

Stakeholder analysis for R&D project management

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R&D projects affect the interests of different stakeholders in different ways. Understanding the stakeholders and analysing their interests helps in the better management of R&D projects. In this paper we discuss a methodology to systematically analyse the stakeholders of R&D projects. This methodology includes Freeman's (1984) three levels of analysis: rational, process and transactional. Based on these three levels, the stakeholder management capability of an R&D project is determined. The final stage is based on Mitchell *et al.* (1997) approach to analysing the dynamics of stakeholders. This methodology is illustrated using a New Zealand case relating to a road pricing R&D project.

1. Introduction

The research interest in the field of stakeholder identification, analysis and salience is growing. Since the publication of Freeman's landmark book, *Strategic Management: A Stakeholder Approach* (1984), about a dozen books and more than 100 articles with primary emphasis on the stakeholder concept have appeared in the management literature (Donaldson and Preston, 1995). Stakeholder theories are being proposed and experts in the field are debating over the acceptability of these theories.

Stakeholder issues are important while managing R&D projects (Coombs *et al.*, 1998). We begin this paper by presenting some examples of stakeholder issues in the R&D management literature. Then, to get a better understanding of the stakeholder concept, we explore and classify the stakeholder concepts in management literature. Based on this literature, we suggest a stakeholder analysis methodology suitable for managing R&D projects. Finally, we demonstrate this methodology by presenting a New Zealand case study.

2. Stakeholders in R&D management

Researchers in the field of R&D management have acknowledged the importance of stakeholders. Introducing the scope of fourth generation R&D, Miller (1995) suggested that participation of multiple stakeholders would permit concurrent learning and alignment of multiple sets of stakeholder values. While trying to extend the definition of stakeholders, he explained that stakeholders exist beyond the boundary of a single organisation into a partnership infrastructure. According to him, fourth generation R&D applies the concept of participatory design to the entire innovation system, and integrates the potential customer (user) and partners into R&D activity, thereby building overlapping communities of practice. He also proposed that one of the steps in fourth generation R&D is performing prototype tests with stakeholders. Tipping *et al.*, (1995) noticed that various R&D stakeholders have different interest and perspectives on the innovation process and they accommodated it in a Technology Value Pyramid model representing a hierarchy of managerial factors. Reijts (1994), while reporting the Foresight studies in the

Netherlands explained that, for the success of the studies, it was essential to bring together different stakeholders, to create consensus between them on future directions, and to commit them to the results. Carter (1997) acknowledged that a principal difficulty in research administration is communicating the value of R&D to sponsors and other stakeholders who make funding decisions. Explaining the challenge of fifth generation R&D, Rogers (1996) proposes that management systems must be collaborative, not competitive or even cooperative, and focus upon the total innovation system designed with suppliers, partners, distributors, and other stakeholders, including customers – all as integral participants in defining new frontiers.

A specific area of R&D management where stakeholders become very important is R&D project management. Identifying key stakeholder issues was found to be a best practice by Coombs *et al.* (1998), while developing benchmarking tools for R&D project management. They have also explained a basic model of the R&D project management process consisting six

stages of initial scoping, project specification, detailed planning, action/review cycle, completion and delivery and post project evaluation. Klimstra and Potts (1988) found that R&D project management requires the management of interpersonal and group relationships and the establishment of equality of power and influence. According to Eckert (1996), one of the steps that a research administrator should take is to assemble the team of stakeholders and communicate with them as needed to ensure good internal working relationships and processes. Thus, these examples verify that stakeholder management is an important aspect of R&D management.

3. A review of stakeholder literature

The development of the stakeholder concept in the management literature can be classified into different stages as shown in the stakeholder literature map (Figure 1). Freeman (1984) developed the first three levels of this map and we extended the map by

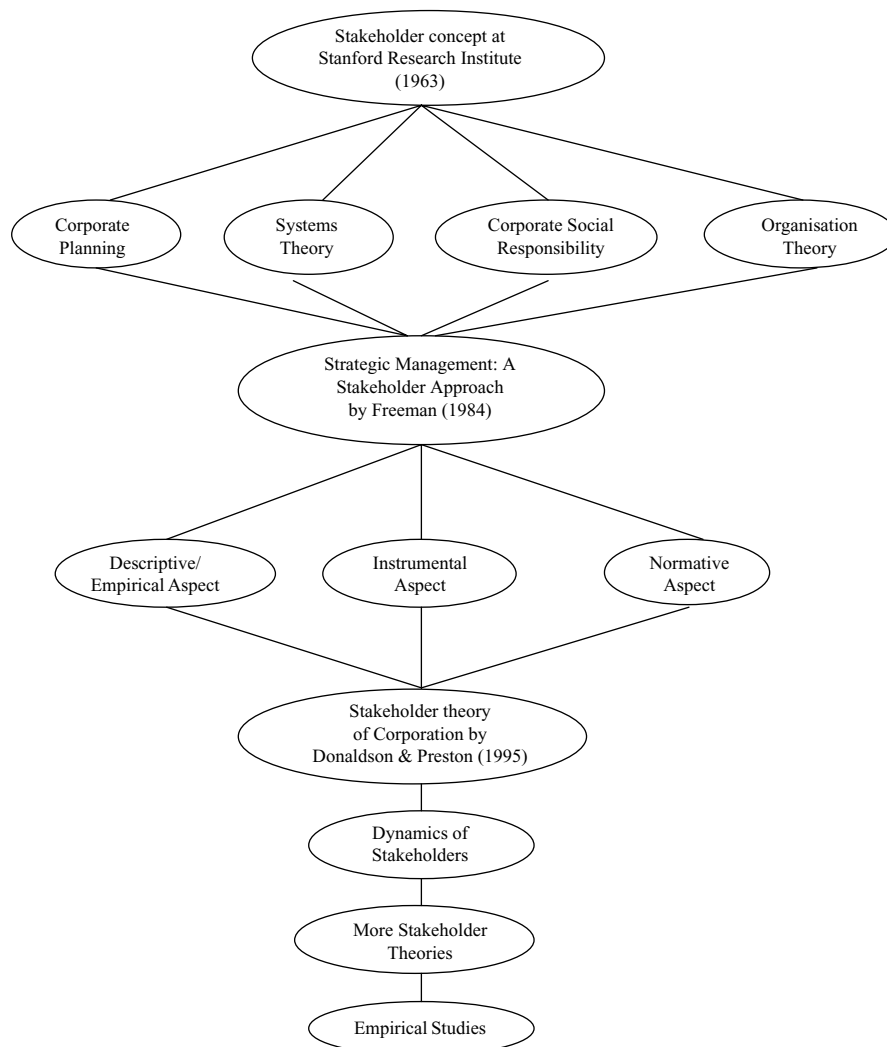


Figure 1. Stakeholder literature map.

incorporating the later developments in this field. After its origin in 1963, the concept diversified into four different fields namely, corporate planning, systems theory, corporate social responsibility and organisation theory. We call this stage 'classical stakeholder literature'.

The next landmark in the development of stakeholder literature was the book by Freeman (1984), *Strategic Management: a Stakeholder Approach*. After this book, this literature developed around three different aspects namely, descriptive/empirical aspect, instrumental aspect and normative aspect. Donaldson and Preston (1995) brought these three aspects together in their stakeholder theory of corporation.

Further, the stakeholder literature started spreading its wings to interesting areas like dynamics of stakeholders and stakeholder theories. Several empirical studies were also conducted to validate the theoretical claims relating to the stakeholder concepts.

A detailed description of this literature map is available in the paper by Elias *et al.* (2000). But for the scope of this paper we discuss three important stages in the development of this literature, namely, classical stakeholder literature, strategic management: a stakeholder approach, and the dynamics of stakeholders.

3.1. Classical stakeholder literature

The origin of 'stakeholder' in management literature can be traced back to 1963, when the word appeared in an international memorandum at the Stanford Research Institute (cited in Freeman, 1984). Stakeholders were defined as 'those groups without whose support the organisation would cease to exist'. The core concept, in other words was 'survival'; without the support of these key groups, the firm will not survive.

During its formative stage, stakeholder theory itself had to fight for survival, when Ansoff (1965) in his classic book *Corporate Strategy* argued for the rejection of stakeholder theory. According to him 'responsibilities' and 'objectives' were not synonymous but were made one in stakeholder theory.

By the 1970s stakeholder concepts began to surface in the strategic planning literature. Taylor (1971) predicted that the importance of stockholders would diminish and that, in the 1970s, businesses would be run for the benefit of other stakeholders too. King and Cleland (1978) came up with a method of analysing stakeholders in project management. Hussey and Langham (1978) developed a model of the organisation and its environment with stakeholders and used it in the corporate planning process.

Systems theorists also contributed to the development of the stakeholder literature in the 1970s. Ackoff (1974) developed a methodology for stakeholder analysis of organisational systems. He argued that stakeholder participation is essential for system design

and the support and interaction of stakeholders would help in solving many societal problems. Churchman (1968) also contributed by developing systems theory to address social issues in an open systems point of view. The systems model of stakeholders emphasised participation and argued that problems should not be defined by focussing on analysis, but by enlarging or synthesising.

Many researchers were also concerned with the social responsibility of business firms. Post (1981) categorised the main lines of research in this area, covering many ideas, concepts and techniques (e.g. Sethi, 1971; Preston, 1979). The distinguishing feature of this literature is that the concept was used to include non-traditional stakeholders who were having adversarial relationships with the firm. The sub discipline of management called 'business and society' developed by researchers at the School of Management at Berkeley (e.g. Epstein and Votaw, 1978) and Harvard Business School (e.g. Ackerman, 1975) argued for responsiveness instead of responsibility.

In the organisation theory literature, Rhenman (1968) used the term stakeholders explicitly to designate the individuals or groups which depend on the company for the realisation of their personal goals and on whom the company is dependant. Pfeffer and Salancik (1978) constructed a model of organisation-environment interaction and claimed that the effectiveness of an organisation derives from the management of demands, particularly the demands of interest groups.

Thus, classic stakeholder theory originated on the concept of survival, falls into four groups namely, corporate planning, systems theory, corporate social responsibility and organisational theory (Freeman, 1984).

3.2. Strategic management: a stakeholder approach

Researchers in the stakeholder field differ in their worldview on stakeholder concepts, but most of them acknowledge Freeman's (1984) book *Strategic Management: a Stakeholder Approach* as a landmark in the stakeholder literature. In his book, Freeman defines stakeholders as 'any group or individual who can affect or is affected by the achievement of the firm's objectives'.

He proposed a framework, which fits three levels of stakeholder analysis – rational, process and transactional. At the rational level, an understanding of 'who are the stakeholders of the organisation' and 'what are their perceived stakes' is necessary. As a technique, Freeman uses a generic stakeholder map as a starting point. It is also possible to prepare a stakeholder map around one major strategic issue. As the next step, a stakeholder chart is prepared by identifying specific stakeholders based on the stakeholder map. Further, the stakes of the specific stakeholder groups are

identified and analysed. He also uses a two dimensional grid as an analytical device to depict an organisation's stakeholders. The first dimension categorises stakeholders by interest or stake and the second dimension is in terms of power. He makes the grid more realistic by improving on the classical stakeholder grid to prepare a real world stakeholder grid.

At the process level, it is necessary to understand how the organisation either implicitly or explicitly manages its relationships with its stakeholders, and whether these processes fit with the rational stakeholder map of the organisation. According to Freeman, existing strategic processes that work reasonably well could be enriched with a concern for multiple stakeholders. For this purpose, he uses a revised version of Lorange's (1980) schema for strategic management processes.

The transactional level involves, understanding the set of transactions or bargains among the organisation and its stakeholders, and deducing whether these negotiations fit with the stakeholder map and the organisational processes for stakeholders. According to Freeman successful transactions with stakeholders are built on understanding the legitimacy of the stakeholder and having processes to routinely surface their concerns.

Broadly, the emphasis of Freeman's book is to construct an approach to management that takes the external environment into account in a systematic way. He provides a solid theoretical basis for the understanding of the stakeholder concept and paved the way for extensive future research in the field.

3.3. Dynamics of stakeholders

Another interesting characteristic of stakeholder concept is the dynamics of stakeholders. Over time, the mix of stakeholders may change. New stakeholders may join and wish to be included in any considerations, while others may drop out, through no longer being involved in the process.

The concept of the dynamics of stakeholders was acknowledged by Freeman (1984), and according to him, in reality stakeholders change over time, and their stakes change depending on the strategic issue under consideration. Alkhafaji (1989) also contributed to the understanding of this concept. To explain the dynamics, he defined stakeholders as the 'groups to whom the corporation is responsible'.

Another notable work on this concept was by Mitchell *et al.* (1997). They proposed that classes of stakeholders can be identified by the possession or attributed possession of one or more of three relationship attributes: power, legitimacy and urgency. According to them, a party to a relationship has power, to the extent it has or can gain access to coercive, utilitarian or normative means, to impose its will in the relationship. For explaining legitimacy they used the

definition of Suchman (1995). Suchman defined legitimacy as a generalised 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. They defined urgency as the degree to which stakeholder claims call for immediate attention. By including urgency as an attribute, a dynamic component was added to the process whereby stakeholders attain salience in the minds of managers. By combining these attributes they generated a typology of stakeholders.

According to their typology (Figure 2), if a stakeholder possesses only one of the three attributes, they are termed latent stakeholders and have low stakeholder salience. If the only attribute present is power, such stakeholders are called dormant stakeholders; if it is only legitimacy, they are called discretionary stakeholders and if only urgency, they are called demanding stakeholders. Stakeholder salience will be moderate, if two attributes are present and such stakeholders are called expectant stakeholders. Among the expectant stakeholders, those having power and legitimacy only are called dominant stakeholders; those having legitimacy and urgency only are called dependant stakeholders and those having power and urgency only are called dangerous stakeholders. Stakeholder salience will be high where all the three attributes are perceived by managers to be present in a stakeholder and they are called definitive stakeholders. Further the dynamic qualities were illustrated by showing how stakeholders can shift from one class to another, when the salience of stakeholders increase/decrease by attaining/losing one or more of the attributes. Later, Agle *et al.* (1999) confirmed the model by empirically testing Mitchell *et al.*'s (1997) theoretical model.

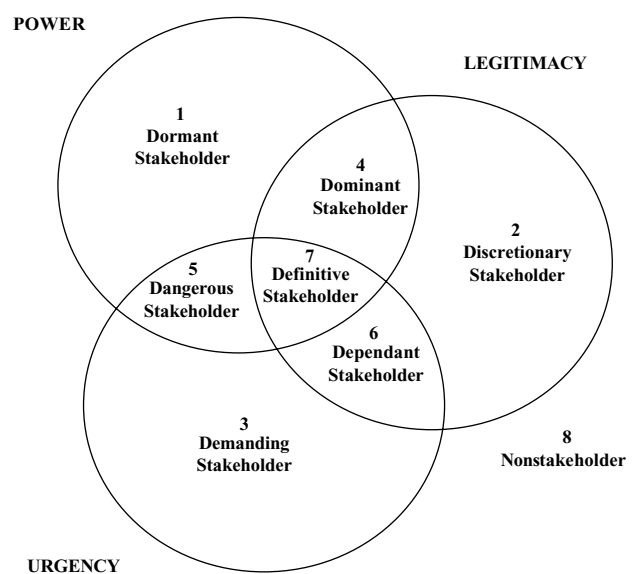


Figure 2. Stakeholder typology.

Source: Mitchell *et al.* 1997, Figure 2, p. 874.

Dynamics of stakeholder is a very interesting and important aspect of the stakeholder concept. Further research and empirical studies are required to get a better understanding and to gain deeper insight of this area.

4. Stakeholder analysis for a New Zealand R&D project

The stakeholder analysis methodology we propose is based on the literature discussed in the previous sections. Mostly, the literature focuses on an organisation, while discussing stakeholder analysis. We try to adapt this methodology for R&D project management. In this section, we illustrate this methodology, using a New Zealand case study.

The New Zealand case that we use in this study is based on an R&D project managed by the Wellington Regional Council. Wellington Regional Council has been seeking a suitable solution to the increasing problems of congestion, safety and community severance along the existing state highway route between Paremata and Paekakariki. A possible solution to these problems is the construction of the Transmission Gully motorway, a 27-km inland route. The cost of constructing Transmission Gully is estimated to be NZ\$245 million. At present, government funding alone may not meet this cost. This situation suggests the introduction of road pricing. Thus, if the early construction of Transmission Gully becomes a reality, it is likely to be the first application of road pricing in New Zealand and the principle of 'doing it right the first time' becomes relevant in this case. Due to the

importance of this situation, the Wellington Regional Council started an R&D project to explore the different aspects of road pricing.

A systematic stakeholder analysis for this R&D project consists of the following eight steps. The first seven steps are based on Freeman (1984) and the last step is based on Mitchell *et al.* (1997).

- (i) Develop a stakeholder map of the project
- (ii) Prepare a chart of specific stakeholders
- (iii) Identify the stakes of stakeholders
- (iv) Prepare a power versus stake grid
- (v) Conduct a process level stakeholder analysis
- (vi) Conduct a transactional level stakeholder analysis
- (vii) Determine the stakeholder management capability of the R&D project
- (viii) Analyse the dynamics of stakeholders

4.1. Develop a stakeholder map of the R&D project

For an R&D project, the rational level of stakeholder analysis should start with the development of a stakeholder map. The stakeholder map of the road pricing R&D project is shown in Figure 3.

4.2. Prepare a chart of specific stakeholders

As the next step in rational level analysis, a stakeholder chart is prepared. This chart consists of the specific stakeholders based on the stakeholder map. For the road pricing project this chart is shown in Figure 4.

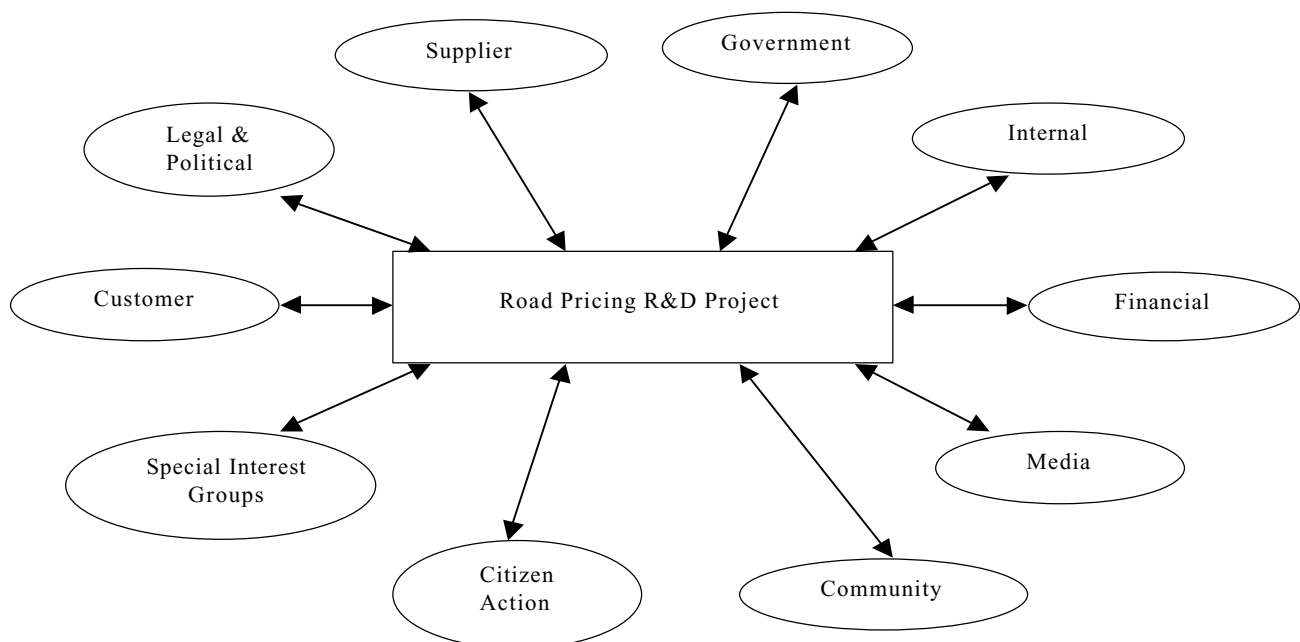


Figure 3. A stakeholder map of the road pricing R&D project.

Internal Wellington regional councillors Regional land transport committee members Passenger transport committee members Environment committee members WRC environmental management department	Financial Commercial banks Private companies funding companies Transfund New Zealand The Treasury Inland revenue department
Media The Dominion newspaper Evening Post newspaper TV New Zealand Radio New Zealand Other local newspapers	Community IWI group - Ngati Toa IWI group - Te Ati Awaki Whakarangotai Farming Community: Pastoral Farmers at Horokiri Valley Forestry: Land Management Group, WRC Property Owners Wellington regional residents
Citizen Action Transmission gully action council Paremata residents association Pukerua bay residents association Plimmerton residents association Mana Esplanade action committee Save Paremata inlet committee Pauatahanui residents association Tawa progressive and ratepayers association Waikanae progressive and ratepayers association Guardians of Pauatahanui inlet	Special Interest Groups Department of Conservation Campaign for Better City Cycle Aware Friends of Patenui inlet Transport 2000 Haywards action group Gully alternatives information network Regional Park Users & Officials Tranz Rail Porirua Gun Club Officials
Customer Commercial road users association Regional chamber of commerce Public transport users association Other road users	Legal/Political New Zealand police Labour party National party Alliance party Greens party ACT party New Zealand First party
Government Ministry of Transport Wellington Regional Council Wellington City Council Hutt City Council Upper Hutt City Council Kapiti Coast District Council Porirua City Council Transit New Zealand	Supplier Booz, Allen & Hamilton-Consultants Beca Carter Hollings & Ferner Ltd.-Consultants: McDermott Miller Ltd. - Consultants

Figure 4. Specific stakeholders of the road pricing R&D project.

4.3. Identify the stakes of the stakeholders

Further, the stakes of the specific stakeholder groups is identified and analysed. In Figure 5 we have shown the major stakes of some selected stakeholders of the road pricing R&D project.

4.4. Prepare a power versus stake grid

In the next phase of rational level analysis, a two dimensional grid is prepared. The first dimension categorises the stakeholders by stake and the second dimension by power. For the road pricing project, this grid for some selected stakeholders is shown in Figure 6.

4.5. Conduct a process level stakeholder analysis

After the rational level of analysis, it is necessary to understand how the project management implicitly or explicitly manages its relationships with its stakeholders. It is also important at this stage to know whether these processes fit with the rational stakeholder map of the project.

While analysing the road pricing R&D project, we found that Wellington Regional Council has a well-

structured stakeholder consultation process. A three-stage process – identifying needs and most desirable outcomes; selecting the best package; and confirming the policies and projects was found to ensure ownership and commitment of stakeholders. This three-stage process was clearly presented in the Wellington Regional Land Transport Strategy, 1999–2004 (Wellington Regional Council, 1999).

4.6. Conduct a transactional level stakeholder analysis

At this level, we must understand the set of transactions or bargains between the project management and its stakeholders and deduce whether these negotiations fit with the stakeholder map and the organisational processes for stakeholders. Successful transactions with stakeholders are built on understanding the legitimacy of the stakeholder and having processes to routinely surface their concerns.

At this stage, it appears that the effectiveness of the transactions between the project managers and stakeholders is relatively low. Due to the very nature of the project, different stakeholders have conflicting interests. But these conflicts have not yet been satisfactorily resolved and this has resulted in a delay of the R&D project.

Regional Land Transport Committee	Transfund New Zealand	Transit New Zealand
Responsibility for regional transport development	Allocation of available funds	Safe and efficient state highway system Management of the needs of road users and communities
Commercial Road Users Association	Transmission Gully Action Council	Regional Chamber of Commerce
High users of the road	Construction of the Transmission Gully at the earliest Needs of local community	Regional business development Profits of member business groups

Figure 5. Stakes of selected stakeholders of the road pricing R&D project.

Stake	Power		
	Formal or voting	Economic	Political
Equity	Wellington Regional Council		
Economic	Transfund New Zealand	The Treasury Inland Revenue Department	
Influencers	Regional Land Transport Committee Transit New Zealand Regional Chamber of Commerce	Private funding companies Commercial banks	Labour Party Alliance Party National Party

Figure 6. Stakeholder grid for selected stakeholders of the road pricing R&D project.

4.7. Determine the stakeholder management capability index of the R&D project

Stakeholder management capability of an R&D project can be defined as its understanding or conceptual map of its stakeholders, the processes for dealing with these stakeholders and the transactions which it uses to carry out the achievement of project purpose with its stakeholders (Freeman, 1984). To determine the stakeholder management capability we have to first judge whether the project management

understands its stakeholder map or not. Then, we have to rate the R&D project for its organisational process and transactions for dealing with its stakeholders.

According to our analysis, the road pricing R&D project managers understand their stakeholder map. Our process level analysis gave a high rating for the processes with which they deal with their stakeholders. But according to us, the effectiveness of the transactions and bargains between the project managers and stakeholders is relatively low. Based on this analysis,

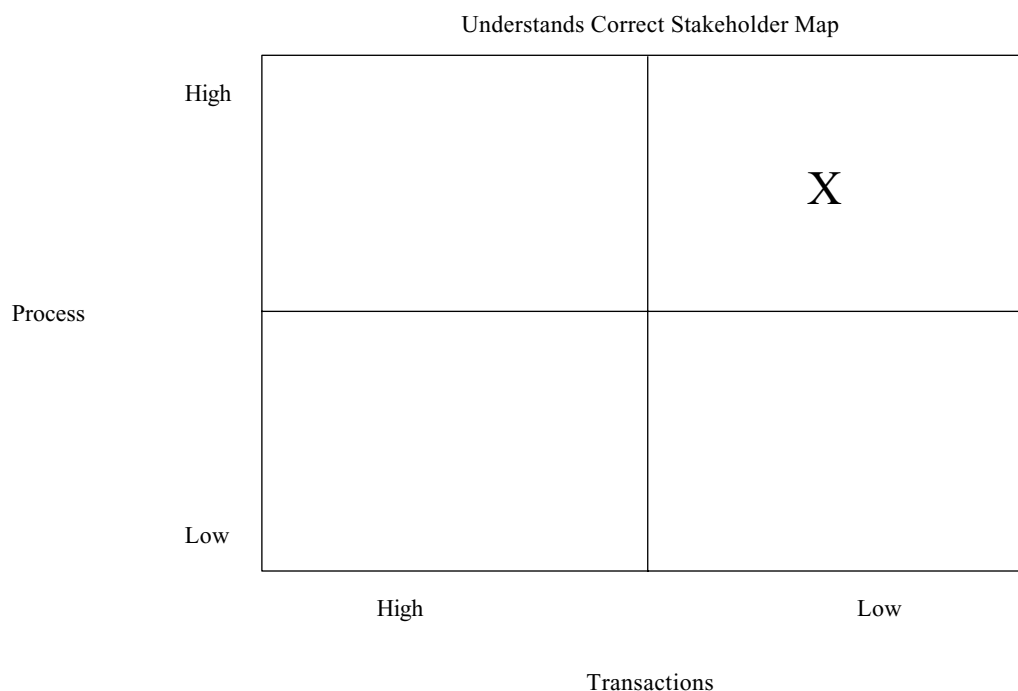


Figure 7. Stakeholder management capability of road pricing R&D project.

we present the stakeholder management capability of this R&D project in Figure 7.

4.8. Analyse the dynamics of stakeholders

The attitudes of stakeholders towards the project and the salience of the stakeholders in the eyes of the project managers change with respect to time. Capturing this dynamic of stakeholders will enrich the stakeholder analysis of an R&D project.

The stakeholder typology model developed by Mitchell *et al.* (1997) can be used for this purpose. The salience of stakeholders will change as their power, legitimacy and urgency changes. Project managers should continuously update this typology model to capture the changing salience of stakeholders. A stakeholder typology model developed during the planning phase of the road pricing R&D project, consisting of some selected stakeholders, is shown in Figure 8. This typology was made according to the typology model discussed in Section 3.3.

<i>Dormant</i> (Power only)	<i>Discretionary</i> (Legitimacy only) Booz, Allen & Hamilton McDermott Miller Consultants Commercial banks Private funding companies	<i>Demanding</i> (Urgency only)	<i>Dominant</i> (Power & Legitimacy) The Treasury Inland Revenue Department
<i>Dangerous</i> (Power & Urgency)	<i>Dependent</i> (Legitimacy & Urgency) Transmission Gully Action Council Iwi group – Ngati Toa Transport 2000	<i>Definitive</i> (Power, Legitimacy & Urgency) Regional Land Transport Committee Transit New Zealand Transfund New Zealand Wellington Regional Chamber of Commerce	<i>Non-stakeholder</i> (No Power, Legitimacy or Urgency)

Figure 8. Stakeholder typology for selected stakeholders of road pricing R&D project.

5. Comments by the New Zealand R&D project managers

A report was submitted to the Wellington Regional Council based on the stakeholder analysis outlined in the previous sections. In general, they found this work to be very useful for their transport policy work. In particular, Brennand and Sargent (personal communication) indicated that this work:

- provides a new way of examining a policy issue which differs from techniques frequently used in the transportation planning (i.e. in the road pricing R&D projects). This is truly innovative work, which provides new insights into difficult issues.
- developed a process that provided insights into addressing the stakeholder concerns that were created by a transportation problem. A useful result of the process was a very clear identification of where the policy conflicts of a proposal lay in the minds of stakeholders.
- confirmed other investigations undertaken by Council such as the preferred funding mechanisms for funding the implementation of the highway project. It provided a useful tool to differentiate between stakeholder preferences important policy initiatives such as toll funding, government funding, regional rates and regional petrol tax. This tool has invaluable applications for Council when major policy initiatives such as road pricing are considered.
- provided useful insights into the effectiveness of information transfer between project management and stakeholder groups. This is very important to Council as it has a statutory obligation to consult on its proposals.

6. Conclusions

In this paper we have combined Freeman (1984) and Mitchell *et al.*'s (1997) approaches to stakeholder analysis and demonstrated that this is an appropriate framework for analysing stakeholders for R&D projects. Freeman's (1984) methodology includes three levels of analysis: rational, process and transactional. Based on these three levels, the stakeholder management capability of an R&D project is determined. The final stage includes Mitchell *et al.*'s (1997) approach to analysing the dynamics of stakeholders. Thus, this methodology provides a systematic approach to analysing who are the stakeholders; what are their interests; and how these may change over time.

This methodology is illustrated using a New Zealand case relating to road pricing for a major R&D infrastructure project. In this case, managers were positive in their assessment of the value of understanding stakeholder interests and the general approach taken in this research. The stakeholder analysis

then laid the foundations for in depth group model building sessions to investigate the wider project.

A number of authors in the recent R&D management literature have discussed the importance of recognising and working with stakeholders (e.g. Miller, 1995; Tipping *et al.*, 1995; Eckert, 1996; Rogers, 1996; Coombs *et al.*, 1998). Our study has described a methodology and actual application to first identify and classify who those stakeholders are, and how to analyse their interests, so that the involvement and communication throughout an R&D project can be more valid and meaningful.

In conclusion, we believe that the methodology outlined in this paper would be very useful at the earliest stages and throughout the management of many R&D projects.

7. Acknowledgements

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