Focus group meetings	4.28	0.197
			Personal past experience	3.80	
			Interviews	3.78	
			Public consultation approaches	3.75	
			Formal memos	3.45	
			Questionnaires	3.23	
	Analysing stakeholders' relationships		Personal past experience	3.91	0.067
			Workshops	3.90	
			Interviews	3.79	
			Public engagement approaches	3.71	
			Surveys	3.47	
	Assessing stakeholders' influence		The stakeholders' power	4.17	0.184
			The directives from higher authorities	4.08	
			The urgency of the stakeholders' requests	3.77	
			The stakeholders' proximity	3.60	
Stakeholder engagement			Meetings	4.31	0.202
			Workshops	3.96	
			Negotiations	3.92	
			Interviews	3.86	
			Social contacts	3.67	
			Public engagement approaches	3.63	
			Surveys	3.26	

[a] Kendall's Coefficient of Concordance Level of significance = 0.000.

Table 3 A typology of approaches for stakeholder analysis and engagement in construction

Approaches	Stakeholder analysis			Stakeholder engagement
	Identifying stakeholders and their interests	Assessing stakeholders' influence	Analysing stakeholders' relationships	
Construction advice letters				√
Darzin (A software tool)	√			√
Directed by higher authorities	√	√	√	
Displays and exhibits	√			√
Door knocks	√			√
Email/mail/fax/phone	√		√	√
Feedback bulletins				√
Focus groups	√	√		√
Formal memos		√		
Forums	√		√	√
Guidelines	√			
Information hotline	√			√
Interviews	√	√	√	√
Listening post	√		√	√
Media management				√
Meetings	√	√	√	√
Negotiations				√
Newsletters/Postcard series/Fact sheets				√
Open house/open day	√		√	√
Personal past experience	√		√	
Power/interest matrix		√		
Professional services	√	√	√	√
Questionnaires and surveys	√	√		√
Snowball	√			
Social contacts	√		√	√
Social Network Analysis	√	√	√	√
Stakeholder Circle (A stakeholder management methodology)	√	√		√
Walking tour/Site tour				√
Website				√
Workshops	√		√	√

Table 4 Description of the approaches

Approaches	Strengths	Limitations	Levels of engagement
Construction advice letters	• Can keep stakeholders informed; • Can include details such as date of delivery, and date of works.	• Can be time consuming; • May not send to all stakeholders due to information scarcity.	• Inform
Darzin (A software tool)	• Easy to create custom fields for contacts and communications; • Can record and manage restricted access to confidential communications; • Easy distribution of data with built-in mail merge; • View all contacts from an organisation and communications with them on one screen; • Integrated qualitative, quantitative and spatial analysis; • Charts issue trends over time; • Easy to create sophisticated, meaningful reports.	• Can be time consuming to input the data; • Costly.	• Inform
Directed by higher authorities	• Provides advices for project managers.	• Not suitable for all issues.	N/A
Displays and exhibits	• Can focus stakeholders attention on the project; • Can create interest from the media.	• Stakeholders must be motivated to attend; • Can damage the project's reputation if not done well.	• Inform • Consult
Door knocks	• Face-to-face contact ensures stakeholders understand issues and information can be elicited about opinions they express;	• Can be time consuming; • Work better if informing the stakeholders earlier.	• Inform • Consult
Email/mail/fax /phone	• Easy and convenient to communicate; • Can solve problems quickly.	• Difficult to document.	• Inform • Consult • Involve • Collaboration • Empower
Feedback bulletins	• Keep stakeholders informed; • Opportunity to satisfy stakeholders.	• Can be time consuming to prepare; • Not all feedback can be included in bulletins.	• Inform
Focus groups	• Provide opportunity for a wider range of comments; • Good for identifying the reasons behind stakeholders' likes/dislikes; • Highly applicable when a new proposal is mooted and little is	• Requires careful selection to be a representative sample; • Skilled facilitators should be hired; • Can be costly;	• Consult

	known of stakeholders' opinions.	• Groups may not represent the majority opinion.	
Formal memos	• Provides detailed information about stakeholders.	• Can be time consuming to document the information.	N/A
Forums	• Encourage discussion between stakeholders; • Opportunity for exchanging ideas.	• Some stakeholders may not have time to join; • May cause dispute.	• Consult • Involve • Collaboration
Guidelines	• Easy to follow; • Includes stakeholder management as duties.	• Takes time to formulate; • Stakeholders can change depending on situations.	N/A
Information hotline	• Offers an inexpensive and simple device for publicity, information and public input; • It is easy to provide updates on project activities.	• Must be adequately advertised to be successful; • Designated contact must have sufficient knowledge of the project to be able to answer questions quickly and accurately; • May limit a project officer from performing other tasks.	• Inform • Consult
Interviews	• Allow in depth discussion and understanding of issues; • Individual contact means that the location of the meeting is flexible; • Able to explain points in own language; • Usually low cost and easy to arrange.	• Can be time consuming for project team; • Can be expensive; • May not have sufficient time; • Requires skilled interviewers; • Little quantitative information gathered and not majority opinion.	• Consult
Listening post	• Provides an engagement opportunity for those stakeholders who may never attend a formal engagement opportunity.	• Stakeholders may not have time at the listening post session; • Team members should arrange a regular time for it.	• Consult
Media management	• Opportunity for promoting the project; • Opportunity for informing a broad range of stakeholders.	• Can be costly.	• Inform
Meetings	• Cheap and relatively easy to organize • Makes use of existing networks and allows specific stakeholders to be targeted; • Face-to-face contact ensures attendees understand issues and information can be elicited about opinions they express.	• Unknown issues and previous relationships between the stakeholders may drive responses; • Opinions might not be representative of the wider community.	• Inform • Consult • Involve • Collaboration
Negotiations	• Cheaper and faster to solve problems.	• Project team should well prepared;	• Consult

		• Concessions should be made sometimes.	• Involve • Collaboration
Newsletters/Postcard series/Fact sheets	• Can provide regular updates on progress giving a sense of momentum; • Opportunity for stakeholders to get familiar with project issues; • Can give positive impression of desire to keep stakeholders informed.	• Many stakeholders may never read them; • Can be time consuming to prepare well on regular basis.	• Inform
Open house/open day	• Useful when a large number of stakeholders exist; • Builds credibility; • Allows other team members to be drawn on to answer difficult questions.	• It is important to advertise in a number of ways; • Difficult to document.	• Inform • Consult • Involve • Collaboration
Personal past experience	• Clear understanding about the previous stakeholders; • Saves time for consultations.	• May have cognitive limitations; • Can be useless due to the unique nature of construction projects.	N/A
Power/interest matrix	• Project team can pay different attentions and apply different engagement methods according to each types of stakeholders; • Cheaper and easy to do.	• Hard to assess power; • The assessment can not consider the interrelationship between stakeholders.	N/A
Professional services	• Provide complete plans for stakeholder management; • Saves time for project managers.	• Can be costly; • May have bias on the project.	• Consult • Involve
Questionnaires and surveys	• Respondents' anonymity can encourage more honest answers; • Can reach respondents who are widely scattered or live considerable distances away; • Provides information from those unlikely to attend meetings and workshops; • Allows the respondent to fill out at a convenient time. • Provide larger samples for lower total costs.	• Low response rates can bias the results; • Care must be taken that wording of questions is unambiguous to prevent skewed results; • Care is needed in sampling to make sure representative samples are taken; • Information gathered can be superficial and the reasons behind an opinion may not always be clear.	• Inform • Consult
Snowball	• Helps to identify unknown stakeholders; • Reduces project risks; • Builds on resources of existing networks.	• Choice of initial contacts is most important; • Boundary of stakeholders should be decided properly.	• Consult • Involve • Empower
Social contacts	• Build trust with stakeholders; • Maximises two-way dialogue.	• Only suitable for some stakeholders; • Requires creativity and resource investigation to reach a large number of people.	• Inform • Consult • Involve

Social Network Analysis	• Views a specific set of linkages among a defined set of persons as a whole to analyse the interrelationship between stakeholders; • Can identify influential stakeholders and the way to engage them; • Can visualize the relationship network.	• Data collection is difficult; • Can be time consuming; • A specialist in SNA methods is needed.	• Involve
Stakeholder Circle (A stakeholder management methodology)	• Allows project team to make a meaningful assessment of the stakeholders; • Visualises stakeholders' relative power and influence; • Project team can develop engagement strategies according to the current and target levels of stakeholders' interest and support.	• Costly.	• Collaboration
Walking tour/Site tour	• Provides stakeholders with an understanding about the project; • Can be most able to be remembered and understood.	• Can cause inconvenient in site; • Facilities are needed.	• Inform • Consult
Website	• Provides access point for information that can be re-visited; • Can provide an opportunity for direct feedback to project team or sharing of issues; • Provides platform for regular updates for those who want to know more.	• Time consuming to set up; • Needs regular maintenance or will not have credibility; • May not be accessed by all stakeholders.	• Inform • Consult • Involve • Collaboration
Workshops	• Ideal for looking at specific issues; • Excellent for discussion on criteria or analysis of alternatives; • Offers a choice of team members to answer difficult questions; • Builds ownership and credibility for the outcomes; • Maximises feedback obtained from participants.	• Not totally individualized discussion; • Needs to well facilitated with credible individuals who have the interpersonal skills to deal with challenging issues; • If actions not followed through can destroy trust.	• Consult • Involve • Collaboration • Empower

Table 5 Results of the feedback questionnaire survey

Descriptions	Score *					Mean
	Project : T College project	Project 2: CI project	Project 3	Project 4	Project 5	
a) The classification of the approaches in the typology is appropriate.	4	5	5	4	5	4.6
b) The approaches in the typology include all methods for stakeholder management in practice.	5	3	4	4	5	4.2
c) The descriptions of the approaches are appropriate and useful for learning about the approaches.	5	4	5	4	5	4.6
d) The typology is a supplement to a systematic process of stakeholder management.	5	4	5	5	5	4.8
e) The typology will be used a tool collection for stakeholder management.	4	5	5	5	5	4.8

* 5 - Strongly agree, 4 – Agree, 3 – Neutral, 2 – Disagree, 1 – Strongly disagree.

Table 6 The status centrality vector

Stakeholders		Out-Status Centrality
1	Warden	1.862931
2	Financier	0.419561
3	Director of Finance & Administration	1.741418
4	Manager Building, Grounds & OHS	1.905681
5	External consultant	0.340341
6	Director of the Theological School	1.705585
7	Architectural firm	1.103764
8	Contractor	0.513178
9	Sub-contractor	0.121456
10	Consultants	0.347407
11	Suppliers	0.000000
12	Students	0.000000
13	Staffs	0.000000
14	City Council	0.396106
15	Family and representatives of the ashes in the landscape	0.173860
16	Board	0.173860

Table 7 The stakeholder engagement profile for the school building project

Priority	Stakeholder	Their interests about the project [a]	Levels of engagement	Approaches
1	Manager Buildings, Grounds & OHS	All	Collaborate	E-mail, directed by higher authorities, focus groups, formal memos, interviews, meetings, personal past experience, site visit, Stakeholder Circle, surveys, telephone conversations.
2	Warden	P1, P2, P4, P5, P6, E3, CS1 and CS2.	Empower	E-mail, focus groups, guidelines, interviews, meetings, site visit, social contact, surveys, telephone conversations.
3	Director of Finance & Administration	P4, P5, P6, P8, E3, E4, CS1 and CS2.	Collaborate	E-mail, directed by higher authorities, focus groups, interviews, meetings, personal past experience, site visit, Stakeholder Circle, surveys, telephone conversations.
4	Architectural firm	P1, P2, P3, P4, P5, P6, P7, P8, E3 and CS2.	Collaborate	E-mail, focus groups, meetings, site visit, surveys, telephone conversations.
5	Director of the Theological School	All	Involve	E-mail, focus groups, interviews, meetings, site visit, surveys, telephone conversations.
6	Contractor	P4, P6, P9, E1 and E2.	Collaborate	E-mail, focus groups, meetings, site visit, surveys, telephone conversations.
7	Financier	P2, P4, P5, E3, E4 and CS2.	Involve	E-mail, focus groups, meetings, site visit, social contact, surveys, telephone conversations.
8	City Council	P3, P9 and CS2.	Consult	E-mail, meetings, guidelines, telephone conversations.
9	Consultants	P4, P6, P9, E1 and E2.	Involve	E-mail, focus groups, meetings, site visit, surveys, telephone conversations.
10	External consultant	All	Consult	E-mail, focus groups, meetings, site visit, surveys, telephone conversations.
11	Family and representatives of the ashes in the landscape	E3.	Involve	E-mail, meetings, site visit, social contact, surveys, telephone conversations.
12	Board [b]	P1, P4, P5, P6, P7, P9, E3, E4 and CS2.	Consult	Meetings.
13	Sub-contractor	P6 & P9	Involve	E-mail, focus groups, meetings, site visit, surveys, telephone conversations.
14	Suppliers	P4, P6 and P9.	Inform	E-mail, meetings, site visit, telephone conversations.

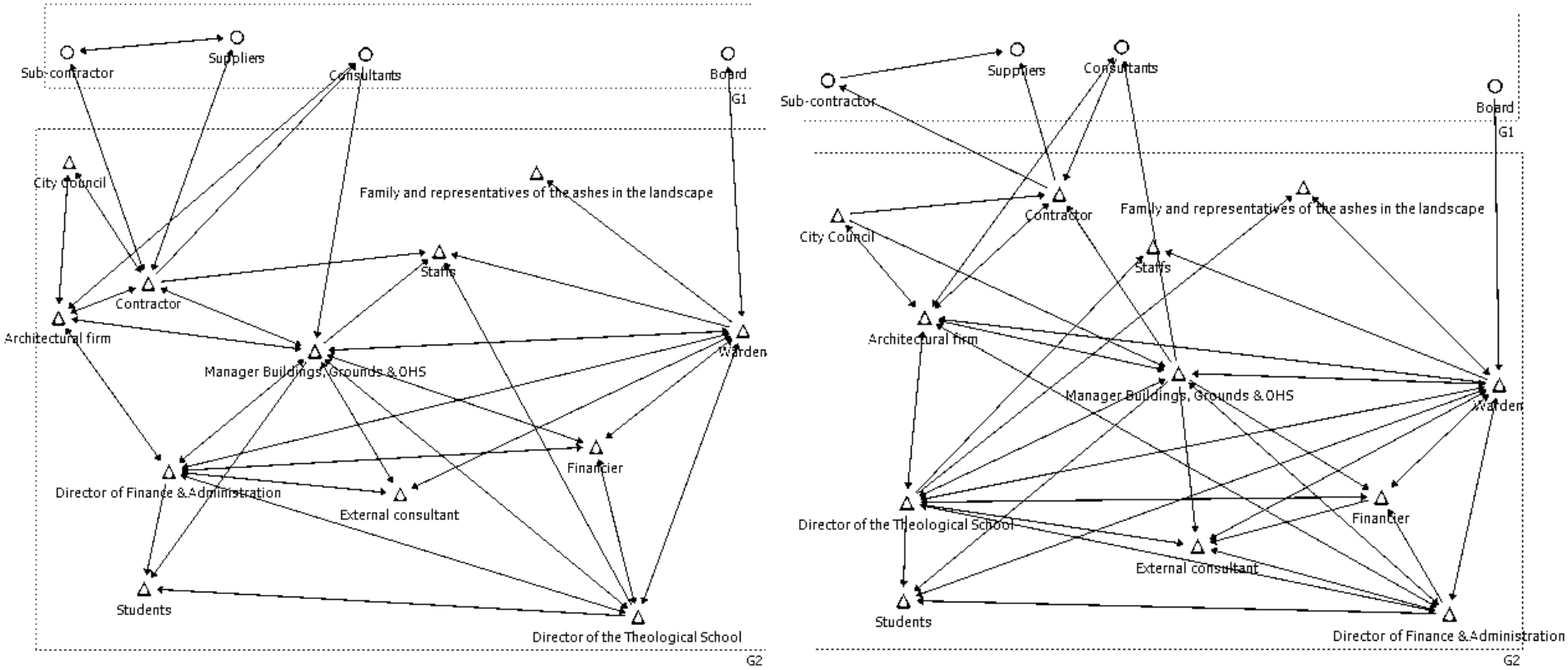
15	Students/Staff	P1, P2, P3, P5, P6, P7, E1, E2, E3, E4, CS1 and CS2.	Inform	E-mail, meetings.

[a] P1 Improved services, P2 Interior space, P3 Mobility, P4 Budget, P5 Quality, P6 Time, P7 Connectivity, P8 Storage, P9 Occupational Health & Safety, E1 Noise, E2 Dust, E3 Landscape, E4 Sustainability practices, CS1 Parking, CS2 Heritage & streetscape.

[b] Board is added in the list according to the SNA survey.

Table 8 The selected stakeholders and their priority in the CI project

Priority	Stakeholders
1	Director of Vic Roads
2	Director of Vic Track
3	Councillors
4	Internal management executive group
5	Chief Executive Officer (Local community health service)
6	CEO of Tram company
7	Director of Public Transport Department - Bus
8	President of Local traders' association
9	Financiers
10	CEO of Affordable housing association
11	CEO of Local energy foundation
12	CEO of a major retail store
13	Local activist (Coach of Under 16 football club)
14	President of Primary School Council
15	Convenor (Save the Olympic Outdoor Pool Group)
16	Coordinator (Local child care centre)
17	Convenor of Disability Advisory Group
18	Hudson Street residents
19	President of Local residents' association
20	Chairman of Library advisory committee
21	Small business owners in local mall
22	CEO of Cinema group
23	Convenor (Local bicycle users group)
24	President of Uniting Church Council
25	President of Local historical society
26	Residents of Local retirement village
27	Director of Small local investment group
28	Convenor of Youth Advisory Group
29	Lebanese women's group



(a) Information exchange network (b) Influence network

Notes: G1 (Circular nodes): Not themselves surveyed stakeholders; G2 (Triangle nodes): Surveyed stakeholders.

Figure 1 The networks and matrixes in the school building project