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# Stakeholder impact analysis of infrastructure project management in developing countries: a study of perception of project managers in state-owned engineering firms in Vietnam

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Construction projects can involve a diverse range of stakeholders and the success of the project depends very much on fulfilling their needs and expectations. It is important, therefore, to identify and recognize project stakeholders and develop a rigorous stakeholder management process. However, limited research has investigated the impact of stakeholders on construction projects in developing countries. A stakeholder impact analysis (SIA), based on an approach developed by Olander (2007), was adopted to investigate the stakeholders' impact on state-owned civil engineering projects in Vietnam. This involved the analysis of a questionnaire survey of 57 project managers to determine the relative importance of different stakeholders. The results show the client to have the highest level of impact on the projects, followed by project managers and the senior management of state-owned engineering firms. The SIA also provides suggestions to project managers in developing and evaluating the stakeholder management process.

**Keywords:** Project management, project success, project stakeholders, infrastructure projects, Vietnam.

## Introduction

In recent years, sustained economic growth and accession to the World Trade Organization (WTO) have provided enormous progress in infrastructure development across Vietnam. Infrastructure development is one of the areas that has been offered investment incentive policy by the Vietnam government. According to Vietnam's General Statistics Office (2008), the amount of money from government budget invested in improving the infrastructural system has been increasing significantly over the period from \$2103 billion VND in 2000 to \$9635 billion in 2007. The total investments in infrastructure have been approximately 10% of GDP in Vietnam in recent years, which is a very high level in comparison with international standards. The government record also shows that the total length of road in Vietnam has doubled since 1990 (Ministry of Agriculture and Rural Development, 2006). These developments have offered a favourable operating environment and business opportunities for local and foreign construction/

engineering firms, but have also intensified competition in the market (Nguyen *et al.*, 2004a). However, the management of construction and infrastructure projects has encountered a range of problems, such as incompetent designers/contractors, poor estimation, changes in environment and inefficient site management (Nguyen *et al.*, 2004a, 2004b). This has driven many construction/engineering firms to examine their internal organizational structure and evaluate the external factors affecting their projects in order to improve competitiveness and achieve better project outcomes (Thé, 2006).

Traditionally, construction projects are considered to be successful if they fulfil the objectives of budget, schedule and quality (Chua *et al.*, 1999). Mallak *et al.* (1991) and Sanvido *et al.* (1992) argue that projects are also considered to be an overall success if they meet the expectations of their participants or stakeholders, including owners, planners, engineers, contractors and operators. Stakeholder management is an important part of the strategic management of organizations (Cleland and Ireland, 2007). Project stakeholders may

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influence projects either positively or negatively and therefore the assessment of stakeholder influence is an important task for project managers to enhance the likelihood of project success (Cleland and Ireland, 2007). Olander (2007) clearly stated that it is necessary to examine and evaluate the application of the stakeholder impact index in construction project management across different stages and places. To date, however, stakeholder impact analysis (SIA) has been very limited on construction projects in developing countries and little is understood of the nature and impact of stakeholder influence in infrastructure development. In summary, there are three main objectives:

- (1) to determine stakeholder influence on projects involving state-owned construction companies in Vietnam, based on Olander's model (Olander and Landin, 2005 and Olander, 2007);
- (2) to identify the degree of influence of each major stakeholder via a questionnaire survey; and
- (3) to prioritize the impact of project stakeholders based on their level of influence.

## Literature review

Infrastructure has been often considered as a key component in the economy (Threadgold, 1996) and also one of the basic services to industry and households (Martini and Lee, 1996). Major infrastructure projects are usually considered as large-scale systems characterized by being physically or dimensionally large, with a large number of subsystems and components, and complex relations between these components (Yeo, 1995). Grimsey and Lewis (2002) defined five major activities regarded as infrastructure projects, which include energy (power generation and supply), transport (toll roads, light rail systems, bridges and tunnels), water (sewerage, waste water treatment and water supply), telecommunications, social infrastructure (hospitals, education institutes, government buildings). However, achieving success in infrastructure development is not an easy task; Yeo maintained that success in development of an infrastructure project requires great integration of effort and careful management of the stakeholders' interests.

There has been much debate relating to the definition of stakeholders. According to Freeman (1984) for example, stakeholders are 'groups and individuals who can have effects on, or are affected by, the objectives of an organization' (p. 46). In general, this definition implies bi-directional influence between organizations and groups/individuals. It therefore takes into account a large number of persons and organizations that are directly and/or indirectly related to the organization.

Several have followed this line of thinking (e.g. Mitchell *et al.*, 1997; Frooman, 1999; Jawahar and Gary, 2001; John, 2002; Olander, 2007; Jepsen and Eskerod, 2008; Stephen and Chris, 2008). A narrower definition is provided by Mitchell *et al.* (1997), who mainly focus on the individuals/groups of direct relevance to the core economic interests of the companies involved, while Cleland and Ireland (2007) believe that stakeholders are people/groups having or claiming interest in a project and its activities. Freeman (1984) considers stakeholders as a necessary factor for the firm's survival (cited in Mitchell *et al.*, 1997). Clarkson (1995), by contrast, believes that stakeholders are those who have placed something at risk in a relationship with the firm. Similarly, Ward and Chapman (2008) regard stakeholders as sources of uncertainties.

Another key question in identifying the stakeholders of a project is *who/what are considered as stakeholders?* In contrast with the stakeholder definition of an organization discussed above, many share similar views on project stakeholder definition. They agree that stakeholders are people/organizations involved in and have an interest in the project (for example, McElroy and Mills, 2000; Bourne, 2005; Johnson *et al.*, 2005). Among these definitions, many authors have used the definition of the Project Management Institute (PMI) for their research (e.g. Gray and Larson, 2002; Burke, 2006; Kerzner, 2006; Cleland and Ireland, 2007; Lester, 2007). PMI (2004, p. 24) describes stakeholders as individuals and organizations that are actively involved in the project, or whose interests may be affected as a result of its execution or completion and this is adopted here. However, the task here is not to evaluate every stakeholder, but rather to focus on key stakeholders, who, as McElroy and Mills (2000, p. 760) state, are people and/or organizations with a strong interest in the project outcomes.

## Stakeholder analysis and identification

Scholars and industry practitioners alike have been attempting to investigate the factors that lead to project success for many decades. In recent years, many researchers have given the view that project success concerns not only cost, time and quality, but also the satisfaction and effective management of the stakeholders involved (e.g. Mallak *et al.*, 1991; Bourne and Walker, 2004; Jepsen and Eskerod, 2008). Recent studies have suggested that stakeholder involvement is an important factor of project success (Dainty *et al.*, 2003; Chan and Chan, 2004; Wang and Huang, 2006). In fact, project success means different things to different parties. According to Parfitt and Sanvido (1993), 'success' is an intangible perceptive feeling, which varies with different management expectations,

among people and with the phases of project. Chan and Chan (2004) maintain that different parties in the construction industry have their own project objectives and criteria for measuring project success. Construction projects attract a large number of individuals, organizations and companies who influence the project in many ways. The impact can be either positive or negative and for different purposes. Project managers, therefore, face significant challenges in managing stakeholders effectively. In order to overcome these difficulties and to complete projects successfully, project managers need to critically identify stakeholders, understand their expectations/interest, and be accurately aware of their potential influence on the project. This must be done so as to maximize stakeholders' positive influence while minimizing the negative impact (Bourne and Walker, 2005b). The failure of projects due to inadequate stakeholder management can therefore be avoided (McElroy and Mills, 2000). SIA helps the project manager to determine the type and extent of attention needed for each stakeholder.

Stakeholder identification is widely regarded as the first step in stakeholder analysis (McElroy and Mills, 2000; Cleland and Ireland, 2007; Jepsen and Eskerod, 2008) and numerous approaches are available. The most popular is to categorize them into several groups depending on their relative position in the project, level of involvement in the project management process or legal relations between them and the project. Project stakeholders include project sponsor, end users, client, core project team, and the team members together with community and external groups and shadow team members—people who have informal relations with the project (Walker, 2003). Similarly, PMI (2004) indicates that project stakeholders comprise a project manager, customer/user, performing organization (the firms whose employees directly participate in the project), project team members, project management team, sponsor, influences and the project management organization (PMO).

Briner *et al.* (1996) identify four sets of stakeholders: client; project leader's organization; outside services; and invisible team members. This perspective on project stakeholders corresponds with Walker (2003) and PMI (2004). In contrast, Tuman's approach (2006) to identify project stakeholders is to consider four main groups, namely project champions, project participants, community participants, and parasitic participants. Among these, project participants include people who bring the project into being, such as the client, developers, customers and investors. Project participants are those who are responsible for planning and implementation; for example project team, engineers, workers and contractors. Communication participants, on the other hand, comprise groups and/or

individuals who are directly affected by the project; for example the social, economic and natural environment within which it is implemented. Lastly, the groups and individuals, such as the media and family, who have no direct stake in the project but present challenges, are considered as parasitic participants. Several have shared the view that project stakeholders fall into two major categories: internal and external (e.g. Mitroff, 1983; Calvert, 1995; Turner, 1995; Pinto, 1996; and Winch, 2004). According to Pinto (1996, p. 30), internal stakeholders include top management, accountants, functional management and project team members. External stakeholders are clients, competitors, suppliers and environmental/political/consumer groups.

Depending on the relationship between stakeholder and project, stakeholders are categorized as primary or secondary (Clarkson, 1995; and McElroy and Mills, 2000) and direct or indirect stakeholders (Lester, 2007). To some extent, the two methods essentially categorize project stakeholders in a similar way. According to Cleland and Ireland (2007, p. 153), primary stakeholders include those who have legal relationships with the project and a responsibility in the project management processes—such as cost, time, quality management. Similarly, direct stakeholders are people who directly engage in the planning, executing and administration processes of a project (Lester, 2007). Both Cleland and Ireland (2007) and Lester (2007) agree that secondary and indirect stakeholders do not participate directly in the project. Included in this category are environmental, social and economic groups, media and families. A recent study (Takim, 2009) of the needs and expectations of different stakeholders, including the government, the consultants, private clients and contractors, in the development of a construction project in Malaysia shows different construction stakeholders' attitudes in the developing country. The results found that the government and the consultants' attitudes towards keeping their stakeholders satisfied, well-informed and educating them is by means of providing forums, open communications interfaces and visual techniques, such as photomontage and project models. This finding reinforces the belief that any criteria possibly affecting a project in terms of social obligations and political interference are most likely to be of great importance to the government and its consultants. In contrast, private clients focus on the formulation of a project coalition, followed by the needs of defining a project mission, while contractors focus on 'lobby tactics', keeping stakeholders well informed and defining project mission. Based on the above literature review and study of Vietnamese state-owned engineering construction firms, the key stakeholders are identified. They include project manager, design team, executive management, quality control, legal adviser, hydraulic engineers,



clients, related organizations, subcontractors/suppliers and environmental organizations.

### **An overview of key stakeholders' factors in influencing project performance**

#### *Power*

The 'power' factor is considered to be a key driver of stakeholder-manager relations for several reasons. First, the definitions of stakeholders discussed in the previous section undoubtedly imply that relationships between stakeholders and the project reflect social-business exchanges. However, many definitions locate power within social relationships. For example, early research by Weber (1947) defines *power* as 'the probability that one actor within a social relationship would be in a position to carry out his own will despite resistance' (p. 152). Dahl (cited in Mitchell *et al.*, 1997, p. 865) shares the view that *power* is 'a relationship among social actors in which one social actor, A, can get another social actor, B, to do something that B would not otherwise have done'. Emerson (1962) shares the same opinion that *power* is a property of social relations. Handy (1993) defined five main sources of power in organizations: physical power; positional power; resource power; expert power; and personal power. Handy (1993) maintains that physical power is rarely used and of little relevance to project stakeholder management. Furthermore, although personal power is fairly important when assessing power level, it is difficult to evaluate in a group of people or an organization because it relates to individual traits. Hence, we only assess stakeholder power here through three sources: positional, resource and expert.

#### *Legitimacy*

The legitimacy of a stakeholder is a prerequisite for the success of transactions with stakeholders (Freeman, 1984). Suchman (1995) defines legitimacy as 'a generalized perception or assumption that the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs and definitions' (p. 574). Mitchell *et al.* (1997) indicate that many scholars define stakeholders as those who have such legitimate relationships with firms (including contracts, moral and legal rights). However, Mitchell *et al.* (1997) suggest that although Suchman's definition is imprecise and difficult to apply, it represents the sociologically based definitions of legitimacy and contains some useful approaches to identify stakeholders. Mitchell *et al.* (1997) conclude that legitimacy is a social good—something larger and more shared than mere self-perception that may be defined and

negotiated differently at various levels of social organization. In addition to this perspective, the central idea of legitimacy is understood in terms of normative and derivative (Phillips, 2003). Phillips points out that normative stakeholders are those to whom the organization has a moral obligation. This is an obligation of stakeholder fairness over and above that due to other social actors, simply by virtue of being human. Derivatively legitimate stakeholders are those whose actions and claims must be accounted for by managers, because of their potential effects upon normative stakeholders. In short, the legitimacy of a stakeholder is a complex concept. However, the above discussion gives a sense that legitimacy reflects the contractual relations, legal and moral rights in relationships between stakeholders and a project.

#### *Urgency*

Urgency is described by Mitchell *et al.* (1997) as the 'degree to which stakeholder claims call for immediate attention' (p. 866). They argue that urgency only exists when two conditions are met: (1) when a relationship or claim is of a time-sensitive nature; and (2) when that relationship or claim is important or critical to the stakeholder. They also state that urgency has two attributes: time-sensitive and criticality. The urgency concept is similar to the imperative concept defined by Mitroff (1983) as feeling strongly enough about an issue to act. Hence, the urgency attribute of stakeholders decides the extent to which they exert pressure on a project manager by calling for emergency action.

#### *Proximity*

Proximity, according to Bourne (2005), implies the extent to which a stakeholder is involved in the project. She uses proximity as a criterion to prioritize project stakeholders by rating them on a scale of 1 to 4—where 1 is relatively remote from the project (does not have direct involvement with the processes) and 4 is directly working on the project (most of the time). Bourne and Walker (2005b) argue the need to take proximity into account in stakeholder analysis by stating that stakeholders who may have strong power and influence but are relatively far from the project core may seem transparent/invisible. Therefore their potential impact may be underestimated.

#### *Vested interest*

Stakeholder interest in a project is considered by many researchers to be a factor affecting the success outcome of a project. Several scholars, as discussed above, even show the 'interest' term in their stakeholder definitions—such as the definitions of McElroy and Mills (2000), PMI (2004) and Bourne (2005). Furthermore,

the interest of stakeholders in a project is included in the power/interest matrix that Johnson *et al.* (2005) formulate. This matrix helps project managers determine which strategy should be applied in communication with and management of project stakeholders. Similarly, Cleland and Ireland (2007) contend that stakeholders have a vested interest in a project for numerous reasons such as mission relevance, economic interest, legal right, political support, health and safety, lifestyle, opportunism and survival. Hence, it can be concluded that vested interest is an important driver of the stakeholder–project relationship.

#### *Stakeholder attitude*

Because stakeholders may have negative or positive impacts on projects, there is a need to determine objectives and supporters. Stakeholder attitude refers to whether the stakeholder supports or opposes the project (McElroy and Mills, 2000). In other words, this factor gives a ‘clue’ for managers to be aware that stakeholders have positive or negative influences on project outcomes. According to McElroy and Mills (2000), stakeholder attitude includes five levels: active opposition, passive opposition, no commitment, passive support and active support.

#### *Stakeholder knowledge*

Mallak *et al.* (1991) observe that today, stakeholders tend to be more sophisticated, informed and vocal, thereby being more knowledgeable than ever before. They argue that owing to technological development, stakeholders can seek a variety of information from numerous sources. Undoubtedly, the more knowledge a stakeholder has about the project, the more he/she is able to influence it. McElroy and Mills (2000) suggest stakeholder knowledge ranges from full awareness to total ignorance. The former refers to the intention of stakeholders to gain knowledge of the project by finding the facts to help them achieve their own objectives. The latter, on the other hand, refers to the fact that stakeholders have knowledge of the project by hearsay and assumptions rather than facts.

Additionally, it may be argued that although the stakeholder may have a strong importance to, and great interest in, the project, it hardly accounts for influence if the stakeholder lacks sufficient knowledge. As such, stakeholder knowledge is considered a driver in respect of stakeholder impact on projects.

#### *Stakeholder impact analysis*

In the real world, stakeholders have influenced projects in a variety of complex ways. In order to analyse the impact of stakeholders upon projects, it is necessary to identify and include the factors by which they do so. An

approach of most concern for many scholars is the stakeholder classification proposed by Mitchell *et al.* (1997). Stakeholders are classified by various combinations of attributes including power, legitimacy and urgency. The levels of these attributes essentially drive the degree of stakeholders’ importance in projects. Mitchell *et al.* (1997) define seven types of stakeholders, depending on the degree of each attribute. These stakeholder types include: (1) dormant; (2) discretionary; (3) demanding; (4) dominant; (5) dependent; (6) dangerous; and (7) definitive. This provides a strong sense of stakeholder impact on projects when considering the alternative concurrence of attributes to determine the importance of stakeholders. Project managers, therefore, can categorize stakeholders to develop appropriate responses to manage them. However, this approach does not show whether or not they support the project. Furthermore, since the approach merely considers the appearance of attributes, it is impossible to compare the level of stakeholder influence with others in the same group. McElroy and Mills (2000) offer a method for assessing stakeholders by mapping two key factors: stakeholder attitude and knowledge. By combining possible attitude and knowledge, they group project stakeholders into four types as represented by four quadrants in the chart, namely: support/aware, support/ignorant, oppose/ignorant and oppose/aware. This approach has included the attitude and knowledge of stakeholders in the assessment, thus enabling project managers to be aware of whether the stakeholder is an ally or enemy of the project. However, since other factors—such as power, legitimacy, urgency and others—are not taken into account, it is impossible to determine the impact of stakeholders on the project. Johnson *et al.* (2005), however, consider only two drivers including power and interest to assess stakeholders. Similar to the McElroy and Mills’ illustration (2000), they also depict power and interest in a chart. Their power/interest matrix consists of a grid where power and interest are relevant factors. These factors range from low to high. There are four discrete areas in the matrix, each of which represents a recommended strategy for managing stakeholders. By grouping them in the power/interest matrix, project managers can produce a better strategy of how to manage stakeholders effectively. This method has included two major factors, namely power and interest, in evaluating influence. However, similar to the approach of Mitchell *et al.* (1997), the attitude of stakeholders towards the project is not included in stakeholder assessment. Furthermore, stakeholder impact is considered insufficient since the approach does not take into account the urgency and legitimacy drivers. In summary, the *stakeholder impact* is calculated by the following formula:

$$I = P + L + U + K + D \quad (1)$$

where  $I$  = stakeholder impact level;  $P$  = stakeholder power level;  $U$  = stakeholder urgency level;  $L$  = stakeholder legitimacy level;  $K$  = stakeholder knowledge level; and  $D$  = stakeholder proximity degree.

In contrast, Bourne and Walker (2005b) establish a connection between the interest/impact and the concepts derived from the risk assessment process associated with probability-impact analysis. Their approach is reasonable because, to some extent, stakeholders can be considered as project risks (including threats and opportunities). They suggest a scale for measuring stakeholder vested interest (5) and impact (1) as 1 = very low; 2 = low; 3 = neutral; 4 = high; and 5 = very high. The *stakeholder vested interest-impact index*, therefore, is calculated by the formula:

$$V_{iii} = \sqrt{\frac{v \star i}{25}} \quad (2)$$

where  $V_{iii}$  = stakeholder vested interest-impact;  $v$  = stakeholder vested interest level; and  $i$  = stakeholder impact level.

Bourne (2005) suggests another method to identify and prioritize stakeholders by considering three key drivers: power, proximity and urgency. Stakeholders, then, are illustrated in the Stakeholder Circle™ visualization tool developed by Bourne, according to their ability to influence project outcomes. Compared to the many methods mentioned above, this approach gives a very clear picture of stakeholder influence on projects. Furthermore, because the level of influence is estimated through the interest-impact index coupled with the level of stakeholder participation through the proximity factor, project managers are able to prioritize stakeholders in projects. Thus, the effectiveness of the stakeholder management process is enhanced. However, because the attitude of stakeholders is not considered, they are not determined as either supporters of or objectors to the project.

Olander (2007) suggests an approach to evaluate stakeholder impact on projects by calculating the impact index. He takes into account most key drivers discussed earlier in his work, such as power, legitimacy, urgency, vested interest-impact and attitude. The *impact index of a stakeholder* then, is the product of the stakeholder attribute ( $A$ ), vested interest-impact index ( $V_{iii}$ ) and stakeholder attitude ( $P_{os}$ ):

$$S_{II} = V_{iii} \star P_{os} \quad (3)$$

Overall, the Olander approach includes comprehensive factors that account for stakeholder influence on the project. However, there is an overlap when Olander (2007) includes both stakeholder impact and power in the calculation, because, as discussed above, power is

the driver of stakeholder impact on the project. Additionally, Olander does not take into account stakeholder knowledge in his work, while this driver also significantly influences the level of stakeholder impact on the project.

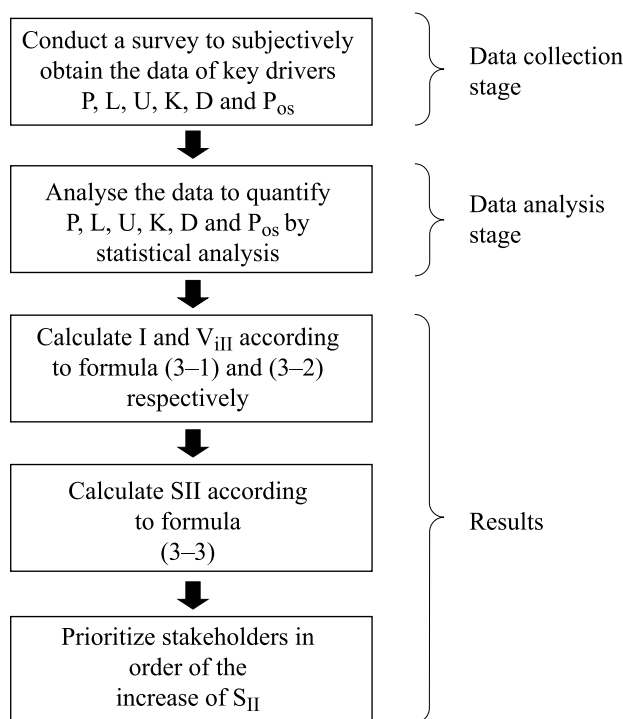
In summary, studies have been conducted and have suggested several methods combining two or more key drivers in order to determine stakeholder influences on projects. Despite these efforts, there is still a lack of any attempt to include all the factors. Based on those discussed in the literature review, an approach to determine influence represented by the stakeholder influencing index is proposed. These indexes are then used for prioritizing the project stakeholders.

## Research method

In order to prioritize project stakeholders, a *stakeholder influence index* is adapted from Olander's (2007) stakeholder impact index. The main reason for using the term 'stakeholder influence index' rather than 'stakeholder impact index' is to distinguish it from the 'stakeholder impact' term as described below. It is important to note that the name is less important than the hidden basis it represents. In order to determine the stakeholder impact on a project, there is a need to identify the factors that drive its level. As discussed earlier, stakeholders have three attributes: power, legitimacy and urgency (Mitchell *et al.*, 1997). The cumulative number of these elements classifies the stakeholders into seven types, namely: dormant; discretionary; demanding; dominant; dangerous; and definitive stakeholders (Mitchell *et al.*, 1997). To demonstrate the level of stakeholders' influence on the project, the three different indices are calculated: (1) stakeholder impact; (2) stakeholder vested interest-impact index; and (3) stakeholder influence index. Figure 1 summarizes the process adopted to determine the stakeholder influence index and prioritize stakeholders in projects owned by state-owned engineering firms.

## Survey sample and data collection

A number of steps were adopted to obtain the sample population in this research. The researcher first created a systematic sample by obtaining a list of companies in engineering firms from various sources, including trade publications, the internet, government publications, Yellow Pages, as well as discussion with industry experts. Phone calls were made in order to identify and confirm the key person in the company before the survey invitation letters were sent out. Then, a survey



**Figure 1** Process to determine stakeholder influence index and to prioritize stakeholders

invitation letter was prepared and addressed to the executives or directors of all targeted companies via postage or, in a few cases, e-mail. The invitation letter attempted to confirm which companies had experience in state-owned infrastructure construction projects, and also to obtain approval and pre-agreement for participation in the surveys. Only those companies with relevant experience are included in this study. Contact names in these companies were obtained.

In the meantime, surveys were distributed to industry friends or partners who have been working with the researcher over a long period of time; members of this group work in organizations varied in size, type of projects, experience, etc. In order to maximize the survey sample size, the 'snowball' sampling approach is adopted by asking the industry partners/friends, as well as directors or project managers of the targeted companies in the invitation letter for referrals to additional practitioners that they knew (Creswell, 2002). The purpose is to 'snow-ball' from a few potential respondents to many respondents. Finally, contact details (including position, company address, phone and e-mail address) of 80 potential respondents were achieved from the above-mentioned channels, and questionnaire surveys were then distributed to these respondents via e-mail. A survey method based on e-mails and online mode was used to gather data as this approach can significantly reduce time and cost, and makes it easier to manage a large sample size (Cobanoglu *et al.*, 2001;

McDonald and Adam, 2003). Project managers were selected as participants as they take full responsibility for the management of projects and play a central role in relationships with other stakeholders (PMI, 2004).

The survey questions were designed as rating scale forms—in which the participants select their attitude on a continuum of options and a pilot survey was carried out with two experienced practitioners in order to ensure the clarity and relevance of the questions and ascertain the criticality of the items. These comprised:

- *Power*: the subjects are asked to rank the power level of each stakeholder in projects in which they were involved. The stakeholder power level in the questionnaire is understood as a stakeholder's capacity to make a change in the project—being gauged on a continuum from 0 (i.e. negligible level of power/cannot generally cause any change) to 4 (i.e. very high level of power/superior capacity in terms of politics, finance to formally instruct change and even stop the project).
- *Legitimacy*: in order to measure the degree of stakeholder legitimacy in projects, this question concerned the relation type between stakeholders and projects. The relation is from 0 (i.e. the stakeholder has only an indirect relationship with the project) to 3 (i.e. the stakeholder has a contractual relationship with the project).
- *Urgency*: the question was concerned with the level of response to claims made by each stakeholder in projects. The possible answers range from 0 (i.e. there is no need for action outside routine communications) to 3 (i.e. immediate action is warranted, irrespective of other work commitments).
- *Proximity*: this evaluated the degree to which stakeholders are associated with projects. This degree rests on a range of 0 to 3, where 0 represents 'fully remote from the project' (i.e. have neither indirect nor direct involvement with project), and 3 represents 'directly working and being involved full-time in all project management processes'.
- *Knowledge*: this is concerned with stakeholder knowledge of projects by evaluating from 0 (i.e. total ignorance) to 5 (i.e. full awareness).
- *Vested interest*: this obtains a subjective assessment of the level of vested interest of each stakeholder in projects by choosing the possible degree from 1 (very low) to 5 (very high).
- *Attitude*: this measures the attitude of each stakeholder towards the project. The subjects are required to choose one option out of five: -1 (active opposition), -0.5 (passive opposition), 0



(no commitment), 0.5 (passive support) and 1 (active support).

Also, it is clearly stated in the questionnaire survey that all collected data will be kept strictly confidential and anonymous, and they will be used for academic research purposes only. The survey was conducted in October–November 2008 by sending the URL of the website containing the questionnaire to the e-mail addresses of 80 project managers. Out of the 80 questionnaires posted, 57 valid responses were received, giving a net response rate of 71%.

## Findings and discussion

### Demographic information

Of the 57 respondents the majority of 50.9% (29 respondents) have worked for state-owned civil engineering design firms from five to 10 years, with 19.3% (11 respondents) from one to five years and 29.8% (17 respondents) from 10 to 20 years. More than half the respondents (57.9%) are project managers of one to five state-owned projects. The percentages for 5–10 projects, 10–20 projects and more than 20 projects are 31.6%, 8.8% and 1.8% respectively. All projects involved in this study were concerned with infrastructure development, including highway and bridge construction projects. In this study, the enterprise where the survey was conducted is engineering firms focusing on the design of the projects. Furthermore, the survey was conducted only on projects in concept design phase, and thus, neither contractor nor supervisor had been involved in projects. In Vietnam, many transport infrastructure projects have been traditionally funded by government, and thus the owner is often either central government or local government. After Vietnam's entry into the World Trade Organization in 2001, there are increasing numbers of infrastructure projects financed by private companies, overseas organizations, and the like.

### Stakeholder power

The responses to this item are used to estimate the value of the power variable for each of the stakeholders. All respondents share the view that project clients have the highest power. This can be explained by the fact that most construction projects for upgrading infrastructure in Vietnam have been funded either by the Vietnamese government or by provinces' authorities. Therefore, in these projects, the clients not only have had the power of those who provide finance, but have also held the political power in the national management system to formally approve and decide whether

the project is to be implemented or changed. Almost 72% of project managers believe that their power level was moderate. This is not surprising because in state-owned construction firms, project managers only have the power to manage project team members, deal with technical issues and assist top management in making decisions related to projects. They have no power to decide either financial issues or changes. Also, around 70% of respondents think that related organizations exert high to very high power over state-owned construction projects. Additionally, many project managers (82.46%) in state-owned construction firms agree that the power level of environmental organizations in projects is low.

### Stakeholder legitimacy

More than 87% of respondents think that, because internal stakeholders (project manager, designer, executive management, quality control department, legal adviser and hydraulic engineer, etc.) have been integrated into state-owned construction firms, their valid relationships with projects are stipulated in firm regulations rather than contracts. Very few of these stakeholders have contractual relationships with state-owned construction projects. The reason for this is that some projects are implemented in a joint venture with other companies and therefore they have to sign legal agreements for those projects. It is not surprising that all respondents believe there to be contracts between projects and clients and subcontractors/suppliers. Also, the legitimacy variable value for client and subcontractors/suppliers is the highest with a mean of 3, followed by project manager and legal adviser with slightly lower means of 2.12 and 2.04 respectively.

### Stakeholder urgency

In general, project managers tend to respond to the demands of all stakeholders. Specifically, more than 70% of project managers polled immediately reply to the claims of executive management (100%), project clients (80.75%), related organizations (78.95%) and environmental organizations (70.18%). Meanwhile, the claims of the rest of the listed stakeholders are replied to within the planned time.

### Stakeholder proximity

All 57 respondents believe that only project managers directly work full time from the beginning to the closure of state-owned projects. Meanwhile, most other stakeholders have directly participated in projects. However, they did this on a part-time basis as they also simultaneously engage in other projects. On the other

hand, no respondents have family members involved in their projects.

### Stakeholder knowledge

All respondents agree that only project managers could have a full awareness of projects. This can be explained by the fact that project managers are the people who take full responsibility, take charge in dealing with technical issues, solving problems, attending meetings, etc. throughout the project life cycle. The results also show that senior management and project clients have a considerable knowledge of projects—in contrast with quality control department, legal advisers and subcontractors/suppliers.

### Stakeholder vested-interest

Many stakeholders (such as design team, quality control department, related organizations, subcontractors/suppliers and environmental organizations) have a moderate interest in state-owned projects, while project managers and project clients have a particular interest in state-owned projects.

### Stakeholder attitude

Unsurprisingly, most respondents think that project managers, senior management, legal advisers and clients express an active supporting attitude towards projects. This can be explained by the fact that the success of those projects would have created many advantages, such as prestige, value for money and promotion. It is also apparent that internal stakeholders, including the design team, express a range of attitudes—from passive opposition to active support. Hard

work with low payment may be the main reason why 14.04% and 63.16% of respondents believe that design teams passively object to projects and have no commitments to do projects respectively. In general, it seems that environmental organizations do not support projects.

### Stakeholder influence index calculation

The results for the individual factors, stakeholder impact calculation, stakeholder vested interest-impact index and stakeholder influence index are displayed in Tables 1 and 2. This shows the stakeholder priority in order of the influence index, ranging from lowest to highest. Overall, the data collected for each variable are closely clustered around the mean, with the population variance ranging from 0 to 0.45—indicating that the data are reasonably uniform (Leedy and Ormrod, 2001, p. 268). As can be seen, the project client is the top of the list, meaning that this stakeholder is likely to have the most influence on state-owned projects and should therefore receive the project manager's closest attention. The project manager and senior management follow with the high scores of 1.55 and 1.54 respectively. This implies that despite being slightly lower than the client's score, these stakeholders have a high level of potential influence on state-owned projects. The high score of project manager in the analysis is not surprising. In the enterprises where the survey was conducted, project managers have taken full responsibility for the projects. Specifically, he/she has to prepare and defend feasibility studies by analysing economic, technical, social and environmental criteria. In addition, their duty is to perform the basic design of projects. Thus, the project managers are likely to have strong influence on projects that they have engaged in.

**Table 1** Summary of stakeholder impact

Stakeholders	Stakeholder Impact				
	Power Mean (SD, variance)	Legit Mean (SD, variance)	Urgency Mean (SD, variance)	Proximity Mean (SD, variance)	Knowledge Mean (SD, variance)
Project manager	2.28 (0.45, 0.21)	2.12 (0.33, 0.11)	2.14 (0.48, 0.23)	3.00 (0.00, 0.00)	3.00 (0.00, 0.00)
Design team	0.84 (0.41, 0.17)	1.98 (0.23, 0.05)	1.98 (0.13, 0.02)	2.02 (0.13, 0.02)	1.58 (0.57, 0.32)
Executive management	3.12 (0.33, 0.11)	2.02 (0.13, 0.02)	3.00 (0.00, 0.00)	2.00 (0.00, 0.00)	2.33 (0.48, 0.23)
Quality control	1.86 (0.35, 0.12)	2.00 (0.19, 0.04)	2.04 (0.19, 0.03)	2.00 (0.00, 0.00)	1.04 (0.19, 0.03)
Legal advisor	0.74 (0.48, 0.23)	2.04 (0.19, 0.03)	2.02 (0.13, 0.02)	1.98 (0.13, 0.02)	0.96 (0.19, 0.03)
Hydraulic engineering	0.56 (0.50, 0.25)	2.00 (0.19, 0.04)	2.00 (0.00, 0.00)	2.00 (0.00, 0.00)	1.23 (0.42, 0.18)
Clients	4.00 (0.00, 0.00)	3.00 (0.00, 0.00)	2.81 (0.40, 0.16)	2.07 (0.26, 0.07)	2.23 (0.42, 0.18)
Related organizations	3.02 (0.55, 0.30)	1.74 (0.44, 0.20)	2.75 (0.51, 0.26)	1.96 (0.19, 0.03)	1.67 (0.51, 0.26)
Subcontractors/suppliers	1.23 (0.42, 0.18)	3.00 (0.00, 0.00)	1.91 (0.34, 0.12)	2.00 (0.00, 0.00)	1.02 (0.35, 0.12)
Environmental organizations	1.21 (0.53, 0.28)	1.12 (0.33, 0.11)	2.68 (0.51, 0.26)	1.74 (0.44, 0.20)	1.26 (0.44, 0.20)

Notes: Power = stakeholder power level; Legit = stakeholder legitimacy level; Urgency = stakeholder urgency level; Proximity = stakeholder proximity degree; Knowledge = stakeholder knowledge level.

**Table 2** Summary of stakeholder influence index

Stakeholders	Stakeholder vested interest-impact index			Stakeholder Influence	Rank	
	Impact	Vested Int Mean (SD, variance)	V <sub>III</sub>	Attribute Mean (SD, variance)	S <sub>II</sub>	
Project manager	12.54	4.77 (0.46, 0.21)	1.55	1.00 (0.00, 0.00)	1.55	2
Design team	8.40	3.25 (0.54, 0.30)	1.04	0.07 (0.36, 0.13)	0.07	9
Executive management	12.47	4.75 (0.43, 0.19)	1.54	1.00 (0.00, 0.00)	1.54	3
Quality control	8.93	2.96 (0.26, 0.07)	1.03	0.48 (0.21, 0.04)	0.50	6
Legal adviser	7.74	3.53 (0.66, 0.43)	1.04	0.94 (0.23, 0.05)	0.98	4
Hydraulic engineering	7.79	3.63 (0.62, 0.38)	1.06	0.25 (0.30, 0.09)	0.26	7
Clients	14.11	4.45 (0.50, 0.25)	1.06	1.00 (0.00, 0.00)	1.60	1
Related organizations	11.14	2.91 (0.47, 0.22)	1.14	0.53 (0.17, 0.03)	0.60	5
Subcontractors/suppliers	9.16	3.04 (0.38, 0.14)	1.05	0.11 (0.21, 0.04)	0.11	8
Environmental organizations	8.02	2.70 (0.50, 0.25)	0.93	-0.17 (0.30, 0.09)	-0.16	10

Notes: Impact = stakeholder impact level; Vested Int = stakeholder vested interest level; V<sub>III</sub> = stakeholder vested interest-impact; Attribute = the product of the stakeholder attribute; S<sub>II</sub> = impact index of a stakeholder.

The next group of stakeholders comprises legal adviser (0.98), related organizations (0.6), quality control department (0.5), hydraulic engineering department (0.26), subcontractors/suppliers (0.11) and design team (0.07). Interestingly, environmental organizations, with negative index value, are thought to negatively impact on state-owned projects.

As noted by Olander (2007), stakeholder analysis based on the stakeholder impact index can be adopted as a tool for planning and evaluation. It not only provides a way to structure the stakeholders and their influences on the project, but also helps to evaluate the stakeholder management process in a project's life. One important function of stakeholder analysis is that it helps to obtain feedback on how alternative options to proceed will affect the 'positive input' and 'negative impact' of project stakeholders prior to each important decision (Olander, 2007).

### Limitations of the study

This paper adopted a standard approach to analyse stakeholders for the success of state-owned engineering projects in Vietnam. This was done by examining key factors affecting stakeholder influences, determining analysis approach, estimating the influence levels of stakeholders in state-owned engineering construction firms and prioritizing stakeholders. It must, however, be acknowledged that there are several limitations. First and foremost, the questionnaire survey issued to project managers necessarily restricts their response, with the danger that information so obtained remains at a rather general and superficial level. Specifically, in order to limit the questionnaire to a reasonable number

of questions, the information sought dealt mainly with general assessment of key factors driving stakeholder influence on project purposes rather than including all sub-drivers that affect key factors. For example, the 'power' driver, as discussed in the literature, includes five sources: physical power, positional power, resource power, expert power and personal power. However, in the survey, project managers are merely required to subjectively evaluate the power level of each stakeholder instead of each power source.

This study also merely analysed the stakeholders of state-owned engineering construction projects in concept phase, and therefore its outcome cannot be used for managing projects in such phases as detailed design or shop drawing design. However, stakeholders of these phases can be analysed in the same manner.

As maintained by Crouch and Housden (2003), good sampling practice is the key to the ability of quantitative surveys to represent the views of the population being studied. In this study, in addition to the random selection of engineering firms from various sources (for example, publications and discussion with experts), a part of the sample in the study was also obtained by distributing the survey instrument to industry contacts who have been associated with the researcher in Vietnam over a long period of time. Of course, it is possible that might affect the representativeness of the sample group and bias the eventual results. However, such an approach is not unusual in studies of this type and the spread of disciplines and experience in the resulting sample is such that it is highly unlikely for bias to be a significant issue. To completely remove any doubts concerning this aspect, it would be beneficial to conduct a future study that contains a purely randomly selected sample for use as a comparison.

A further limitation of the study lies in its limited generalizability. Since only 57 state-owned engineering construction firm project managers are involved in the questionnaire, the findings cannot be firmly generalized to other companies in Vietnam. Thus the limited scope of this study does not allow the researcher to make strong general claims. Further research is required to examine and evaluate the application of stakeholder analysis in Vietnam's construction industry across different organizations/firms and project execution level. A larger sample size would help in increasing the generalizability of these findings. Similar representative studies can also be conducted in other developing countries. Furthermore, the overall stakeholder impact, power and other criteria could be influenced by factors including the type of project, the procurement method and the size of project. Thus, further study could be extended to include these factors and examine the effects on the stakeholder.

## Conclusions

This research attempts to understand and analyse stakeholders' impact on infrastructure projects (mainly highway and bridge construction projects) in Vietnam. State-owned engineering firms are the focus of the study. This research provides an insight to the project managers in regard to the levels of stakeholder influence on their projects in Vietnam. This enables the management in Vietnamese engineering firms to formalize appropriate action plans to ensure effectiveness in stakeholder management. Since this research project is one of the first few studies investigating Vietnam's state-owned engineering firms dealing with stakeholder analysis, it focuses on analysis for projects implemented in the concept design phase. The results provide groundwork and help to formulate strategies for managing stakeholders in state-owned firms. Future studies may be undertaken to analyse stakeholder influences in other phases of projects and determine appropriate strategies to effectively manage stakeholders.

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