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VALUE-MAPPING INPUTS

FINAL REPORT

for the

CONSTRUCTION INDUSTRY INSTITUTE OF AUSTRALIA

Prepared by

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November 2009

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The author acknowledges and thanks the Construction Industry Institute of Australia (CIIA) for providing seed funding to further develop this emergent research direction.

1 Project aims and objectives

This research aims to increase understanding of and delivery to qualitative (or intangible) outcomes and impacts of major economic infrastructure projects (i.e. bridges, roads, water infrastructure and the like), and the role of stakeholder engagement in this process.

Recent doctoral research completed at the Queensland University of Technology by the author investigated how the principles of corporate responsibility are applied in the construction sector. This related specifically to major economic infrastructure projectsⁱ (hereafter referred to as major projects), with particular regard to urban transportation projects. One outcome of this past research was a value-mapping framework which enables organisations to track project outcomes to pre-existing corporate objectives, and report on these throughout the project life-cycle. Two recommendations for future research from that work formed the basis for this current research:

- How can qualitative measurables be better integrated into decision-making on major economic infrastructure projects?
- How can non-contractual stakeholders be more effectively engaged with on these projects?

The link between these two areas may relate to the stakeholders' role in qualitative indicator identification and measurement. This is a key point for future investigation.

The aim of this research is thus to further investigate these two areas, with the intent of (i) better defining the research direction; (ii) identifying potential research partners; and (iii) identify possible sources of future funding.

2 Significance of the project

In 2006 ABN AMROⁱⁱ estimated 'a base case for public sector infrastructure spending in Australia over the decade to 2016 of \$338 billion, of which about \$80 billion, or one quarter, would be privately financed'. This was prior to the announcement of \$200billion worth of State and Federal government spending infrastructure project spending in Australia in late 2008ⁱⁱⁱ. Of this \$20billion was allocated, as a part of the Building Australia Fund, for spending on road, rail and transportation projects in 2009 and 2010. The need for such expenditure on transport infrastructure had been highlighted in reports such as that by the Business Council of Australia^{iv} to ensure the competitiveness of a growing Australian economy (p. 2), and Engineers Australia^v (2008) to address the decline in the 'fitness' of Australian infrastructure (pp. 2-3).

The need to deliver major infrastructure projects in the context of the broader public sector objectives is self evident. All Australian public sector agencies engaged within the course of previous doctoral research had a set of corporate objectives and outcomes, which are used to communicate with the public, and for both external (Annual and Corporate reports) and internal (budget and service-level) reporting. The Queensland Government has the Queensland State Government Priorities^{vi}. The Victorian Government has the Building Futures strategy. Brisbane City Council (Australia's largest local government authority) has the Living in Brisbane 2026 themes and the City-wide outcomes^{vii}. The opportunity thus exists for major projects, with their substantial and long-term impacts, to report directly to their corporate objectives, in order to better fulfil corporate obligations and to better communicate organisational intent and values to the community. The ability however to effectively integrate the intangible aspects of their responsibilities into both strategic and project decision-making, is somewhat limited by the difficulty in firstly defining these often qualitative outcomes and impacts; and secondly assigning measures and targets which can be effectively integrated into decision-making.

This current research thus seeks to identify how these objectives may be achieved. To this end the *following avenues for further research* has been identified from (i) the review of relevant literature, (ii) interviews with potential research partners, (iii) a survey (albeit limited) of current industry practice:

- *Accounting for externalities such as social and ecological costs of projects or transportation*
- *Mapping accountabilities and stakeholders in response to increased community demands for enhanced accountability on such projects*
- *Aligning values on major projects using new tools (e.g. social learning) to create shared values to facilitate more informed and effective decision-making*
- *Identifying governance structures which can facilitate the above in the delivery of major projects, for specific environments (i.e. public or private sectors)*

3 Research undertakings

This current research included the following four activities:

- Review of literature related to measurables (Part II)
- Review of literature related to stakeholder engagement (Part III)
- A survey of current industry practice in Australia (Part IV)
- Identifying a potential research cohort (Section 4.4 of this Part)

Measurables literature review

Key themes addressed in this review included:

- Externalities
- Monetisation
- Full-cost accounting/investigation
- Accounting for environmental flows

- Social costs of transportation
- Decision-making methods
- Data sets

This review is included in Part II of this report.

Stakeholder engagement literature review

Key themes addressed in this review included:

- Stakeholder engagement theory and identification
- New approaches to engagement (e.g. social learning)
- Existing standards and guidelines relating to stakeholder engagement

This review is included in Part III of this report.

Industry survey

This survey addressed the two aspects of this research, asking for responses in the following areas:

- Links between corporate and project objectives
- Decision-making systems
- Full-cost accounting
- Benchmark data for project performance
- Social cost benefit indicators
- Stakeholder engagement tools

The findings of this survey are included in Part IV of this report.

Identification of a potential cohort of partners

Meetings were held in Queensland and Victoria to gauge interest from government, academic and industry. Potential partners have been identified in both states, from all sectors (Section 4.4).

4 Proposed future research

The following is proposed for future research in this field. This proposed is the basis for future discussions with potential partners, dependent upon the identification of future research funds.

4.1. Research outline

In 2008, Transport Canada^{viii} released a report on the Social Cost of Transportation. This report sort to identify and cost the externalities associated with transportation in Canada. Externalities being those items and/or outcomes which fall outside an economic transaction between parties to a contract (which are internal costs). Figure 1 (over-page) identifies some

of these areas. As illustrated, these externalities are often intangible or qualitative in nature, and thus traditionally difficult to integrate into project decision-making.

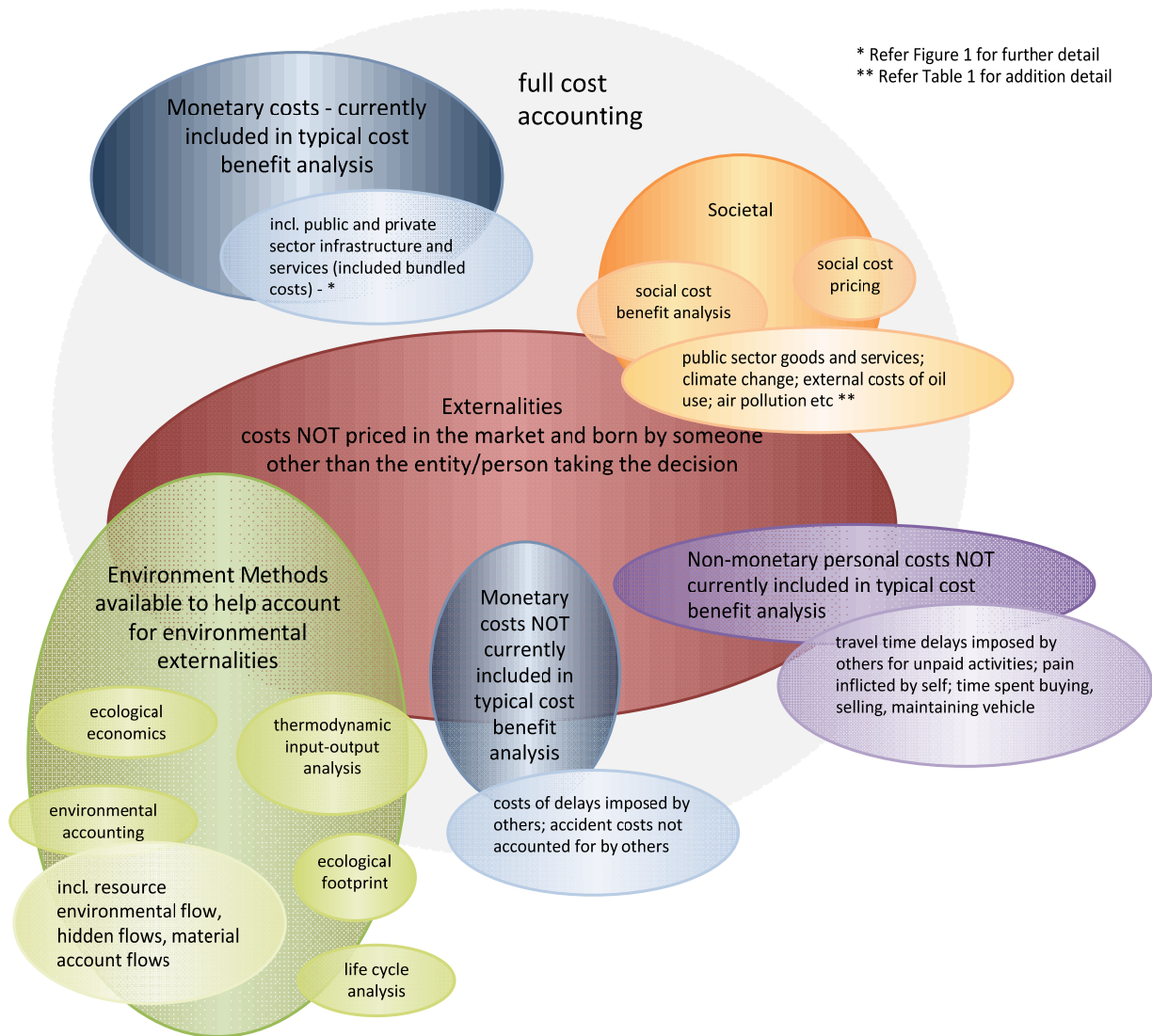


Figure 1 - Externalities related to transport infrastructure (Compiled from Delucchi 2008^{ix})

It is these external costs which are often borne by stakeholders outside the traditional contractual arrangements, hence the significance of including stakeholder engagement in this current research. It is thus recommended as an outcome of this research that, through providing an avenue for better engagement between contractual and non-contractual parties, external costs may be able to be better highlighted and/or accounted for. This focus is considered important for a number of reasons:

- To ensure non-contractual obligations and objectives are more effectively managed and integrated into project decision-making.
- To better enable non-monetised project objectives (which are often the social objectives linked to community and other non-contractual stakeholders) are better integrated into project decision-making.
- To facilitate continuity of effective engagement throughout the life span of engagement.

4.2. Research approach

Current industry practice is to monetise measurables and targets for project objectives, where-ever possible, in order to provide a definitive method of comparison and reporting. When not possible, the status of the objective can be either consciously or inadvertently down-graded. Whilst methodologies do exist to integrate the assessment of descriptive qualitative objectives into decision-making (e.g. cost benefit analysis, multi-criteria analysis), there still remains a strong tendency to more effectively manage those objectives that can be monetised. Qualitative measurables often fall into the realm of ecological or social considerations. Bell and Morse^xsuggest that “valuation of (such) effects is difficult because ... How does one translate biological indicators (such as species diversity...) into a financial impact?” (p.73). Whilst some of the softer measurables are now able to be more readily quantified (or monetised) in part (e.g. local amenity, the benefits of green space) it remains important to capture the qualitative aspects and ensure they are appropriately considered and managed. Precedence exists for this in the form of congestion costs, which place a value against travel time. It is further noted that the monetisation of measurables becomes more difficult when futurity is considered, as again highlighted by Bell and Morse - “One should remember that changes in the ecosystem can occur because of factors outside the control of humans... How does one cost such factors, or should they be discounted?” (p.73)

Further research is recommended, based upon this initial investigation, to develop a practical methodology whereby monetised; physically quantifiable; and descriptive qualitative measures can be more effectively integrated into corporate reporting frameworks to aid decision-making in the delivering of major economic infrastructure projects.

4.3. Research method

The following provides an indicative outline of one research methodology which could be adopted for this research. This is yet to be tested with potential project partners.

It is anticipated that two Masters or PhD students be involved in this research. Specific areas are still to be determined, but likely areas would be one (possibly PhD level) in the theory

building aspects of the research and the other (possibly Masters level) in the case study activity.

Review of Literature

This would build upon work already completed as a part of both recent doctoral work and this current research. Key themes for further review include (i) monetisation of ecological and social measures; (ii) tools for building shared values (such as social learning); (iii) stakeholder engagement; (iii) accountability; and (iv) values. All these would be in the context of delivering major economic infrastructure projects with a specific focus on transportation.

Formal Interviews or Delphi survey

In order to provide rigorous data to support this research, a series of formal interviews, or a Delphi-survey is proposed of Australia-based experts to identify (i) current understanding and practice in Australia (building on this current research); (ii) the need for full-cost accounting; (iii) what to capture; and (iv) how to capture relevant data.

Theory development

It may be that a grounded theory approach is adopted in order to develop new theory relating to the identification and application of qualitative measurables linked to establishing shared values between non-contractual and contractual stakeholders of major projects. This detail needs to be considered further after initial investigations have been carried out.

Longitudinal case studies

It is proposed that two longitudinal case studies are undertaken as a part of this proposed research (one Queensland-based and one based in Victoria). One aspect of this case study activity would be the development and implementation of governance structures that better enable integration of intangible indicators and an expanded, related role for stakeholders.

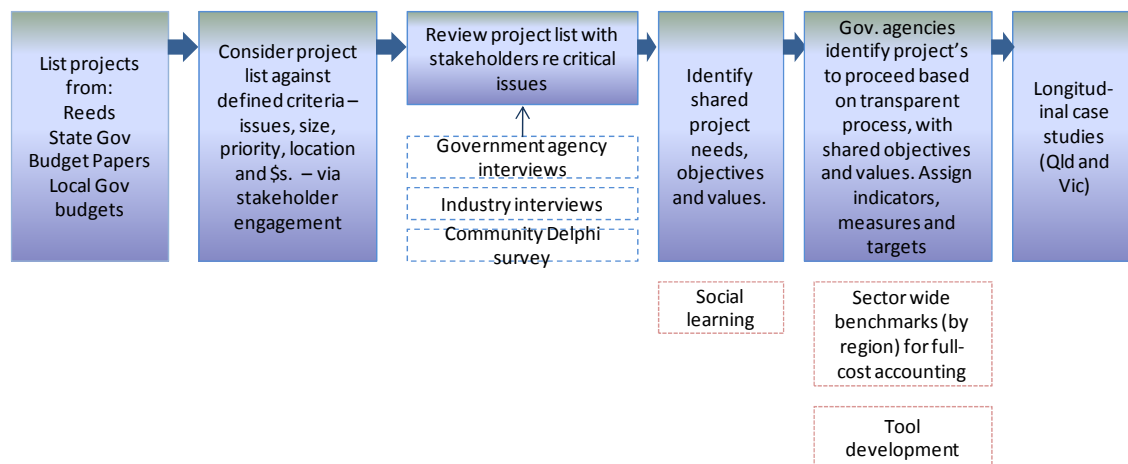


Figure 2 - Draft conception for a new project governance structure

4.4. Potential research cohort

Initial discussions have been held in 2009 with potential Australian-based research partners (Table 1). This research proposal has been forwarded to each of these potential partners for further consideration. Once a funding opportunity is identified, further discussions will need to be held to determine the nature and extent of involvement.

Table 1 - Potential Australian-based research cohort – initial meetings held

Organisation	Contact	Areas of potential interest
QUT	Professor Stephen Kajewski Judy Kraatz	Project leadership and coordination
RMIT	Professor Ron Wakefield	Governance framework; accountability
RMIT	Professor Ralph Horne - Centre of Design and Social Context	Decision-support tools
La Trobe University	Assoc. Professor Suzanne Young Director Corporate Responsibility Grad School of Management	Governance framework; accountability stakeholders
Qld Dept of Transport	John Spathionis Derek Skinner	Provide Project plan to determine level/nature of interest. Potentially case study; data gathering
Brisbane City Council	Scott Stewart - MIPO	Case study; data collection; stakeholders
Leightons	Lorelie Bahm	Methodology; case study; stakeholders
Linking Melbourne Authority	Brad Akers (follow up with Ken Mathers – CEO)	Provide project plan for further comment. Potentially case study; data gathering
Macroplan	Brian Hiratsis	Partner for peer review

In the course of initial interviews additional contacts were identified who could add value to, and may find benefits from this research (Table 2). These contacts will be followed up once the next stage of research project fund is secured.

Table 2 - Additional Australian-based contacts for future follow-up

Organisation	Contact	Areas of potential interest
RMIT	Professor John Fien	Social learning
Major Cities Unit – Infrastructure Australia	Dorte Ekelund	Governance framework; data gathering
Victorian Dept of Transport	Stuart Humphries Gray – Project Management Office	Case study
Victorian Dept of Treasury and Finance	Richard Foster – Commercial Infrastructure Jason Loos – Client Services	Governance framework; data gathering
Melbourne City Council	Austen Ley	Case study; data gathering

It is considered important to position this research in an international context, and draw upon knowledge already gathered (e.g. Canadian social cost of transportation research from past two decades). The following people have been identified as valuable contacts for future follow-up (Table 3).

Table 3 – Potential international links

Organisation	Contact	Areas of potential interest
Warwick Business School - UK	Professor Alyson Warhurst - Chair of Strategy and International Development - Warwick University UK	Stakeholder engagement
Harvard University's Kennedy School	Simon Zadek - Managing Partner and Director at AccountAbility, a Visiting Senior Fellow at the Centre for Government and Business	Accountability
St Andrews Sustainability Institute - UK	Professor Jan Bebbington - Professor of Accounting and Sustainable Development and Director	Full-cost accounting
University of California	Dr Mark Delucchi: Research Scientist	Social cost of transportation

Davis - USA		(incl. ecological)
Victorian Transport Policy Unit, Canada	Todd Litmann	Social cost of transportation (incl. ecological)

5 Potential funding

Two avenues of potential future funding have currently been identified:

- QUT Vice-Chancellors post-doctoral fellowship
- ARC Linkage bid

An application has been submitted for the former, with the support of the School of Urban Development (Faculty of Built Environment and Engineering). This would fund the salary component of for this researcher, and provide funding for a limited amount of Research Assistance, along with interstate and overseas travel required to consolidate the research cohort.

In addition it is considered that an ARC linkage proposal for the May 2010 bid should be considered. Funding to prepare this bid would need to be secured as a matter of priority.

6 Conclusions

The seed funding provided by the CIIA has enabled the researcher to further understand the international knowledge-base related to the monetisation of indicators, and full-cost accounting. It has also confirmed a potential link between this field, and that of stakeholder engagement. Both these areas, in relation to major economic infrastructure projects, are of specific relevance to Australia, in the context of the current and future provision of infrastructure.

A context has now been provided for future research in this area, and interest identified from a number of potential research partners.

The next step is to identify sources of funding which can enable work in this area to continue.

ⁱ J.A.Kraatz (2009) "Value-mapping for major Economic Infrastructure Projects".

ⁱⁱ ABM AMRO

ⁱⁱⁱ K.Rudd (2008)

^{iv} Sims 2007

^v Engineers Australia 2008

^{vi} http://www.qgm.qld.gov.au/02_policy/spp.htm

^{vii} Brisbane City Council 2006 Living in Brisbane 2026

^{viii} Transport Canada (2008). Estimates of the Full Cost of Transportation in Canada. Transport Canada

^{ix} Delucchi, M.A. (2008). The Social Cost of Motor Vehicle Use in the United States. Environmentally Conscious Transportation. M. Kutz, John Wiley and Sons

^x Bell, S. and S. Morse (1999). Sustainability indicators : measuring the immeasurable?, London : Earthscan Publications.

Part II – Measurables Literature Review

1. Introduction

The research question explored through this review of literature is - how can quantitative and qualitative measures be better determined and considered when monitoring the alignment between corporate and project-based objectives in the delivery of major economic infrastructure projects?

For effective project reporting against organisational objectives, account needs to be made for not only traditional quantitative indicators (e.g. cost of infrastructure and travel times), but also for qualitative criteria which have more recently been presented as triple bottom line or sustainability indicators (e.g. social impacts such as the barrier effect).

Sustainability may be defined as a dynamic balance among three mutually interdependent elements: (1) protection and enhancement of natural ecosystems and resources, (2) economic productivity; and (3) provision of social infrastructure such as jobs, housing, education, medical care and cultural opportunities. (Dominski et al 1992, in Bell and Morse 1999, p. 61)

The review involved a search of global data-bases using the sub-themes of full cost accounting/analysis and multi-criteria decision making as their starting point, with a limit placed on the search as appropriate related to transport infrastructure. The key themes which emerged from this review have then been considered under the following heading:

Table 1 - Key themes and authors

Theme	Relevant Authors
Externalities (Section 2.1)	Bein 1997; Levinson and Gillen 1998; Denniss and Kniest 2000; Bebbington, Gray et al 2001; Suter and Walter 2001; GRI 2002; Delucchi 2004b
Monetisation (Section 2.2)	Bein 1997; Delucchi 2004; Litman 2007; Bebbington and Frame 2007
Full cost accounting / analysis (Section 2.3)	Bebbington, Gray et al. 2001; Suter and Walter 2001; Transport Canada 2008
Environmental flows (Section 2.4)	Daly, 1990; Anderson 1991; Bein 1997; Costanza et al 1997; Bell and Morse 1999; Bebbington, Gray et al 2001; Nash and Sansom 2001; Bringezu 2002; Antheaume 2004; Ukidwe 2005; Bebbington 2007
Social costs (Section 2.5)	Costanza et al 1997; Nash and Sansom 2001; Delucchi 2004a; Delucchi 2006; Bebbington 2007; Delucchi 2008
Decision-making methods (Section 2.6)	Bein 1997, Bebbington, Gray et al. 2001, Xing, Horner et al. 2008, Doloj 2008, Sutrisna and Barrett 2007, Rother and Shook 2003, Mostert 2008
Multi-criteria analysis (Section 2.6)	Crowley 1987; Bein 1997; Austroads 2000; Rogers 2001; Wenstop 2005; Kiker et al 2007; Lahdelma and Salminen 2007; Salling et al 2007; Kain and Soderberg 2008; Mostert 2008

In view of the possible future adoption of existing methods already implemented in other countries, a break-down by country of origin for the key authors is also provided.

Table 2 – Author / Country affiliation

Country in which research has been undertaken	Key Authors
Canada	Bein (1997), Transport Canada (2008), Litman (2007)
United States of America	Mark Delucchi (2004a, 2004b, 2007)
United Kingdom	Jan Bebbington (2001, 2003, 2007)

This current research into better ways to integrate both quantitative and qualitative indicators into decision-making, can be largely considered as an exploration of issues and items previously considered as external to the decision-making process. Considerable research has been undertaken in the past two decades to account for these externalities (Section 2.1). These are largely environmental and social items, as financial and economic issues associated with the provision of major economic infrastructure projects have long been central to decision-making. This does not however, mean that environmental and social criteria cannot and/or are not been accounted for in current decision-making. This is traditionally undertaken through assigning monetary value to the item. This process has however tended to limit the inclusion of social and environmental criteria to those for which such a monetary value can be assigned.

Although economists have a variety of techniques (e.g., hedonic-price analysis and stated-preference analysis) to estimate the \$/unit costs of (or demand curves for) nonmonetary items, all of the techniques can be problematic, and as a result the social nonmonetary costs of motor-vehicle use often are very uncertain -- typically, much more uncertain than are the monetary costs. (Delucchi 2004a, p.14)

In recent years however, various methods for better integrating qualitative criteria have been explored (e.g. multi-criteria analysis).

Economics can only say something meaningful about other values than human use to the extent that these other values can be converted into the human use value, usually by attributing a monetary value to them. This is very difficult and sometimes even impossible. Different methods may be used, such as the Contingent Valuation Method – how much are people willing to pay for e.g. a new lake? –, the Travel Cost Method – how much time and money are people willing to invest in visiting the new lake? – and the Hedonic Pricing Method – how much will houses in or near the lake rise in value? Each of these methods has its limitations (Nature Valuation and Financing Network, 2005). ... Economics cannot say anything about “incommensurable values”. Incommensurable values are values that are seen as unique and not convertible into monetary terms, such as the intrinsic value of nature (Espeland and Stevens, 1998). Economics are also problematic for intergenerational equity. In economics the future is typically discounted: future costs and benefits are valued less than current costs and benefits. This may be justifiable for our own lifetime, when our own preferences are concerned, but not when future generations are concerned (Mostert 2008, p.24)

The following literature relates to various (often interrelated) methods for undertaking this task, and tools which can assist in this process.

The need for this research was identified in doctoral research completed in September 2009, by the author, at the Queensland University of Technology. The importance of addressing qualitative criteria in decision-making runs parallel to the rise in expected accountability in corporate decision-making, which aligns with the growing focus (since the 1990's) on achieving more sustainable outcomes.

This focus on corporate responsibility, is partnered with an increased need to include stakeholders more effectively in the decision-making process in order to better define environmental costs (Bein 1997). Scipioni, Mazzi et al. (2008) reinforces this point of view:

Sustainability indicators are able to carry out fundamental role as interface between science, politics and society: measuring sustainable development allows the entrance of social and environmental themes in the political and economical discussion [6]. To achieve this target, in order to ensure neutrality, the indicators shall be used as a scientific and objective tool. It is essential to define them by a transparent process and

by consulting all those people that are interested in realizing sustainable ways, especially on a local scale [7]. (Scipioni, Mazzi et al. 2008, p.2)

It is important to note that the determination of indicators is not a part of this current research. This requires considerable focussed research and remains an area of considerable debate as to both their purpose and constitution, and is an area for proposed future research. Their role in simplifying complex phenomenon can serve many purposes, from political to analytical (Scipioni, Mazzi et al. 2008).

Zadek (2008) defines a much broader role for indicators. This reflects the approach taken by this author in the establishment of the value-mapping framework which informed the proposal for this current research (Kraatz, Kajewski and Manley 2008). Zadek (2008) suggests that 'indicators need to provide a foundation of common language and shared understanding of what are the critical benchmarks against which performance is judged, and how that judgment is to be made' (p.184).

As a final introductory point, Rogers (2001) provides some pertinent insights into decision-making processes relevant to this review, and furthers the values-based orientation introduced above. This author discusses the various types of decision making (pp.10-16), including non-analytical decision-making; analytical decision-making; classical rational decision-making; and behavioural decision-making.

The basic, central assertion of this theory is that the decision-maker, possessing complete knowledge of the problem, can, within the appraisal process, select the option which best meets the needs and objectives of the developer. This approach, termed optimisation, is strongly influenced by classical economics, and assumes that the decision-maker is unerringly rational and devoid of personal preferences, motives and emotions...Simon (Herbet, 1976) (however) notes that decision-makers are, in reality, limited by their value systems, habits and skills as well as by less than perfect levels of knowledge and information. (Rogers 2001 p.17)

2. Summary of literature

Ukidwe and Bakshi (2005) provide a clear definition of the different capital bases, of which this research focuses on the economic

Productive capital base or the capital stock of a region is made up of economic, natural, and social capitals. Economic capital includes assets such as buildings, machinery, and infrastructure. Natural capital includes environmental functions such as provision of natural resources such as coal and water to production activities and dissipation and absorption of wastes from these activities. Social capital includes human resources, value systems, and social organizations through which contributions of individuals are mobilized and coordinated. (Ukidwe and Bakshi 2005, p. 9759)

By further way of clarifying the premises underpinning this research, Anderson's (1991) seven criteria for good indicators are provided:

1. The indicator itself, or the information it is calculated from, should be already available, or else be able to be made available easily and cheaply.
2. The indicator should be relatively easy to understand...
3. The indicator, to work at all, must be about something measurable...
4. an indicator should measure something believed to be important or significant in its own right...
5. There should preferably only be a short time-lag between the state of affairs referred to and the indicator becoming available...
6. It is useful if the indicator is based on information which can be used to compare different geographical areas, social groups etc...

7. International compatibility is desirable... (Anderson 1991, pp.50-51)

In considering these seven points, how then, does the literature reviewed provide insight?

The following address which of the seven points raised by Anderson:

1. A focus on **monetization** and/or **physicalisation** of measures; restricts indicators to realm of the known', whereas new approaches / technology / understandings may enable measurement of previously un-measurable qualitative events/actions.
2. **Aligning values (or value-mapping)** places the indicator in a corporate objective; project objective; indicator continuum which is often in a language already known to many stakeholders.
3. This research is largely about seeking to 'measure' **environmental** and **social** issues and impacts.
4. This links to beliefs and values, thus embracing current **externalities**.
5. This reinforces the need to build sector-wide data-base of indicators, measures and targets.
6. **Full cost accounting** can provide the basis for this enabling regional specificity whilst enabling comparisons between different projects being delivered in the same sector.
7. The use of the **Global Reporting Initiative** as a foundation ensures global relevance.

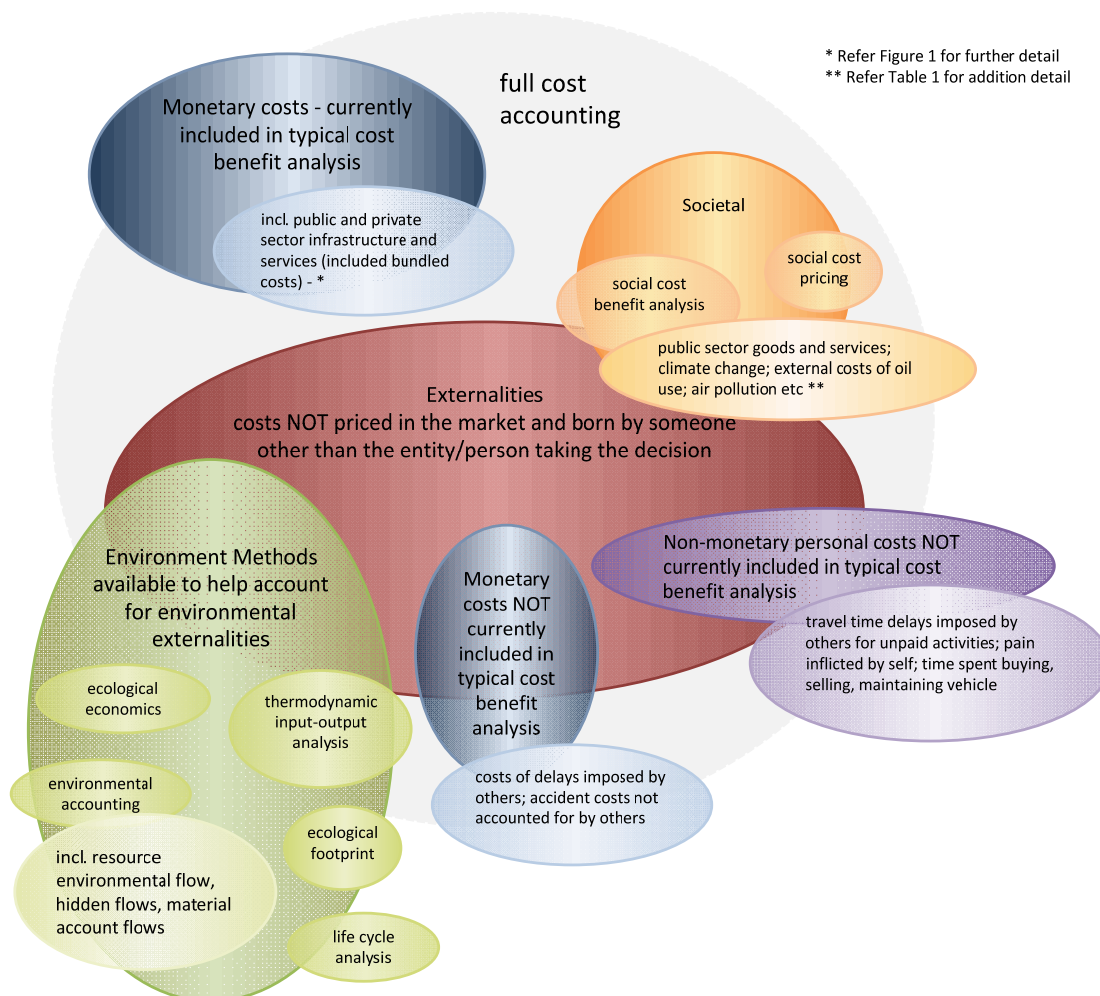


Figure 1 – Summary of literature

Many options and opinions exist as to how broader costs and impacts of transportation are firstly identified, and secondly accounted for. Costanza, Cumberland et al. (1997) present three methods (through increased government regulation) for achieving sustainability:

1. a broad natural capital depletion tax to assume that resources and inputs from the environment to the economy are sustainable, while giving strong incentives to develop new technologies and processes to minimise impacts ...
2. application of the precautionary polluter pays principal (4P) to assure full costs of outputs from the economy to the environment are charged to the polluter ...
3. a system of ecological tariffs as one way ... to allow countries to implement the first two proposals without putting themselves at an undue disadvantage (pp.206-207)

Another approach requires the sector to identify previously unaccounted for costs exist, and develop tools and processes for addressing the full costs of doing business. These items which are outside the current market bounds are commonly referred to as externalities (Section 2.1). When identified, one is able to assign monetary values to these (Section 2.6) and where possible implement a process of full-cost accounting (Section 2.2).

Government regulatory tools are not explored in this review, as this would require a deep understanding of existing regulation in each of the countries from which the literature is drawn. A range of practical methods for integrating the qualitative are however now discussed. Topics discussed include:

- Externalities – in order to provide back-ground as to what is currently excluded from our accounting process.
- Monetisation – to demonstrate ways in which intangible items can have dollar values assigned to them.
- Full-cost accounting – to demonstrate ways in which these externalities can be included.
- Environmental and Social Costing – to provide an understanding of current research.
- Multi-criteria and other known decision-making methods.

2.1. Externalities

The concept of costs external to those accounted for in the market is not a new one. Delucchi (2004b) cites Bator (1958), Scitovsky (1954) and Viner (1931) when establishing the foundation for considering external economies.

Decades ago, Bator (1958) distinguished several kinds of externalities: “ownership” externalities, which are attributable to a lack of property rights, or ownership; “technical” externalities, which are due to increasing returns to scale, and include the problems of decreasing long-run marginal costs and natural monopolies; and “public-good” externalities. This definition includes virtually all forms of market failure, and is broader than most economists now accept. (Delucchi 2004b, p.1)

Bebbington, Gray et al. (2001) provide a definition which can enable current thinking to focus on the identification of transport-related externalities, and how these might be better accounted for in decision-making on major economic infrastructure projects.

Externalities arise where private decisions (taken for largely personal reasons) do not reflect either the public costs of those decisions (costs borne in society as a whole) or private costs which are borne elsewhere in the system (by someone other than the individual causing the costs). These two sorts of costs are called externalities because they are costs borne by someone external to the system making the decision or taking the action. (Bebbington, Gray et al. 2001, pp.13-15)

Another definition which reveals a deeper aspect to the nature of externalities is attributed to Spulber (1989), who states that ‘an externality refers to a commodity bundle that is supplied by an economic agent to another economic agent in the absence of any related economic transaction between the agents’ (Levinson and Gillen 1998, p.208).

Through the growing focus on corporate responsibility and accountability to stakeholders there is a growing level of business and community acceptance that costs other than the traditional financial ones need to be recognized. This is particularly apparent since the 1990’s, when the greater need to account for non-financial costs and impacts saw the mainstreaming of sustainable business practices (largely environmental in focus), and more recently a greater willingness to report on broader social responsibilities.

To account for a cost, a consumer must know its magnitude and be required to feel obliged to bear it. Generally a price accomplishes both of these things: It tells the consumer what he must give up in order to consume the item ... A cost can be borne abstractly, as, for example, a feeling of guilt. Thus, in principal, pollution could be satisfactorily accounted for in consumer decisions if everyone knew all the costs of pollution and cared enough to act as though their paid the cost in dollars (Delucchi 2008 pp.70-71)

Bein (1997) identifies four factors which are driving the growing focus on intangibles:

- the presence of uncertainty about ecosystem functioning and its total service value,
- irreversibility of some natural resource degradation or loss,
- aversion to loss felt by many individuals, and
- the criticality of some natural components for which man-made capital cannot be substituted (Bein 1997, p.2-5)

Delucchi (2004b) provides a summary of external social costs of motor-vehicle use identified in the course of his research. This includes:

- Pain, suffering, death, and lost nonmarket productivity due to accidents
- Travel delay, imposed by other drivers (including delay due to accidents), that displaces unpaid activities
- Cost of the health effects of air pollution from motor vehicles
- Emissions and air quality
- Air pollution and health effects
- Toxic air pollutants
- Cost of reduced visibility due to particulate air pollution from motor vehicles
- Cost of crop losses caused by ozone air pollution from motor vehicles
- Cost of material damage caused by air pollution from motor vehicles
- External cost of noise from motor vehicles
- Health and environmental impacts of leaking motor-fuel storage tanks
- Environmental and economic impacts of large oil spills
- Other water pollution related to motor-vehicle use: urban runoff polluted by oil from motor vehicles, and nitrogen deposition
- Nonmonetary costs due to net crimes related to using or having motor-vehicle goods, services, or infrastructure
- Pain, suffering, and other nonmonetary costs due to fires related to using or having motor-vehicle goods, services, or infrastructure
- Environmental and aesthetic impacts of motor-vehicle waste
- Aesthetics of roads and the motor-vehicle service infrastructure
- Fear and avoidance of motor-vehicles
- Habitat destruction, and effects on plants and animals (not estimated in this report)
- The water-quality impacts of highway deicing

- The socially divisive effect of roads as barriers

Litman (2007, pp.1-2) also identifies twenty transport related cost categories (which builds on the work of Bein)

Table 3 – Transport related cost categories
(Litman 2007, pp.1-2)

Vehicle Ownership	Vehicle Operation	Operating Subsidies
Travel Time	Internal Crash	External Crash
Internal Parking	External Parking	Congestion
Road Facilities	Roadway Land Value	Traffic services
Transport diversity*	Air pollution	Noise
Resource Consumption	Barrier Effect	Land Use Impacts
Water Pollution	Waste Disposal	

*also called Transport Options, Transport Choice or Balanced Transportation

Many of the above-mentioned social costs also have direct impacts (and thus potentially costs) for the environment. Direct environmental costs may also include resource use and biodiversity losses. These will be discussed later in this report.

2.1.1. Addressing externalities

Bein (1997) highlights some of the difficulties endemic in the process of accounting for environmental and social externalities associated with transportation.

Wackernagel and Rees (1994) make the following points concerning market valuations of natural resources.

- Biophysical scarcity is poorly reflected in market prices...
- The monetary measures say nothing about nature's life-supporting stocks and process...
- A regions monetary wealth fluctuates with world market prices, but its biophysical wealth...is independent of the market.
- Monetary valuations do no distinguish between substitutable and complementary goods.
- the potential for growth of money seems unlimited, which can obscure the existence of biophysical limits, such as global carrying capacity (Bein 1997, pp.2-5 to 2-6)

Denniss and Kniest (2000, p.231) speak of a number of solutions, other than monetization, to address externalities (which they consider a form of market failure). These include assigning property rights to the resources under consideration; or through education campaigns, voluntary codes or government regulation.

The Global Reporting Initiative (GRI) is one such voluntary code, initially published in 2000, which has received broad global acceptance as a framework for identifying economic, environmental and social indicators which can be used effectively to reveal externalities. The GRI has continued to evolve and is now releasing sector supplements to assist in the identification of indicators on a sector by sector basis (a guide for the Construction and Real Estate sector is currently under development). The GRI is an important tool in that it provides an internationally accepted guideline for benchmarking sustainability performance, and includes an extensive listing of potential indicators across economic, environmental and social issues.

This review found a number of examples of efforts to account for externalities. The most tangible instance is provided by Suter and Walter (2001) from a study of heavy vehicle traffic in Switzerland, where external costs related to the environment and accidents were captured.

The monetary valuation of the adverse effects of road transport on the environment and human health has been the subject of different projects

within National Research Programmes, but also in studies commissioned by the Federal Department of Environment, Transport, Energy and Communication (see below). Thus, scientifically well-founded arguments justifying an adjustment and an increase in taxation of heavy vehicle traffic were available in Switzerland. In 1977, the Integral Concept for Transport ... asked for an identification, monetarisation and internalisation of external effects of transport. A decade later, a system of indicators for social costs and benefits was published (Suter and Walter 2001, p.384)

Thus after a twenty year period of data gathering, externalities related to transport in that country could be formerly accounted for. This reflects Canadian activity (Litman 2007) discussed further in the following section.

2.2. Monetisation

Bebbington and Frame (2003) state that ‘monetisation is the most difficult and contentious element of full-cost-accounting, for both practical and philosophical reasons’ (p.2)

The ‘deep greens’ would suggest that a belief that one can reduce ‘the environment’ (for example) to a monetary figure is what has caused the environmental crisis in the first place ... The second set of reservations over monetisation of external impacts arise from the difficulty of obtaining a single uncontested figure for monetisation. The main approaches to monetisation (the maintenance cost approach and the variety of approaches that come under the broad heading of the damage cost approach – see Bebbington et al. 2001, pp. 63-67 for an introduction) may yield significantly different measures of externalities. (Bebbington and Frame 2003, p.2)

As Bein (1997) points out however, non-market goods in the transport sector have been historically monetized. He provides examples of travel time and traffic safety. The need arises however to have ‘uniform reference values of costs per unit of impact or impact reduction’ (Bein 1997, p.2-8). He goes on to provide extensive data wherein he has monetized a number of previously non accounted elements of transportation activity (Section 2.5 Social costs), whilst at the same time recognizing that not all elements can be monetized.

This report breaks down the complexity of impacts into individual economic and non-economic functions of the natural systems that are affected by transportation activities. The result is two sets of values: (1) Shadow prices for environmental amenities, which are not necessarily seen in the market.. (2) Non-monetised and intangible values, which cannot be translated into monetary costs and may have uncertain outcomes. (Bein 1997, p.iv)

Through identifying these two categories, Bein pre-empted one concern of Bebbington, Brown et al. (2007).

The fear is that monetization will lead to all activities becoming socially constructed as “economic” and, relatedly, that all valued things will be regarded as substitutable. For sustainability, attempts to force arguably incommensurable values into a one-dimensional monetary metric can be regarded as particularly counter-productive. (Bebbington, Brown et al 2007, p.226)

Litman (2007) however reiterates the main driver for this need to monetize as being the need for easy-to-measure inputs into decision-making, and if these ‘intangibles’ cannot be monetised, they may remain ‘overlooked and undervalued’. Thus through undertaking this process, more equitable decision-making may result (Litman 2007, p.4-2). This however remains open to questioning.

Delucchi (2004a) provides one potential criteria for deciding what to monetize or not.

The distinction here is not between cost items that “ought” to be valued in dollars and costs that ought not, nor between efficiently and inefficiently priced items, but rather between cost items that are traded in real markets and hence valued directly in dollars, and items that are not. Although this distinction is not directly relevant to efficiency of resource use, it is relevant to the practical estimation of social cost. (Delucchi 2004a p.13)

Litman (2007) suggest that this may be achieved through:

Analysis of consumers’ willingness-to-pay for a safety or environmental improvement, or willingness-to-accept compensation for a loss of safety or environmental quality. Although the evaluation methodologies are the same, the results of a willingness-to-pay analysis often differ from the results of a willingness-to-accept. For example, people may only be willing to pay a \$20 per month rent premium for a 20% reduction in noise impacts (perhaps by moving to a quieter street or installing sound insulation in their homes), but would demand \$100 per month in compensation for a 20% increase in residential noise. (Litman 2007, p. 4-4)

Difficulties also arise where monetized estimates do not reflect to full cost of the impacts and/or damages. The question of boundaries becomes an important one for consideration.

For example, some air pollution cost estimates only reflect human health impacts of ozone or particulates, but other harmful emissions, and agricultural and ecological impacts, are ignored (Chapter 5.10). Some estimates only count health impacts that require medical treatment, but ignore less severe discomfort, and preventive actions such as foregoing outdoor recreation. (Litman 2007 p.4-4)

The discussion regarding boundaries is likely a critical one for both organisations and their stakeholders, and is where the decision-making method becomes critical (Sections 2.6 & 2.7). Hence the need exists to clearly identify the boundaries of what is and is not included in such a monetization effort. This also includes consideration of issues of a temporal nature, and links to uncertainty and thus risk. To this end Litman discusses Social Discount Rates (SDR) and Social Opportunity Cost of Capita (SCOC) which ‘reflect the change in value of impacts and assets over time’ (Litman 2007 p.4-7). This is important in the context of legacy projects that may provide long term benefits and costs, both social and environmental. This has a link to not only full cost accounting (Section 2.3) but also to life cycle analysis, and supply chain mapping.

Litman (2007) provides a summary of studies undertaken across the world in which some effort at defining financial, environmental and social costs has occurred. Of note, is that the single Australian Study included, only provided costs in four of the seventeen categories (Table 4).

Table 4 - Transport Costs in Current Literature (C = Costed; D = Described)
Litman (2007 p.2.11)

Study No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
Cost Categories	a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.	aa	ab	
Vehicle Costs	C			D	C		C	C				C	C		C	C		C	C		C			C	C	C	C	C	
Travel Time	C			D	C			C				C	C			C		C	C								C	C	
Accidents	C	D	C	C	C		C	C	D	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Parking	C	D	C		C		C	C				C	C	C	C	C		C	C		C						C		C
Congestion	C	D	C	D	C		C	C	D	C	C	C	C		C	D	C	C	C	C	C	C	C	C	C	C	C	C	C
Facilities	C	D	C	C	C		C	C		C		C	C	C	C	C	C	C	C	C	C			C	C	C	C	C	C
Roadway Land	C	D	D		C		D					C	C	C		D		C	C							C	C	C	C
Mun. Services	C	D	C	D	C		C	C		C		C	C	C	C	D		C	C		C				C	C	C		C
Local Air Pollution	C	D	C	C	C	D	C	C	D	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Global Air Pollution		D	C	C		D	C	C	D	C		C	C		C	D	C	C	C			C	C	C	C	C	C	C	C
Noise & Vibration	C	D	C	C	C	D	C	C	D		C	C	C	C		D	C	C	C	C	C	C	C	C	C	C	C	C	C
Resources/ Energy		D	C		C	D	C	C	D	C		C	C	C		D		D	C		C		C		C				
Barrier Effect		D		D		D							C			D													
Land Use/Sprawl				D	C	D	D	D					C			D	D	D	D			C	C	C					
Inequity							D						C			D		D	D										
Water		D		D	C	D	C	C	D	C		C	C	C		D		D	C		C	C							
Waste Disposal						D							C	C	C		D		D	C		C							

a. Keeler; b. Hanson; c. McKenzie; d. Kageson; e. KPMG; f. Works N.Z.; g. Miller & Moffat; h. Apogee, CLF; i. US DOT, FRA; j. CEC; k. EPA, Aust; l. OTA; m. CDTC; n. Lee; o. IBI; p. Black; q. Maddison; r. IIEC; s. Delecchi; t. FHWA; u. DS & JF; v. Elwanger; w. INFRAS; x. Samsom et al; y. Quinet; z. NZMOT; aa. TC; ab. CE.

This field consists of many uncertainties however, which is recognized by all authors' whose papers have been reviewed. Bein effectively summarises these 'practical limits' as:

- factors which intrinsically can never be known, such as preferences of future generations,
- future effects, which cannot be known with any certainty, but which can be predicted on the basis of scientific knowledge and/or extrapolation of trends, such as the degree of global warming
- variables for which the data is theoretically measurable but at present is unknown...
- effects for which the "dose" may be known but not the "response", such as local precipitation pattern changes...
- effects for which the size of the effect may be known (perhaps only partially), but where the value of the effect cannot be measured by an current available methods, such as the total value of preserving an endangered species. (Bein 1997, p.2-8-2-9)

Table 5 below summarised Delucchi's (2008) considerations regarding the monetary and non-monetary social costs of transportation, assigning them based on whether they are internalised or externalised.

Table 5 – Summary from Delucchi 2008 pp.58-61

Monetary Costs			Non-monetary costs		
Private Sector		Public sector	Externalities	Personal	Externalities
Goods and Services	Bundled costs	Infrastructure & services	Unpriced in market	May be misestimated	Unpriced in market
Examples					
Fleet costs; used car costs; parts, supply, repair, cleaning storage, insurance; commercial parking; travel time (uncongested); costs of accidents inflicted by others	Non-residential parking; off street parking; private sector roads	Cost of public roads and on-street parking; municipal off-street parking; law enforcement; regulation (air, water pollution; energy R&D; police and fire protection; oil protection	Costs of travel delay imposed by others; accident costs not accounted for by others; oil-price shocks; costs of fires and crime related to motor vehicles; police and fire protection; oil protection	travel time excluding delays imposed by others that displaces unpaid activities; accidental pain suffering inflicted on self; time spent buying selling maintaining MV; noise and pollution inflicted on self	Pain suffering death & lost productivity not accounted for by responsible party; travel delay imposed by others that displaced unpaid activities; air pollution effects on health; cops visibility; global warming due to fuel-cycle emissions; noise; water pollution (e.g. urban run-off); non-monetary costs of fire/crime; air pollution damage to ecosystem other than forests; costs of mv waste

* MV – motor vehicle

2.3. Full cost accounting / investigation

Suter and Walter (2001) provide three categories for considering detailed costing.

The "price-relevant marginal costs" consist of costs of three different parties:

- producer costs (for example, road wear and tear, reconstruction of road surfaces);
- user costs (for example, congestion costs);
- external costs (for example, costs of air pollution and noise). (Suter and Walter 2001, p.388)

Delucchi (2004a) states that ‘to account for a cost, a consumer must know its magnitude and be required or feel obliged to bear it’ (p.12). Full cost accounting is one mechanism for addressing this need for improved accounting and thus greater corporate reporting by both business and government.

The work of Transport Canada (2008) is the most recent and comprehensive report discovered in the course of this review. The objective of this full cost projects was to ‘assemble defensible, consistent estimates of financial and social costs of transport in Canada, primarily for use in policy analyses, and also to allow all parties a better understanding of the impacts of transportation activities’ (p.4). This report includes data such as those for ‘Financial Cost Estimates of Local Passenger Transportation Services for Selected Urban Centres for Given Distances (\$/ Passenger)’ (p.24) (the data gathered is discussed further in Section 2.8). The importance of such investigation is highlighted by the following analysis:

Since adding social costs to financial costs reverses the order of modes in many cities (urban transit and commuter rail become cheaper), this is an indication that charging full cost of modal choice could have an impact on that decision if relative price plays a role in that decision. This raises the interest of further research in that area since many other factors are likely to influence the decision making process of commuters. (Transport Canada 2008, p.25)

This disclosure provides a simple yet powerful example of how full cost accounting can reveal information which may change either public opinion, policy making or both. Results can reveal counter-intuitive information, as a result of the complex interplays which exist in modern society.

It is important to note that Transport Canada clearly defined three limiting factors in their investigation. These included:

- i. The identification of ‘two sets of estimates (a low and a high) have been generated in addition to the middle estimates’ (Transport Canada 2008, p.1). This addresses a concern raised by Litman (2007).

Some economic analyses only include costs that are commonly accepted and easily quantified. Excluding or using low estimates of relatively uncertain costs is often defended as being “conservative,” implying that this approach is cautious. Use of the word conservative in this context is confusing because it often results in the opposite of what is implied. Low cost estimates undervalue damages and risks, which is less cautious and conservative than would be higher cost estimates. In practice, low estimates of indirect and non-market costs can lead to increased social and environmental damages. For example, low estimates of pollution costs reduce the justification for control measures, resulting in more emissions. (Litman 2007, p.1-11)

- ii. Data availability – which impacted on the ‘coverage and scope’ of the investigation
- iii. Limiting social impacts ‘to addressing congestion delay costs, accident costs, as well as damage caused by air pollutants, noise and greenhouse gas (GHG) emissions’ (Transport Canada 2008, p.1).

An addition work led by Jan Bebbington from the University of St Andrews presents a UK-based perspective on this topic. They propose three techniques for determining the ecological impacts of particular activities, i.e. ‘the eco-balance, life cycle analysis and the idea of an ecological footprint’. (Bebbington, Gray et al. 2001, p.59). These authors also identify four required steps in undertaking a full cost accounting appraisal.

Stage 1 Define the cost objective...
 Stage 2 Specify the scope or limits for analysis...
 Stage 3 Identify and measure external impact...

Stage 4 Cost external impact ... (Bebbington, Gray et al. 2001, p.68)

The value of undertaking full cost investigations is not only evidenced in terms of the quantified data which may result, but also in terms of awareness raising.

FCA helped gain better knowledge of the organization's operations and helped to change several taken-for-granted ways of conducting business. The second one, however, is that some of the measures that would move a company towards more sustainable operations are sometimes out of its reach (Antheaume 2004, p.445)

2.4. Accounting for environmental flows

Environment Australia (2003 p.20) highlight the following environmental issues for reporting, in its paper on triple bottom line reporting in Australia.

Energy	Biodiversity
Greenhouse	Ozone-depleting substances
Water	Suppliers
Materials	Products and services
Waste – solid and hazardous	Compliance
Emissions and discharges to air, land and water	

Environmental impacts and costs such as those above have been recognized as important to a project's success for a number of decades. Whilst some aspects of environmental costs have been included in project costs (e.g. pollution prevention related to on-site project activities) many aspects still remain external to mainstream financial accounting (e.g. pollution impacts of transporting material to site and waste materials from site). Ukidwe (2005) proposes a number of reasons for considering environmental flows.

Systematic analysis of the flow of natural capital through the network of economic sectors and the corresponding economic activity is missing. Such analysis can provide useful insight into the reliance of economic activity on natural capital and guide the development of effective policies and corporate decisions. It can also complement existing techniques for sustainability metrics and environmental life cycle assessment and for the greening of industrial supply chains. (Ukidwe 2005 p.9759)

Nash and Sansom (2001) suggest that 'perhaps the most notable methodological development has been in the estimation of environmental externalities.

Bottom-up methods for determination of values for local and regional air pollution have been developed in the ExternE Transport project (Friedrich et al., 1998). These methods are known as the "impact pathway approach" since they follow the chain of events from tailpipe emission, through dispersion to quantification of physical impacts in health and non-health terms. The final step is to convert to monetary values by applying values per unit of impact. (Nash and Sansom 2001, p.375)

Ukidwe and Bakshi (2005) identify three ways in which these environmental externalities may be accounted for. 'Since natural capital usually lies outside the market, many efforts have been made for quantifying its importance. These include monetary valuation and analysis of material and energy flows (Ukidwe and Bakshi 2005, p.9759)

Monetary valuation of the environment

The basic points of consensus in the ecological economics vision are:
1. the vision of the earth as a thermodynamically closed and non-materially growing system ...

2. the future vision of a sustainable planet with a high quality of life for all its citizens....
3. the recognition that in the analysis of complex systems like the earth at all space and time scales, fundamental uncertainty is large and irreducible and certain processes are irreversible, requiring a fundamentally precautionary stance; and
4. that institutions and management should be proactive rather than reactive and should result in simple, adaptive, and implementable policies.... (Costanza, Cumberland et al. 1997, p.79)

Antheaume (2004) provides a more direct definition of environmental accounting as covering 'the disclosure of impacts on the physical environment and the efforts carried out to reduce these impacts' (Antheaume 2004 p.443).

In 1997 Costanza, Cumberland et al. indicated that some aspects of environmental (and social) costing had already become mainstream in decision-making.

Some argue that valuation of ecosystems is either impossible or unwise. For example, some argue that we cannot place a value on such "intangibles" as human life, environmental aesthetics, or long term, ecological benefits. But in fact, we do so every day. When we set construction standards for high-ways, bridges and the like, we value human life - acknowledged or not - because spending more money on construction would save lives. (Costanza, Cumberland et al. 1997, p.142)

Anderson highlighted in 1991 that such accounting had in fact been occurring for some time, with Norway having a system of environmental accounting in place wherein 'the accounts are divided into 'mineral resources', 'biological resources, ' in flowing resources (solar radiation, wind, ocean currents etc), and 'environmental resources (air, water, soil,space) (Anderson 1991, p65). And in 1997 Bein (p.1-7) made reference to the advanced state of modelling of environmental impacts in Northern America, citing MicroBENCOST as an example.

More recently however, and in terms of ecosystem health, Bell and Morse (2008, p.23) simplify this complex field through two key methods. The first being the identification of indicator species and the second measuring biodiversity. Through these mechanisms the potential exists to then quantify (and then monetize) impacts upon these ecosystems.

There is an extensive literature base regarding ecological economics which was not reviewed as a part of this current project. This discipline has however provided a substantial body of knowledge unpinning the credibility of providing monetary value to aspects of the environment, and needs to be review in greater depth in the course of any future research in this area.

Resource flows

Approaching natural resources used in the provision of infrastructure in line of full cost accounting methods may result in new set of cost drivers for materials pricing and thus specification, and reuse.

For the management of renewable resources there are two obvious principals of sustainable development. First that harvest rates should equal regeneration rates (sustained yield). Second that waste emission rates should equal natural assimilative capacities of the ecosystems into which the wastes are emitted. Regenerative and assimilative capacities must be treated as natural capital, and failure to maintain these capacities must be treated as capital consumption, and therefore not sustainable. (Daly 1990, p.2)

Further to this, Bringezu (2002) highlights an important element of accounting for environmental burden, highlighting the need to consider both upstream and downstream impacts and flows.

These are called "rucksack" or "hidden flows". These flows consist of overburden and extraction waste in mining and quarrying activities ... The rucksack of "low-volume flows" (e.g. metals, wood, plastics, glass) per ton of material is higher than the rucksack of "high-volume flows" (e.g. sand and gravel, stones, concrete, bricks) ... Any assessment of the resource intensity of construction activities will be insufficient if these upstream flows are neglected. (Bringezu 2002, pp.201-202)

Bebbington (2007) discusses the differing ways in which resources can be accounted for. She highlights the need for specific reference to resource accounts in order that 'double counting' does not occur.

The resource category in the SAM attempts to capture the value of resources used, to the extent that payments made (and captured under economic flows) do not fully account for the use of resources. Such a distinction is necessary to ensure that double counting is avoided. In theory, economists value environmental change arising from resource use on the basis of the 'economic rent of depleted resources' (Ekins, 2000, p. 12) which is itself estimated in a variety of ways (net price approach, present value approach or user cost method). There is no consensus as to which approach is the correct one. (Bebbington 2007, p.43)

She highlights the importance of such accounting due to the finite nature of natural resources. To this end the Strategic Assessment Management tool (SAM) to which this paper refers accounts for 'oil and gas, water, energy, raw materials, intellectual capital and infrastructure' (Bebbington 2007, p.43). This tool may warrant further investigation for application in the Australian context.

Bringezu (1993) also provides guidance on how a material flow account may be established. Whilst this is unlikely to occur at a project level, such a flow could be established for a region (e.g. SEQ), a state (e.g. Queensland) or a country (e.g. Australia).

A Material Flow Account is outlined first to measure all primary input materials to the economy and the output of the economy to the environment within political borders; second to monitor those flows of primary materials that are associated with imported and exported products on a "cradle to border" basis; and third to consider all materials stocked within infrastructures and products. Thus the Total Material Consumption of a region (which includes consumption of energy) could be reported and indicators like Material Productivity of GDP could be measured. (Bringezu 1993, p.437)

This is discussed as an eco-balance (or mass balance) by Bebbington, Gray et al. (2001).

An eco-balance...is a representation for a single entity of all its material, resources, energy and service inputs and the corresponding outputs, emissions and leakages. That is, an eco-balance seeks to track the inputs from a particular activity or for a particular entity....in a properly constructed eco-balance, the energy and materials input should equal the energy and materials outputs. (Bebbington, Gray et al. 2001, p.60)

For a single material or product, this is traditionally referred to as a life cycle analysis (LCA)

Life cycle analysis (LCA) is a process used to evaluate the environmental burdens of a product, process or activity. This is accomplished through identifying and quantifying energy and material usage and environmental releases. The data are then used to assess the impact of those energy and material releases on the environment ... (over) the entire lifecycle of the product process or activity... (Fava 1991 in Bebbington, Gray et al. 2001, p.60)

Antheaume (2004) reports on the related life cycle inventory (LCI) method, and the process of then valuing these outputs. This author defines LCI as ‘an inventory of all the flows of elementary matter and energy (inputs and outputs) at the boundaries of a system (p.448) The results of the inventory are then used for an ‘external cost evaluation stage’ in which ‘three external cost valuation methods were used: the avoidance cost method, the cost of damages method and the collective consent to pay method’ (Antheaume 2004, pp. 448-449).

Adding to this field, Bringezu (2002) provides a focus on what is referred to as the ‘materials intensity per service unit, with a ‘focus on the life-cycle-wide material intensity of products and services, the materials intensity per service unit (MIPS) of construction, indicating essential aspects of ecological-economic performance, but also widen the scope to an integrated resource management (IRM) based on multi-criteria analysis considering ecological, economic, and social aspects’ (Bringezu 2002, p.197).

This method helps to determine the cumulative material requirements (material input) on a life cycle-wide basis and relates it to the service provided. This relation is called the MIPS (material input per service unit)....The primary materials input is aggregated to five main categories, which are recorded separately: abiotic (= naturally non-renewable) raw materials, biotic (=naturally renewable) raw materials, soil, water and air. (Bringezu 2002 pp. 201-203)

Ukidwe (2002) discusses a further approach called ‘thermodynamic input-output analysis’.

“Thermodynamic input-output analysis” (TIOA), treats industrial and ecological systems as networks of energy flow and quantifies the contribution of natural capital to an industrial product or process by the ecological cumulative exergy consumption (ECEC) of ecological and industrial processes in the corresponding supply network (16). Exergy provides a scientifically sound common currency for combining all kinds of material and energy streams and analyzing industrial and ecological systems and is the only truly limiting resource on the planet. ... TIOA is not meant to replace preference-based valuation of natural capital but rather to complement and strengthen it with a sound biophysical basis. (Ukidwe 2005, p.9759)

Ecological footprints are another method for identifying the material consumption, typically of a nation, but more popularized now as individual eco-footprints. Project-based ecological footprints could be determined, as a reporting tool, but would require many of the previously mentioned tools and techniques to calculate.

2.5. Social costs

As previously discussed, Transport Canada undertook an extensive study of the social costs of transportation in that country. The final report, released in 2008, provides substantial detail regarding this topic

When it comes to transportation, social costs refer to the costs imposed on society from transportation activities; costs that are not however the object of direct financial transactions. For instance, if the health impact on individuals affected by air pollution caused by transportation are not factored in the costs of transportation service providers, then society, somehow, must absorb the said costs. So such costs would be a “social” cost. The general approach is to quantify the impacts of transportation activities, monetize them and finally allocate these costs to the sub-activities of transportation responsible for them (Transport Canada 2008, pp.59-60)

Delucchi (2004a) explains that social cost analysis is considered necessary as it:

Can provide: i) general cost data, references, methods, and cost models⁴; ii) marginal unit-cost estimates derived from detailed cost models (e.g., \$/kg of pollutant emitted.); and iii) simple estimates of total cost and average cost (which is total cost divided by total quantity). These data, models, unit costs, and results can help analysts: i) evaluate the costs of transportation projects, policies, and long-range scenarios; ii) establish efficient prices for and ensure efficient use of transportation services and commodities; and iii) prioritize research and funding. (Delucchi 2004a, p.2)

He also highlights the high degree of uncertainty regarding the monetisation of social impacts . ‘Although economists have a variety of techniques (e.g., hedonic-price analysis and stated-preference analysis) to estimate the \$/unit costs of (or demand curves for) nonmonetary items, all of the techniques can be problematic, and as a result the social nonmonetary costs of motor-vehicle use often are very uncertain -- typically, much more uncertain than are the monetary costs’ (DeLucca 2004a, p.13).

Table 6 provides a summary of the social costs of transportation identified by Delucchi (2006). The reasoning behind these inclusions and exclusions are detailed in the article.

Table 6 – Summary of social costs tabled in Delucchi 2006

Public-sector goods & services (e.g., highway maintenance and repair, highway patrol; unpriced public parking)
Climate-change – e.g. dollar value of the damages from climate change attributable to emissions of greenhouse gases (GHGs) from the use of motor-vehicles.
External costs of oil use (e.g., supply disruptions, military defense of oil supplies)
Fuel cost (i.e. resource cost, taxes, producer surplus, and costs of delay)
Noise – e.g. value of damages inflicted by noise from the use of motor vehicles - including the value of “defensive” expenditures as well as unmitigated damages
Accidents – e.g. costs associated with accidents including nonmonetary costs, (i.e. pain and suffering & lost quality of life); monetary costs (i.e. property damage); personal costs borne by people responsible for accidents, are included as well as external costs. Costs to non-motorists, such as bicyclists and pedestrians, are also included
Parking - capital, land, and O&M costs of private off-street nonresidential parking places.
Travel time and congestion – e.g. four categories, distinguishing external from private (personal) costs & monetary from nonmonetary costs
Air pollution from motor-vehicle exhaust - the physical impacts include damages to motor-vehicle exhaust emissions that cause air pollution (i.e. CO, VOCs, NOX, SOX, and PM10). Essentially all motor-vehicle exhaust air pollution impacts are completely un-priced & hence are external costs.
Air pollution from the upstream lifecycle of fuels - the estimated monetary value of the physical impacts of urban air pollution attributable to activities related to the production and transportation of motor fuels.
Air pollution from road dust, brake wear, and tire wear (from Delucchi 2006 p.1)

By way of further example, Bebbington (2007) defines three specific elements of social flows, being ‘the external impact of employment, how a project contributes more broadly to creating a socially sustainable society and the social impact of the products which arise from oil and gas field development’ (Bebbington 2007, pp45-46).

Nash and Sansom (2001) identify some of the practical barriers which exist to implementing what they refer to as ‘social cost pricing’. These include issues with commercialisation (and the belief that commercial decision-making is more effective than government decision-making); cost recovery; equity; complexity and international competition (perhaps more relevant in European countries). They do however dismiss these as being unconvincing obstacles

It is hard therefore to understand why so little progress has been made towards marginal cost pricing in practice in the transport system. Obviously, much of the opposition comes from those who perceive themselves as losing from the change (Nash and Sansom 2001, p. 371)

Considering Delucchi's (2008) comments below with regard to price setting may provide some direction in terms of the next areas of research in countries such as the US, UK and Canada with regards to the social cost of transportation.

To account for a cost, a consumer must know its magnitude and be required to feel obliged to bear it. Generally a price accomplishes both of these things: It tells the consumer what he must give up in order to consume the item....A cost can be borne abstractly, as, for example, a feeling of guilt. Thus, in principal, pollution could be satisfactorily accounted for in consumer decisions if everyone knew all the costs of pollution and cared enough to act as though their paid the cost in dollars (Delucchi 2008 pp.70-71)

It is important to note that the items included in social cost analyses to date still fall considerable short of being able to quantify the full social costs of transportation projects. What is presented here should be considered against the backdrop of Costanza, Cumberland et al. (1997) measures for welfare and well-being.

He (Manfred Max-Nef) lists nine categories of axiological human needs which must be satisfied in order to achieve well-being: (1) subsistence, (2) protection, (3) affection, (4) understanding, (5) participation, (6) leisure, (7) creation, (8) identity, and (9) freedom. These are arrayed against the existential needs of (1) having, as in consuming; (2) being, as in being a passive part of without necessarily having; (3) doing, as in actively participating in the work process; and (4) relating, as in interacting in social and organisational structures. (Costanza, Cumberland et al. 1997, p.135)

2.6. Decision-making methods

A number of methods for considering both quantitative and qualitative criteria in decision-making on major economic infrastructure projects have been considered briefly, as revealed in the search for relevant literature. These include:

- Multi-criteria decision-making
- Cost-benefit analysis
- Sustainability assessment modeling
- Integrated management system
- Reasoning mapping
- Social learning

Multi-criteria decision analysis (MCDA)

Multi-criteria decision making is a method for managing both quantitative and qualitative issues in decision-making. Rogers (2001) explains the broad principals of MCDA

The overall strategy within multi-criteria decision models involves decomposition followed by aggregation. The decomposition process divides the problem into a number of smaller problems involving each of the individual criteria. ...The process of aggregation allows all the individual pieces of information to be drawn together to allow a final decision to be made. (Rogers 2001, pp.181-182)

He discussed four methods including '(1) Simple 'non-compensatory' methods, (2) Simple Additive Weighting Method, (3) Analytical Hierarchy Process, and (4) Concordance Analysis Techniques' (p.182). He suggests these models as a way to 'help us attain the 'desired situation', as expressed in the set of objectives, in the presence of ambiguity and uncertainty' (Rogers 2001 p.29). This attitude is reinforced by Kain and Soderberg (2008) who state that 'in order to successfully manage the wide range of ecosystems and risk information, multi-criteria decision analysis (MCDA) provides a useful approach to create structured and defensible decisions' (Kain and Soderberg 2008, p.39).

Mostert (2008) summarises the essence of MCDA as follows:

- developing evaluation criteria and measurable indicators;
 - developing alternatives;
 - assessing the impacts of the different alternatives;
 - scoring the alternatives on the criteria, resulting in a score card.
- Often weighing is used to arrive at an overall ranking of alternatives. This requires some further steps:
- assigning weights to the different criteria, e.g. between 0 and 1;
 - standardised scoring on the different criteria, e.g. on a 0– 10 scale;
 - multiplying the scores and the weights and adding up the results for each alternative. (Mostert 2008, p.24)

A key benefit of the MCDA method is to assist in the management of uncertainty (and thus risk). Lahdelma and Salminen (2007) 'describe how to represent imprecise and/or uncertain criteria measurements and stakeholder preferences through probability distributions and how to efficiently aggregate this information using stochastic simulation' (p.233).

Kiker, Linkov et al. (2007) reinforce this view regarding benefits:

Significant ecological risks and their uncertainty combine with conflicting stakeholder objectives to create a need for systematic risk and decision integration methods. Comparative Risk Assessment and Multi-Criteria Decision Analysis provide useful methods for integrating these diverse, decision-relevant factors (Kiker, Linkov et al. 2007, p.37)

A key benefit of MCDA over the more traditional cost-benefit analysis, is the lack of a need for all criteria to be converted to a single unit (typically \$'s).

The essence of CBA is that it converts all criteria to a common denominator, usually money (e.g. Pearce 1983). This entails the assembly of a series of conversion prices, to allow given quantities of various outcomes to be converted into their monetary equivalences ... MCDA does not attempt to aggregate heterogeneous component affects or objectives, and allows them to be measured in whatever units are appropriate and even to be conflicting with each other. Thus MCDA bypasses the monetary pricing problem, although in so doing it gives rise to the need for a series of new techniques which can interpret the multi-criteria scorings of different projects, and apply the decision-makers' priorities among the different criteria to select the most suitable project from the candidates. (Crowley 1987, pp.169-170)

Wenstop (2005) highlights one of the key differences between CBA and MCDA, that of subjective preference, and the role of emotions.

One should not consider elicitation of subjective preference as a problem and a threat to rationality. Rather the contrary: the modeling of subjectivity is a unique strength of MCDA that fulfils the requirements of rationality. This reasoning is based on a reconsideration of the concept of rationality. I shall argue that rationality requires emotions. If emotions are not allowed to play a carefully monitored role in the decision making process, decisions are liable to arbitrariness. I shall introduce the notion of emotional rationality which emphasises what I consider the most important challenge of MCDA, namely to work with the decision-maker's emotions to elicit values that are well founded. I base the argument on the observation that emotions are indispensable precursors to any action; awareness of this helps both analyst and client. It follows that MCDA, with its focus on values, is in an eminent situation to provide a truly rational approach to decision-making. (Wenstop 2005, p.162)

Furthering this line of thinking, Wenstop goes on to discuss the role of beliefs and values in this method of decision-making.

The main picture is simple: Decision-making involves two different arenas that are separated by Hume's gulf, namely beliefs and values. Beliefs about facts are obtained through perception and reasoning, while values must be felt. Rationality requires that both beliefs and values be well founded, and values cannot be well founded without emotion. Thus, rational decision-making {or emotional rationality} requires elicitation of emotions ... Although this paper has argued that MCDA cannot handle virtues in a comfortable way, this important issue should be considered further. The question comes for instance up as rights issues in environmental management. It also comes up with regard to corporate core values; can they {should they} be incorporated in MCDA? (Wenstop 2005 p.171)

This final question posed by Wenstop was essentially the starting point for this current research, wherein the importance of explicitly identifying and articulating value/s, has led to a need to be able to better account for the intangible, alongside the tangible, in decision-making (Kraatz, Kajewski and Manley 2008).

Cost-benefit analysis (CBA)

CBA has not been considered in detail in this review of literature. Whilst it has been and still used extensively for cost-based decision-making, its worth in terms of addressing environmental and social, quantitative and qualitative criteria is limited.

Cost benefit analysis is based on the concept of measuring the net impacts of projects on society and, where possible, monetizing these impacts to determine the maximum benefits to society as a whole. It does not consider the distribution of benefits among different sectors or regions of society. In other works, it considers efficiency but not equity. (Bein 1997, pp.2-3)

An extension of this tradition form of CBA is social cost-benefit analysis which 'attempts to reduce all types of costs and benefits to a monetary unit' (Bein 1997, p.2-3) Bein further suggests that there may be an 'unrealised capability of CBA to consider a wider range of social costs than is normally practices' (Bein 199, pp.2-3/2-4).

Thus debate exists as to the CBA's ability to reflect the complexity and uncertainty of current decision-making, in an climate where environmental and social costs and externalities need to be increasingly considered in a real way.

Sunstein (2002a,b), for example, argues that it forces decision makers into conversations with objective data, that it makes decision-making more transparent, prevents undue pressure from interest groups, and increases accountability ... (however) Sinden (2004a, pp. 213–214), for example, argues that CBA: ...flattens our most profound emotions, beliefs, and values into the dull gray of dollars and cents; it produces hopelessly indeterminate results; it clouds transparency and undermines public participation by giving controversial and uncertain predictions a false patina of scientific accuracy and objectivity. (Bebbington, Gray et al. 2007b, pp.225-226)

Sustainability assessment modeling

Bebbington, Brown et al. (2007) discuss the issues of CBA extensively, as the basis of promoting sustainability assessment modeling (SAM) as an alternative method of coping with both the quantitative and qualitative elements of modern complex decision making. 'SAM generates a sustainability 'signature', which presents monetised impacts in each of the four dimensions: social, environmental, resource and economic' (Xing, Horner et al. 2008, p.3). This tool is worthy of further investigation and a potential case study in an Australian context.

Integrated management system

Approaching this issue from a different angle, Doloi (2008) discusses the integration of a multi-criteria decision-making framework with project management systems, in order to 'optimise project plans'. In doing this, he identifies similar issues to those already presented when addressing both quantitative and qualitative criteria for reporting on project performance. These issues include:

- Identifying environmental and performance variables and their representations for defining the non-quantitative components, and defining a series of indicators for each variable to characterise the same;
- Determining the relationships between each (high-level) variable and the respective set of indicators;
- Determining the weighting and preference conversion to estimate the overall satisfaction level and the overall benefit point values; and
- Further analysis of the selected solutions (already meeting target criteria) to determine a single/hybrid optimum solution. (Doloi 2007 p.473)

He goes on to identify a series of challenges including the identification of environmental and performance variables; relationships between variables; weightings and preferences used to estimate satisfactions and benefit levels and values; and how to further analyse selected solutions (p.1392). It is the first of these challenges that this review is seeking to find direction for. It is the third challenge, of determining weightings, that this author suggests add a further level of subjectivity to the any assessment, that further removes some criteria (typically those for which quantitative measures cannot be found) from remaining fundamental drivers in project decision-making, despite their possible medium to long term relevance.

Visual mapping

Monibeller and Valerie (2007, p.16) 'discuss several possible operators for aggregating qualitative data in a Reasoning Map'. Through the use of causal maps, 'the evaluation of options along complex chains of reasoning statements: from the means available to the ends that decision-makers want to achieve' (Monibeller and Valerie 2007, p.16). The concept of using visual rather than written or numeric tools to express and communicate qualitative data, is also seen in (i) the process maps associated with lean manufacturing (Rother and Shook 2003) and (ii) rich picture diagrams (Sutrisna and Barrett 2007).

Rother and Shook (2003) developed the use of process maps to not only map production and material flows, but also information flows.

Within the production flow, the movement of material through the factory is the flow that usually comes to mind. But there is another flow - of information - that tells each process what to make to do next. Material and information flow are two sides of the same coin. You must map both of them. (Rother and Shook 2003, p.5)

In a similar visual way, rich picture diagrams are used to represent relationships and connections.

The rich picture diagram (RPD) technique within the SSM (soft systems methodology) is defined as a pictorial summary of the actual situation in the "systems world" based on inquiries or observations of the "real world" (Patching, 1990). The RPD technique has been used with the SSM with an assumption that the observed human affairs reveal a rich moving pageant of relationships, whilst pictures have been regarded better means for recording relationships and connections than is linear prose (Checkland and Scholes, 2005, in Sutrisna and Barrett 2007, p.116)

That some form of visual tool may be able to be developed, to represent the role of qualitative criteria in conjunction with quantitative criteria, may be worth further investigation.

Social Learning

The internet has enabled the sharing of knowledge in unprecedented ways. It has been credited with democratising access to knowledge and information. Similar connectivity occurs in the way some professional teams now operate. Mostert (2008) reports on 'communities of practice'.

Social learning refers to the development of new perceptions (data, information and insights), new attitudes, new skills and new types of behavior ... These are best learnt in practice, in so-called "communities of practice": small groups of people who are involved in the same task and interact directly with each other (Wenger, 1998; Weick, 1995 in Dewulf et al., 2005, in Mostert 2008, p.25)

Does this type of interaction have the potential to build a new form of credible decision-making, not requiring the quantitative structures of cost benefit analysis or multi-criteria decision-making? Can this be achieved through:

- An exchange of problem perceptions. Complete consensus is not needed, but everybody needs to recognise each other's perception.
- The development and critical assessment of different potential solutions. Preferably, more than two alternatives should be studied to minimise the risk of polarisation (Fisher and Ury, 1981).
- Joint decision-making, based on reciprocity (give-and-take) and commitment.
- Arrangements to promote the implementation of decisions (cf. Gray, 1989). (Mostert 2008, pp.25-26)

A further question that this raises, is can this type of social learning address the gap identified by Bebbington et al (2007b), regarding the role of emotions, values and beliefs in decision-making for major economic infrastructure projects?

2.7. Data sets

Two sets of collected data are highlighted here. The first are those data sets relating to the environmental and social costs of transportation, as developed in Canada, the United States and the United Kingdom. The second are some key indicator sets that are directly relevant to possible areas requiring further monetisation; or further consideration as how to better integrate them, on a qualitative basis, into decision making.

2.7.1. Environmental and social cost data

Several data-sets were discovered in the course of this review, relating to the monetisation of environmental and social costs. Typically these were associated with details of the methods and tools required to arrive at these outcomes. A summary of this data is presented below, sorted by country of origin, as the data itself is not transferable from country to country, though the methodology may be able to be replicated.

Canada

Bein (1997) includes some initial estimates of shadow prices (equivalent to externalities) for some of the known environmental impacts of roads (Table 7).

Table 7 – Initial shadow price estimates

(Abridged from Bein 1997, Chap.1, pp.4-7)

Green-house gases
Fine particles
Ozone depletion
Ground-level ozone
Noise and vibrations
Land-use impacts
Resources and energy
Waste disposal
Water pollution and hydrologic impacts
Barrier effects
Impacts on biodiversity

Bein also includes details of the major ‘stressors and impacts’ associated with highway development in Canada (Table 8), and then goes on to provide costings for these.

Table 8 – Environmental stressors and impacts of road transportation

(Abridged from Bein 1997, Chap 3 p.1)

Green-house gases
Fine particles
Ozone depletion
Ground-level ozone
Noise and vibrations
Land-use impacts
Resources and energy
Waste disposal
Water pollution and hydrologic impacts
Barrier effects
Impacts on biodiversity

Litman (2007) provides estimates of full costs and benefits for twenty transportation cost categories (Table 3), including environmental and social criteria, for eleven modes under three travel conditions.

Transport Canada (2008) present the most recent analysis of transport related costs, building upon the previous work of Bein and Litman, including financial cost estimates of local passenger transport services. They also provide international comparisons (which do not include Australia) for accident, congestion, air pollution and noise costs (Appendix A). It is noted that different methodologies used in different countries yield differing results.

A further important contribution from the Transport Canada report is the methodological approach. This approach should be investigated further for its potential contribution to any future Australian-based research in this area.

California, USA

Estimates of the social cost of transportation are presented by Delucchi in a number of reports. Actual costs (1991 US\$’s) are summarized in a series of tables presented in Delucchi 2004a, pp. 38-51 (Appendix B). In Delucchi 2004b, pp. 90-106, the focus is on health and climate change, noise, crime (Appendix C). These figures are again presented by Delucchi in Kutz 2008, pp. 84-91.

Lave and Griffin (2008) provide data (US based) on transportation energy use for 2000 for a variety of transport modes (p.4) , fuel use for 1990 and 2000 (p.5), transportation direct and life cycle emissions of key pollutants (pp. 6-8), and figures for fatalities and injuries (p.10).

Levinson and Gillen (1998) provide specification and estimates for a full cost model including details for user costs, infrastructure costs, time and congestion costs, noise costs, accident costs, and pollution costs, along with details of the methodologies to arrive at these estimates

Switzerland

Suter and Walter (2001) present details of the internalization of external costs associated with transportation. This built upon work undertaken since 1988 in Switzerland.

United Kingdom

Bebbington, Gray et al. (2001) provide a number of examples of full cost accounting 'experiments', including that of Interface carpets European operation, along with the assumptions behind some of the monetisation calculations

2.7.2. Indicator sets

In addition to the data sets discussed above, the following key, relevant indicator sets are included here for future reference.

Environment Australia (2003) presents a set of eleven Environmental Performance Indicators along with a set of sub-indicators and units of measure, including quantitative measures where possible. The eleven indicators are Energy, Greenhouse, Water, Materials, Waste (solid and hazardous), Emissions and discharges to air, land and water, Biodiversity, Ozone-depleting substances, Suppliers, Products and services, and Compliance.

In the recently released Global Reporting Initiative document (2008), which relates specifically to the construction and real estate sector, sets of performance measures or indicators are included for each of the economic, environmental and social themes. Performance measures for the economic theme relate to values; derived income; tax contributions and supplier diversity (p.7) Performance measures for the environment relate to GGEs; water, electricity and fuel consumption; natural gas; heating oil; construction waste; usage of recycled materials; adoption of green materials; projects exceeding regulatory requirements; air travel; use of alternative fuel and materials and transport use (p8). Indicators relating to social responsibilities relate to fatal incidents; accident rates; equal opportunity employment; training; staff retention; CSR spend; unemployed training; consumer education; training; and absenteeism.

Xing, Horner et al. (2008, p.12) present a series of activities associated with the Sustainable Asset Management model (SAM) (Figure 6). Each of the categories and sub-categories included in the figure provide a further example of a set of indicators with relevance to this sector.

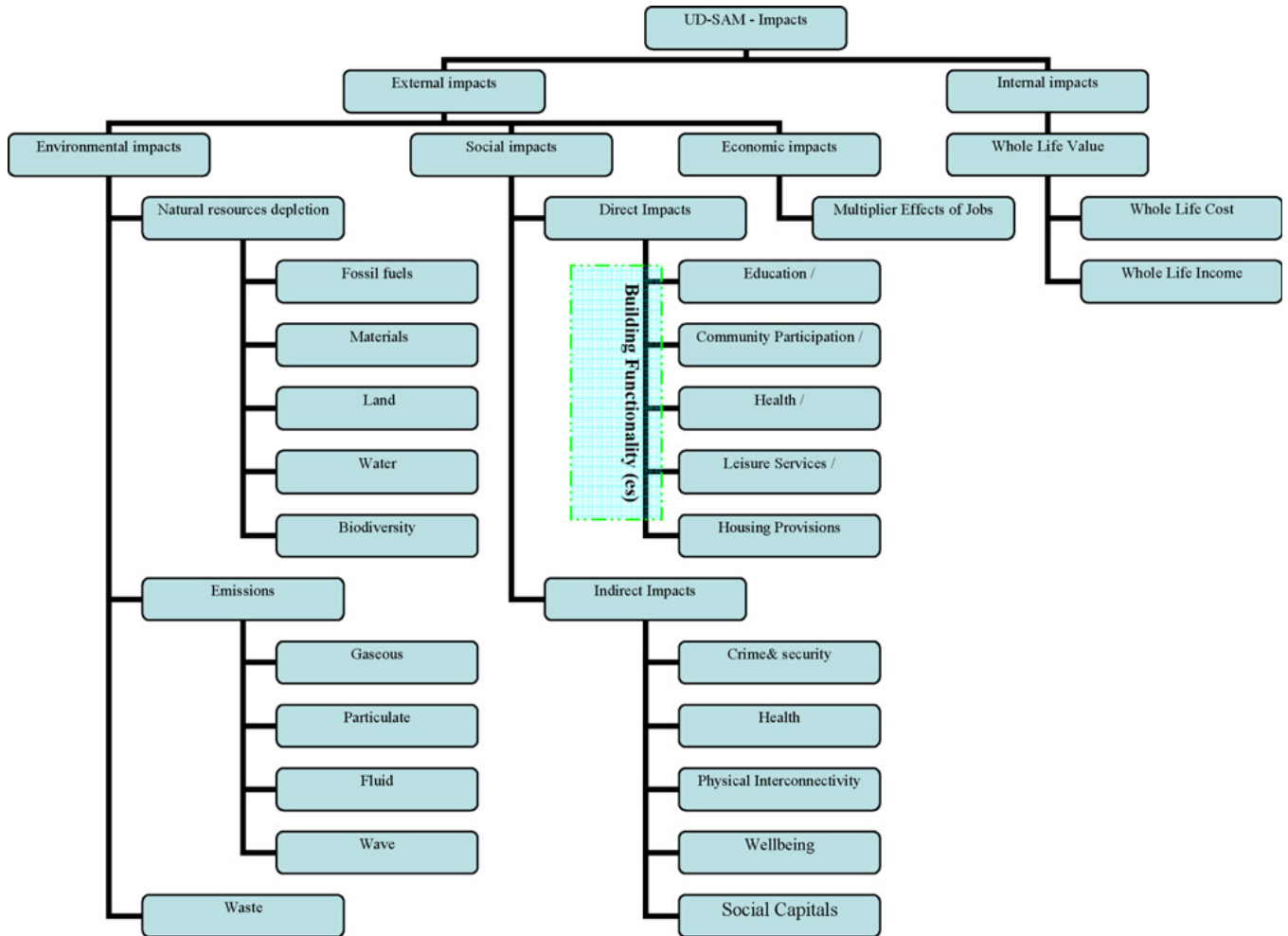


Figure 2. Urban Design – Sustainable Asset Management (Xing et al 2008, p.12)

Bell and Morse (2008, pp. 62-70) discuss sustainability indicators for marine ecosystems. Particular reference is made to the methodology used to determine and present the quantum of life in a marine ecosystem, and how then that the Ecological Dow Jones Index (EDJI) can be determined for selected indicators.

The final reference cited with regards to indicator sets is that published by the United Nations in 2001. Whilst this present a broader spectrum than those core to the delivery of major economic infrastructure projects in Australia, valuable detail can be distilled from these.

3. Summary

As a result of the review undertaken, it is apparent that a number of countries have undertaken considerable research in the past two decades, to determine the full cost of transportation. This represents an attempt to identify, and where possible quantify, aspects of transportation-related activities not previously accounted for. This review highlights a series of issues and questions, which could potentially be addressed in the context of future research.

1. The need exists to identify the externalities which exist in the Australian / South East Queensland context regarding the provision of major economic infrastructure.
2. Once identified, which of these externalities are suited to monetization and/or physicalisation, and which are best considered as qualitative?

3. For those indicators to be monetized, (i) what is the best mechanism for monetizing, and (ii) what are the bounds of this process?
4. For those to remain as qualitative criteria, how are these to be integrated into decision-making, so that their value is appropriately considered? Sub-issues to be considered in this context include:
 - a. The use of visual tools such as reasoning maps, process mapping or rich picture diagrams?
 - b. Can 'social learning' theory be developed to address this?
5. What is the potential role of stakeholders, as discussed in Part III of this report, in better integrating qualitative indicators into decision-making?

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Part III – Stakeholder Engagement Literature Review

5. Introduction

The research question explored in this review of literature relates to the selection of and engagement with stakeholders on major economic infrastructure projects. The key intent for this review is to better understand engagement with non-contractual stakeholders. This is considered important to:

- ensure non-contractual obligations and objectives are more effectively managed and integrated into project decision-making.
- better enable the integration of non-monetised project objectives (often social objectives linked to the broader community and non-contractual stakeholders) into project decision-making.
- facilitate continuity of engagement throughout the project life cycle.

Carroll (1991) discusses the management of stakeholders as a key component of a corporation's social responsibilities. This approach is reinforced by considerable literature over a number of decades.

It is well argued that a corporation is a social institution (Ohmae, 1999), whose responsibilities extend far beyond the wellbeing of its shareholders to giving security and a sustainable good life to its employees, customers, suppliers, local communities and the society beyond the current generation (Davis, 1960; Filios, 1984; Ullmann, 1985; Dennis et al., 1998; Harrison and Freeman, 1999; Friedman and Miles, 2001; Deegan, 2002). (Gao 2006, p.724)

Cooper and Owen (2007) indicate however that criticism continues to be made that 'prevailing stakeholder engagement practices have little to do with extending accountability and amount to nothing more than exercises in stakeholder management and corporate spin' (p.2). They highlight some of the complexity of how this engagement occurs.

In a discussion, decisions are made. In a dialogue, complex issues are explored. When a team must reach agreement and decisions must be taken, some discussion is needed. On the basis of a commonly agreed analysis, alternative views need to be weighed and a preferred view selected (which may be one of the original alternatives or a new view that emerges from the discussion). When they are productive, discussions converge on a conclusion or course of action. On the other hand, dialogues are diverging; they do not seek agreement, but a richer grasp of complex issues. (Senge, 1990, p. 247 in Cooper and Owen 2007, p.4)

There are many approaches to how this can occur. Debate has continued for many decades. In 1984 Freeman called for a formalized theory of stakeholder engagement, wherein this engagement is considered as a part of good business practice, rather than as a separate part, not core to the business of servicing shareholder needs. Freeman's seminal approach challenges the traditional view that economical and ethical aspects of business remain separate. Freeman advocates an inclusive approach upon which much subsequent literature has built. Since Freeman's 1984 paper, much literature has emerged regarding firstly, the need to engage, and secondly, the way in which this engagement occurs. The approaches presented range from discussion and dialogue, to social learning, with many approaches existing within this spectrum of accountability.

By way of clarity Freeman (1984, p.53) provided a seminal definition of a 'stakeholder' as 'any group or individual who can affect or is affected by the achievement of an organisation's purpose'. He goes on to propose three levels of engagement in these circumstances.

First of all, we must understand from a rational perspective, who are the stakeholders in the organizations and what are the perceived stakes. Second, we must understand the organizational process used to either implicitly or explicitly manage the organization's relations with its stakeholders, and whether these processes "fit" with the rational

"stakeholder map: of the organizations. Finally, we must understand the set of transactions or bargains among the organizations and its stakeholders and deduce whether these negotiations "fit" with the stakeholder map and the organizational process for stakeholders. (Freeman 1984, p.53)

The need to better define stakeholder engagement is reinforced in recent times with the substantial shift to greater corporate responsibility. This need is further highlighted by three additional drivers, namely (i) risk management; (ii) dealing with complexity; and (iii) value creation. Lazlo highlights two of the more recently emerging risks on organisations:

- The impact of the growth of the size and reach of individual businesses.
- The changing communications environment, which further increases the potential for amplifying – both positively and negatively – the performance of one part of a business on the others, whether through corporate communications or civil campaigning. (Zadek 2008, p.379)

Stakeholder Research Associates, UN Environment Program et al. (2005) highlight the second of these three drives, and state that:

Businesses and their stakeholders recognise that today’s complex issues cannot be solved by any single actor. They require a coordinated effort with multiple stakeholders contributing to innovative and sustainable solutions (SRA, UNEP et al. 2005, p.8)

Lazlo (2008) highlights the third in saying that ‘stakeholders have gone from having illegitimate claims on business value to having a limited voice primarily focused on ensuring compliance, to now being value-creating partners with whom the company can collaborate for mutual benefit’ (Lazlo 2008, pp.130-131). Lazlo further expands on the issue of value with regards to the ‘increase in the importance of intangible assets as a value driver’ and ‘public value as a growing source of economic value (p.131).

With these additional demands, the risks associated with not undertaking effective engagement thus become more readily apparent and critical to project delivery.

A further introductory point of note is the link between sustainability and stakeholder engagement. This occurs for a number of reasons included (i) that sustainability requires inclusion of environmental and social indicators, thus requiring stakeholder engagement for these less tangible aspects of project outcomes; (ii) that the environment is often now considered as a stakeholder; and (iii) that the Global Reporting Initiative, original published in 2000, which remains a key touchstone for sustainability reporting, includes stakeholder engagement as a part of its measurement base.

The literature discovered in the course of this research has been presented here under a number of key, relevant themes (Table 1).

Table 9 - Key themes and authors

Theme	Relevant Authors
Stakeholders and value	Freeman and Gilbert; Frooman; Lazlo; Berman, Wicks et al.; Agle, Mitchell et al.
Stakeholder engagement theory	Agle, Donaldson et al; Donaldson and Preston; Wheeler; Freeman
Stakeholder identification	Freeman; Gao; Holme and Watt; AccountAbility; O’Connor; Welford; Bell and Morse; Maharaj; Birkin; Stayeart and Jiggins
New ways of doing business	Freeman; SRA, UNEP et al.; Gao; Stayeart and Jiggins; Bell and Morse; Deakin; Gao and Zhang; Cooper and Owen; Mostert; Blackmore, Ray et al.; Warhurst; Zadek;
Standards, methods and tools	AccountAbility; Zadek; Warhurst; GRI; Gao and Zhang

6. Background to this review

This research emerged from previous doctoral research related to value/s-mapping for major economic infrastructure projects (Kraatz 2009). An explanation of how this exploration of stakeholder engagement links to (i) value/s and (ii) measurement follows.

SRA, UNEP et al. (2005) explicitly link the various characteristics of modern stakeholder groups to the creation of social capital. They propose that past distinctions between primary and secondary stakeholders are no longer sufficient for business' to have successful stakeholder relationships. They broaden these needs out to factors including:

- The dynamics of the interrelationships between stakeholders
- The power and influence of different stakeholders
- The abilities and competencies of the engaging parties
- The mindsets and cultures (values, beliefs and behaviours) of the engaging parties (SRA, UNEP et al. 2005, p.20)

Wheeler (2003, p.19) states that 'value creation at the highest level requires an ability to build value-based networks where all stakeholders see merit in their association with and support for a business'. Wheeler goes on to add:

Our aim is to put forward a simple framework to reconcile the concepts of corporate social responsibility and sustainable development (or 'sustainability' in business terms) with a stakeholder approach, through a focus on the creation of value — as defined by different actors and networks — as an integrating ground. We believe that a business model that places value creation at its core will allow concepts of CSR, sustainability and the stakeholder approach to find their natural homes. (Wheeler 2003, p.2)

This approach was previously advocated by Freeman and Gilbert (1988) in saying that 'we cannot connect ethics and strategy unless there is some point of intersection between the values and ethics we hold and the business practices that exemplify these values and ethics' (Freeman and Gilbert 1988, 70-71 in Berman 1999, p.493). This early debate in the literature regarding the links between value-creation, ethics and business practice, was premised upon the discussion around the unified and separatist theories of stakeholder engagement. Freeman's (1994) discussion of this point introduces concepts of fairness and equality amongst stakeholders. This can be seen as precursor discussions to that which we identify today as related to corporate social responsibility.

Notice that building these moral notions into the foundations of how we understand value creation and contracting requires that we eschew separating the "business" part of the process from the "ethical" part, and that we start with the presumption of equality among the contractors, rather than the presumption in favor of financier rights. ... The liberal idea of autonomy is captured by the realization that each stakeholder must be free to enter agreements that create value for themselves, and solidarity is realized by the recognition of the mutuality of stakeholder interests. (Freeman 1994, pp.415-416)

In more recent writing, Freeman (2004) goes on to state that 'economic value is created by people who voluntarily come together and cooperate to improve everyone's circumstance' (p.364). This in turn, he states, places the pressure upon managers to develop relationships which enable this.

Lazlo (2008) further develops this concept in terms of 'sustainable value' and the role of stakeholders, seeking to include those previously marginalised by business. With 'stakeholder value becomes a source of competitive advantage rather than only a moral obligation' (p.119). He attributes the growth in the 'stakeholder-rich competitive environment' to both the growth in information technology, and society's expectations with regards to both 'health and the environment' (p.119).

Lazlo (2008) thus reconciles the dichotomy (or duality) which has previously existed between value (traditionally capital based) and values (or ethics and morals).

The core concept behind the framework is that the business value created by a company is always associated with a stakeholder values that can be either positive or negative. Value is created when a business adds to the capital or well-being of its stakeholders. It is destroyed when a business reduces their capital or undermines their well-being. (Lazlo 2008, p.120)

With this focus in mind, Lazlo highlights the inadequacies of our systems for integrating social and environmental issues into organisational decision-making, when ‘sophisticated managerial competencies now exist to manage shareholder value, from valuing investment opportunities using Economic Value Added (EVA) to assessing changing customer preferences using multi-dimensional maps based on composite product attributes (Lazlo 2008, p.135)

Berman, Wicks et al. (1999) discuss research into the positive effects of good stakeholder relations on business value in relation to environmental issues.

- being proactive on environmental issues can lower the costs of complying with present and future environmental regulations (Dechant, Altman, Downing, & Keeney, 1994; Hart, 1995; Shrivastava, 1995).
- environmental responsiveness can enhance firm efficiencies and drive down operating costs (Russo & Fouts, 1997; Shrivastava, 1995).
- firms can create distinctive, "ecofriendly" products that appeal to customers, thereby creating a competitive advantage for the firms (Shrivastava, 1995).
- being environmentally proactive negative reactions on the part of key stakeholders, but can also improve a firm's image and enhance the loyalty.
(paraphrased from Berman, Wicks et al. 1999, pp. 489-490)

Conversely, poor relations can be demonstrated to have a negative impact on business value. Frooman (1997) noted that the evidence from event studies examining market reactions to corporate irresponsibility and illegal behaviour is fairly unequivocal: the market value of firms engaged in such activity decreases’ (Berman, Wicks et al. 1999, p.490).

And again a further perspective is provided by Agle, Mitchell et al. (1999) who discuss how CEOs’ values can affect relationships among their stakeholders.

Hence there is substantial literature which provides a richness to the correlation between value/s and stakeholder engagement, and which can be drawn upon to further investigate this area in the course of future research. In the context of this report however, the following provides a concise review of central themes which provide a context for possible future investigation.

7. Summary of literature

Key themes which have emerged from this review of literature include:

- Stakeholder engagement and identification
- New ways of doing business
- Standards and guidelines

Literature in each of these themes is discussed in the following sections. Prior to this however, a short discussion regarding definitions is provided.

Mitchell, Agle et al. (1997) highlight the relationship between corporate social responsibility and stakeholders, citing Jones' (1980) definition of CSR as 'the notion that corporations have an obligation to constituent groups in society other than stockholders and beyond that prescribed by law or union contract, indicating that a stake may go beyond mere ownership' (1980, p.59-60 in Mitchell, Agle et al. 1997, p.856). This approach has been repeatedly reinforced since that time, as indicated in Figure 1 where a timeline of definitions is presented.

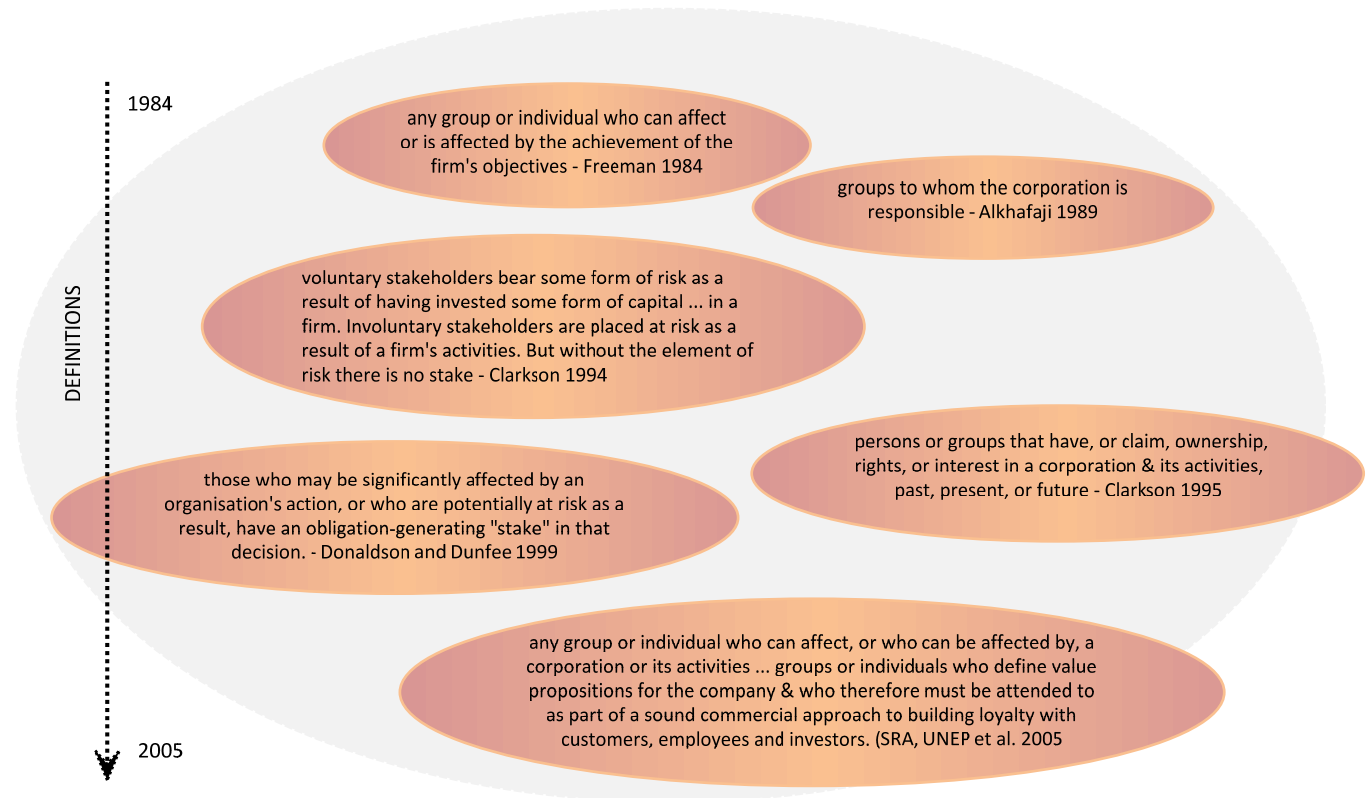


Figure 3 Definitions of 'stakeholder' across time.

A further breakdown of the generic stakeholder group is provided by SRA, UNEP et al. (2005).

Stakeholders are sometimes divided into primary stakeholders, or those who have a direct stake in the organisation and its success, and secondary stakeholders, or those who may be very influential, especially in questions of reputation, but whose stake is more representational than direct. Secondary stakeholders can also be surrogate representatives for interests that cannot represent themselves, i.e., the natural environment or future generations Unified theory of stakeholder engagement. (SRA, UNEP et al. 2005, pp.11-12)

7.1. Stakeholder engagement and identification

Separatist versus unified theory

The traditional separation in the business environment between financial performance and the business ethics, which was reflected in a focus on shareholder outcomes rather than stakeholder outcomes, was challenged by Freeman (1984). This is presented in the literature as the distinction between separatist versus unified theories of stakeholder engagement. It is this fundamental revision that corporate responsibility has reinforced (Lazlo 2008 and Zadek 2009).

Table 1 in Agle, Donaldson et al. (2008) provides a snapshot of the history of stakeholder engagement from 1999 to 2007 (Appendix D).

Much of the literature relating to stakeholder engagement theory, since Freeman's 1984 paper, focuses on whether such a theory is instrumental, normative, or descriptive. Donaldson and Preston (1995) provide an example of this on-going debate.

We summarize our central theses here: Thesis 1: The stakeholder theory is unarguably descriptive. It presents a model describing what the corporation is.....Thesis 2: The stakeholder theory is also instrumental. It establishes a framework for examining the connections, if any, between the practice of stakeholder management and the achievement of various corporate performance goals ...Thesis 3:...is normative and involves acceptance of the following ideas: (a) Stakeholders are persons or groups with legitimate interests in procedural and/or substantive aspects of corporate activity. ... (b) The interests of all stakeholders are of intrinsic value. ... Thesis 4:...managerial...it also recommends attitudes, structures, and practices that, taken together, constitute stakeholder management. (Donaldson and Preston 1995, p.66-67)

Beyond these debates, and more practical in nature, are the various models for stakeholder engagement and/or management. Berman, Wicks et al. (1999) discuss two of these models. The first is strategic stakeholder management, wherein 'the nature and extent of managerial concern for a stakeholder group is viewed as determined solely by the perceived ability of such concern to improve firm financial performance'. The second is the intrinsic stakeholder commitment model, wherein 'firms are viewed as having a normative (moral) commitment to treating stakeholders in a positive way' (Berman, Wicks et al. 1999, p.448).

Wheeler (2003) provides an even broader perspective on unified theory:

Over the past fifteen years, stakeholder theory has emerged as a primary organizing framework undergirding all of business ethics [57]... and is more recently gaining ground as a viable framework in the field of strategy [58]. Stakeholder "theory" is not so much a formal unified theory as a broad research tradition that encompasses philosophy, ethics, political theory, economics, law and organizational social science. In its applied form we therefore refer to a 'stakeholder approach'. (Wheeler 2003, p.15)

Stakeholder identification

Since Freeman's text on stakeholder engagement in 1984, much has been written on the identification and consideration of stakeholders. Freeman provides many tools (including various grids and matrices) for stakeholder identification and mapping in this book. Pertinent questions for stakeholder identification include:

- 'Who are our stakeholders?'
- 'How best can we identify them?'
- 'Through what process do we engage with them?'

This however oversimplifies the relationships as the answer to the above three questions will change over time and will change dependent upon the nature of the relationships.

Stakeholder relationships must be understood as a complex interplay of shifting, ambiguous and contested relationships between/within diverse stakeholders and organizations. As most policies, strategies and activities of a business are embedded in a network of stakeholder relationships, the business needs to build such a network that is fully understood by stakeholders and is real meaningful to stakeholders. (Gao 2006, p.725)

Holme and Watt (200) also discuss the complexity of stakeholder engagement and recommend the use of the following three questions when considering stakeholder selection:

- > Legitimacy: is a particular stakeholder group representative of issues which are relevant to your business and accountable to those with a legitimate interest in the way you do business
- > Contribution / Influences: Does the stakeholder group have a contribution to make in helping your run the business more responsibly or significant influence on your companies business and/or other stakeholders
- > Outcome: is the engagement likely to result in a productive outcome in the long run? (Holme and Watt 2000, p15)

The AA1000 Stakeholder Engagement Standard provides the six criteria for guidance when considering stakeholder identification, including responsibility, influence, proximity, dependency, representation, and policy and strategic intent (AA1000SES, p.31-32).

O'Connor (2007) recommends one starting point for considering distinctions between stakeholders as not only identifying between internal and external stakeholders, but in further splitting external stakeholders into two groups, namely business partners, and discourse partners.

The 'external' stakeholders as traditionally identified business partners (suppliers, customers, banks, etc., all having direct commercial importance to the company) ... The broader external stakeholders as discourse partners (NGOs, associations, partner companies, local authorities, all having an interest in, or claims about business performance, and therefore having an indirect significance for commercial success). (O'Connor 2007, p.5)

O'Connor suggests that by separating out these categories, 'an important distinction is made between 'traditional' external stakeholders and the 'extended' or 'broader' stakeholder set, helping to see the different needs of (a) those stakeholders who are of interest to the company as opposed to those who have an interest in the company (including civil society at large)' (O'Connor 2007, p.5). Welford reinforces this distinction with reference to business and non-business stakeholders (Table 2).

Table 10 - Comparison between business and non-business stakeholders
Welford 2007 p.55

Businesses	Non-business stakeholders
1 Health and safety	1 Environment
2 Environment	2 Health and safety
3 Governance	3 Corruption
4 HRM	4 Governance
5 Corruption	5 HRM
6 Supply chains	6 Supply chains
7 Stakeholder dialogue	7 Stakeholder dialogue
8 Product responsibility	8 Policies
9 Policies	9 Reporting
10 Reporting	10 Partnerships
11 Community	11 Product responsibility
12 Partnerships	12 Human rights
13 Human rights	13 Standards
14 Standards	14 Community
15 Philanthropy	15 Philanthropy

Stakeholder mapping

Stakeholder mapping is a tool that is addressed in much of the literature. This is a mechanism through which stakeholders can be discovered, relevant to a particular project. Freeman (1984), Holme and Watt (2000) and Maharaj (2008) all discuss this concept at length. Holme and Watt (2000) provide a stakeholder mapping tool to be used as a part of

the World Business Council for Sustainable Development's suite of CSR tools. It is this tool that has been adapted to form a part of the value-mapping framework developed by this author in the context of recent doctoral research (Kraatz 2009). Maharaj (2008) discusses stakeholder mapping as a tool for identifying the power and urgency associated with stakeholder claims. AccountAbility (2005) suggests the following elements as integral to stakeholder mapping:

- Convening a cross-functional group of people...
 - Categorising identified stakeholders according to the criteria under which they have been identified, to what extent and why.
 - Grouping stakeholders into categories and then subcategories likely to share similar perspectives...
- Further, the organisation should establish systematic processes to:
- enable stakeholders not currently identified to voice their concerns or to identify opportunities...
 - include mechanisms for representation of the voiceless. (AccountAbility 2005, p.34)

Freeman highlights a key point when undertaking stakeholder mapping, that is the temporal aspect, that is, that conditions change over time. 'The concern with future forecasts of stakeholder behaviour so that the corporation can plan its "best reply," assumes that there will be no radical shifts in a stakeholder's actions' (Freeman 1984, p.35).

Stayeart and Jiggins (2007) also consider this point.

Stakeholder analysis (SA) (SLIM, 2004a) often is used as an analytical tool in the start-up phases of collaborative stakeholder processes, in order to map stakeholders and the stakes they defend. But SA provides a static view of stakeholders and stakes and it requires judgments to be made on the basis of imperfect information. (Stayeart and Jiggins 2007, p.579)

This reinforces the need to have methods of identification and engagement which do not pre-determine outcomes through the approach taken, and do not remain static over time, and that may be easily and effectively re-applied at key project milestones.

Current commercial tools for stakeholder engagement (e.g. Stakeholder Circles, Stakeholder 360) have identification, mapping and salience aspects of engagement as central to their structure.

Stakeholder salience

The concept of stakeholder salience is also discussed in much of the literature. This is a way of identifying the relevant importance of competing stakeholder claims. Agle, Mitchell et al. (1999) discuss how competing stakeholder claims can be addressed by managers and others responsible for dealing with stakeholders. 'Stakeholder salience is positively related to the cumulative number of the three variable attributes, power, legitimacy, and urgency (Agle, Mitchell et al. 1999, p.508)

7.2. New ways of doing business

In 1984 Freeman cited Ackoff's argument 'that many societal problems could be solved by the redesign of fundamental institutions with the support and interaction of the stakeholders in the systems' (Freeman 1984, p.37) Thus Freeman identifies a fundamental aspect of stakeholder engagement which is being further promoted in recent times, based on principles of corporate social responsibility. This approach of integration and understanding (of drivers, values and the like) requires a far greater commitment to stakeholder engagement.

Stakeholder engagement encompasses relationships built around one-way communication, basic consultation, in-depth dialogue and working partnerships. Each successive approach represents a greater

commitment on both sides in terms of time and money, and risk and cooperation. Choosing an approach to engagement is not a technical question about focus groups versus public meetings but about understanding the drivers, risks and opportunities associated with an issue and the needs and aspirations of the company and its stakeholders in relation to that issue. (SRA, UNEP et al. 2005, p.14)

An approach aligned with CSR thus requires new ways of thinking, new ways of obtaining and applying knowledge; and new methods of engagement.

One form of knowledge which is again being recognized in this context is that which stakeholders bring through their intimate understanding of the local environment (whether ecological and social). Integrating such forms of 'living knowledge', along with shifting the broad parameters upon which decisions are made, provides an enhanced ability to deliver this new value.

To achieve this, Welford (1995, p. 117) identifies the following "six shifts":

- (1) shift from objects to relationships;
- (2) shift from parts to the whole;
- (3) shift from domination to partnership;
- (4) shift from structures to processes;
- (5) shift from individualism to integration; and
- (6) shift from growth to sustainability. (Gao 2006, pp.728-729)

Stayeart and Jiggins (2007) highlight the dilemma posed by traditional methods of stakeholder engagement wherein 'if expert knowledge is presented as uniquely 'truth determining' – thereby negating these other knowledge domains – confrontation, mistrust, or disengagement typically results' (p.576-577). This view again supports the point of view, that in order to have more effective stakeholder engagement, in the context of the civil organisation, then the knowledge embedded in stakeholder experience (of living and being) needs also to be recognised.

Bell and Morse (2008) cite Ison's (1993) principles in acknowledging the role of other forms of knowledge in achieving outcomes.

- Projects have far more potential for more mutually satisfying outcomes when an invitation is extended to participate...
- It is important to understand that experience and knowledge are related to context...
- Enthusiasm, which may be triggered, appears to be an emotional state...
- Knowledge is both individually and socially constructed...
- Diversity of experience, knowledge, research and extension action is an asset. (Bell and Morse 1999, p.145)

In this context, a number of methods for enhanced stakeholder engagement are further discussed. These include:

- Recognition of interdependencies
- Dialogue
- Social learning
- Social license to operate
- Partnerships

Recognition of interdependencies

In recognizing the inter-dependency of stakeholders and business, civil organizations are becoming active in new forms of engagement which enable this richer form of engagement. Deakin (2007) discusses four mechanisms for enhanced engagement including:

- (1) instrument participation
 - (2) communitarian participation
 - (3) the politics of presence
 - (4) deliberative democracy
- (Deakin 2007, p.53)

Deakin goes onto detail the following characteristics of such a process:

- Inclusion of a full range of stakeholders
- A task that is meaningful to the participants...
- Participants who set their own ground rules for behavior, agenda setting, making decisions and many other topics.
- A process that begins with mutual understanding...
- A dialogue where all are heard...
- A self organizing process unconstrained by convenors ...
- Information which is accessible and fully shared ...
- *An understanding that consensus...is only reached when all interest have been explored... (Deakin 2007, p.62)

AccountAbility provides the following description for 'civil organisations' as a part of a continuum of organisational awareness:

The standard recognizes three levels of achievement: the emergent organization, the strategic organization and the civil organization.

- An Emergent Organization has made a commitment to inclusivity and the three AccountAbility principles but is at an early stage of design and implementation....
- A Strategic Organization actively and strategically engages with its stakeholders to understand their concerns, facilitate learning and find solutions....
- A Civil Organization has shifted its engagement practice from an organization- centered approach to an approach that is linked into the wider societal debate (i.e. issues centered).... (AccountAbility 2005, pp.52-53)

In both the above instances a greater focus on truly deliberative engagement is required.

Internal advisory panels

Cooper and Owen (2007) suggest that the 'Most highly developed in terms of incorporating an external dimension into CSR internal governance procedures are Camelot and BT' (Cooper and Owen 2007, p.7). Camelot has established Advisory Panels for Social Responsibility:

Chaired by a non-executive director and comprising individuals 'with professional expertise in stakeholder concerns' each of whom focuses on the concerns of a particular stakeholder group...All 12 reports, in addition to outlining the nature of the internal governance structures employed, express a clear commitment to engage with their stakeholders so that concerns of the latter may be adequately addressed. In fact each of the reports identifies a wide range of stakeholder dialogue and engagement processes employed, such as questionnaire surveys, telephone interviews, focus groups, liaison panels and discussion forums. (Cooper and Owen 2007, p.7)

Dialogue

Gao and Zhang (2006) identify a number of key references which highlight the role of 'dialogue' in the process of stakeholder engagement in the current context of CSR.

Dialogue has been widely advocated in the literature (Long and Arnold, 1995; Elkington, 1997; Zadek and Hummels, 1998; Cheney and Christensen, 2001; Bendell, 2003), particularly as an instrument in the paradigm shift from conflictual modes of relationship towards partnership and collaboration in complex problem-solving.

They highlight the ability of dialogue (as opposed to consultation) to ‘search for win-wins, an exploration of shared and different interests, values, needs and fears, a focus on process rather than issues, strengthening and building relationships (Environment Council, 1999, p. 8, in Goa and Zhang 2006, p.729). Thus, they bring the discussion of stakeholder engagement to that of establishing shared values between both organisation and key stakeholders.

Cooper and Owen (2007) also present an argument for the ability of dialogue to enhance accountability.

Roberts (1996, p. 59) concludes that “dialogue as a process and practice of accountability” has the potential to “restore the balance”, such that the “instrumental pursuit of power and profit” cannot be undertaken “without regard to the wider social or environmental consequences of the pursuit of such interests”. (Cooper and Owen 2007, p.4)

For dialogue to be a successful tool, Cooper and Owen cite three required conditions for the collective, rather than the individual views, to be accounted for. These are:

1. all participants must “suspend” their assumptions, literally to hold them “as if suspended before us”;
2. all participants must regard one another as colleagues;
3. there must be a “facilitator” who “holds the context of dialogue.” (Senge, 1990, p. 243, in Cooper and Owen 2007, p.4)

Social licence to operate

Warhurst (2005) considers a central issue in the consideration of stakeholders in the context of CSR is ‘in defining the roles and responsibilities of business in society (Warhurst 2005, p.153). This work relates specifically to multi-national organisations and their involvement in societal development goals within the countries they are doing business in. This area may well provide opportunities for knowledge translation with regards to stakeholder engagement in the Australian context. Warhurst highlights that this is in response to increased risks.

Companies are also being legally obliged to review their risks more strategically—such that they encompass wider areas of ethical, social and political risk that might affect future business strategy, performance, license to operate and liabilities, as well as shareholder value. (Warhurst 2005, p.153)

Zadek (2008) provides a definition of such arrangements as referring to ‘institutional arrangements that involve a deliberative multi-stakeholder collaboration in establishing rules of behavior governing some or all of those involved in their development and potentially a broader community of actors’ (Zadek 2008, p.382I).

Partnerships

Warhurst (2001) discusses tri-sector (or multi-sector) partnerships, which are ‘an agreement between business, government and civil society ... a model or framework for managing coherently and systematically over time project level partnerships between business, governments agencies/intergovernmental organisations and local communities or civil society organisations’ (p.59)

SRA, UNEP et al, (2005, p.25) provide details of different kinds of partnerships which exist at a multinational level of stakeholder engagement. These include bilateral and multilateral partnerships, along with stakeholder forums. The examples provided tend to relate to community development or knowledge-related consensus building.

Gao and Zhang (2006) details required characteristics for partnerships:

- .Allow stakeholders to assist in the identification of other stakeholders.
- Ensure that stakeholders trust the social and ethical accountant (internal or external) that is collecting and processing the findings of the engagement.
- Be a dialogue, not a one-way information feed.
- Be between parties with sufficient preparation and briefing to have well-informed opinions and decisions.
- Involve stakeholders in defining the terms of the engagement ...
- Allow stakeholders to voice their views without restriction and without fear of penalty or discipline ...
- Include a public disclosure and feedback process that offers other stakeholders information that is valuable in assessing the engagement and allows them to comment upon it (ISEA, 1999, p. 21 in Gao 2006, p.726)

Zadek (2008) also highlights characteristics of new styles of partnerships.

A growing number of such multi-stakeholder partnerships are, crucially, gaining influence beyond well-defined, localized, and operational benefits (AHS, 2004; Rochlin et al., 2008). Increasing numbers are establishing and indeed enforcing wide-ranging norms of behavior, often well beyond the activities and impacts of direct participants. (Zadek 2008, p.375)

Social learning

A more recent and perhaps even more challenging tool for stakeholder engagement is 'social learning', that is, 'the development of new perceptions (data, information and insights), new attitudes, new skills and new types of behaviour' (Mostert 2008, p.25). Mostert suggests that these new skills and so forth are best learnt in ' "communities of practice": small groups of people who are involved in the same task and interact directly with each other (Wenger, 1998; Weick, 1995 in Dewulf et al., 2005, in Mostert 2008, p.25)

Mostert (2008) goes on to identify the following key elements integral to this approach:

- Recognition of interdependence.
- Interaction between all stakeholders.
- The development of openness and trust (Vangen and Huxham, 2003).
- Critical self-reflection by all participants. ...
- An exchange of problem perceptions. ...
- The development and critical assessment of different potential solutions. ...
- Joint decision-making, based on reciprocity (give-and-take) and commitment.
- Arrangements to promote the implementation of decisions (cf. Gray, 1989). (Mostert 2008, pp.25-26)

Blackmore, Ray et al. (2007) discuss the use of social learning in the context of interaction between people and the environment. They highlight its use in increasing awareness and understanding the 'competing values, beliefs, perceptions and political positions' (p.494) inherent in situations such as the current 'environmental crisis', through internalizing rather than externalizing the problem.

From our perspective, social learning is defined as an iterative process of knowledge co-production (i.e., of 'knowing') among stakeholders brought into interaction. (Stayeart, Barzman et al 2007, p.504)

Social learning as a tool for delivering enhanced outcomes for major projects is proposed as a key element of future proposed research, potentially via a case study application.

7.3. Standards and guidelines

Standards and guidelines to support stakeholder engagement and enable effective reporting are becoming more mainstream. These include:

- Ethical reporting standards (or social auditing tools) such as SA8000 (1997) which assists organizations in managing workplace conditions throughout their supply chains.
- Global Reporting Initiative (2000) including a draft sector supplement for construction and real estate.
- AA1000SES – Stakeholder Engagement Standard (2005) is designed to provide a framework to help ensure stakeholder engagement are effective and accountable
- ISO26000 social responsibility standard to be launched in 2010.

Social auditing

Social auditing has emerged as a tool to enable business to audit and report on this aspect of business activity, in much the same way as financial auditing is undertaken to assure performance to accepted financial standards.

Gao and Zhang (2006) propose ‘social auditing as a practical approach to engage stakeholders in assessing and reporting on corporate sustainability’ (p.724). They provide a broad definition of social auditing as “a process that enables an organisation to assess its performance in relation to society’s requirements and expectations” (Elkington 1997, in Gao and Zhang 2006, p.730).

SA8000 is one tool which is promoted as a voluntary, universal standard for companies interested in auditing and certifying labour practices in their facilities and those of their suppliers and vendors. It is designed for independent third party certification.

Within the context of social auditing, Gao and Zhang (2006) suggest that stakeholder councils, which comprise both internal and external stakeholders with a knowledge of business’ operations, contribute to the social auditing process through a verification, evaluation and definition process. Importantly, in addition:

- some of the most important social indicators require qualitative rather than quantitative information and these can be verified and evaluated by stakeholders.
- stakeholders can directly contribute in assisting the enterprise to improve its social, community and environmental objectives and performance.
- stakeholders are operationally involved with the enterprise and have greater authority, self-interest and so motivation to minimize any negative social impact of the organisation.
- they can advise shareholders and their directors the social performance indicators by which management should be evaluated and remunerated. (Gao 2006, p. 733)

Global Reporting Initiative (GRI)

GRI has a well established reputation with regards to providing sustainability indicator sets to enable businesses to report on broader impacts. They are currently working with industry to produce a sector supplement for Construction and Real Estate which is planned for release in 2010.

AA1000 Stakeholder Engagement Standard (AA1000SES)

AA1000SES is designed ‘for all those initiating, participating in, observing, assessing, assuring or otherwise communicating about stakeholder engagement’ (p.12). The standard has been referred to in other parts of this document.

8. Summary – Adding value and aligning values

Once we have rejected the separation thesis, the issue is not whether a theory has moral content, but rather what kind of moral content it has (Freeman 1994) ... stakeholder theory better equips managers to articulate and foster the shared purpose of their firm. Unlike the narrow view of shareholder theory that ascribes one objective function to all corporations, stakeholder theory admits a wide range of answers. (Freeman et al. 2004, p. 368)

Through new norms for engagement with stakeholders, as briefly outlined in this initial review of literature, forecasting possible stakeholder needs has been replaced by integrating stakeholders into the decision-making process, so that shared values and intents may emerge.

This requires recognition of various types of knowledge and expertise, beyond the technical, to that of 'living and being'. It thus follows that stakeholder involvement in the development of project indicators (particularly those related to social and environmental indicators) can contribute to project outcomes, thus adding value and aligning values. Spangenberg (2008) discusses this direction.

It considers indicator development as a social decision making process dealing with direct and indirect impacts of and on a company ... this includes uncertainty management, multi-criterion analysis (MCA), extended peer systems, stakeholder participation, discursive decision preparation and, on the company level, stakeholder judgments on the 'acceptability of operations as an indication of CSR performance (Mikkilä, 2005). The methodology developed thus combines a phase on opening up the decision process by stakeholder involvement with a closing-down phase providing scientific input and allowing for management decision on indicator choice. (Spangenberg 2008, p.125-126)

This thus forms the link between the two aspects of research currently being investigated is confirmed. This however, in part, requires recognition of the value of other types of knowledge in the decision-making environment.

Our task is to take metaphors like the stakeholder concept and embed it in theory about how human beings create and exchange value. (Freeman 1994, p. 418)

This aligns with what Warhurst (2005) observes as one of the key challenges of corporate citizenship, namely, 'broadening risk and impact assessment and communication to include 'intangibles' and long term considerations, across the environment, economic, political and social dimensions' (Warhurst 2005, p.164).

These success factors recognise the interactive nature of effective stakeholder engagement, as acknowledged by Stayeart and Jiggins (2007).

Sees knowledge not only as a "thing" but also as a "flow", i.e. as ephemeral, produced during interactions, used to act, and once used, disappearing in some way. He distinguishes four 'knowledge management' domains or situations, each of them demanding a distinctive leadership and way of managing: the known; the complicated but knowable; the complex, unknowable but partly predictable; and the chaotic. (Stayeart and Jiggins 2007 p.576)

How then can these new forms of knowledge and practice can be integrated into the rigorous process of delivering major economic infrastructure projects?

Berman (1999) suggests that this relates to motivations, trust and the need for a broader definition of performance (beyond financial):

First, the most obvious extension is that future work could include survey data capturing managerial motivations and intentions pertaining to strategy decisions and stakeholder orientation. Capturing intentions could provide valuable insights both to help categorize the commitment of firms ... Second, a related line of research that appears relevant is the role trust plays in stakeholder relations ... Third, although we focused on a rather narrow financial definition of firm performance, researchers examining corporate social performance have argued for expanding the definition of firm performance to include more than financial measures. (Berman 1999, pp.501-502)

Cooper and Owen (2007) suggest that 'a far more pluralistic form of corporate governance would be required. There would need to be a clear recognition that there are other normatively legitimate stakeholders than simply equity shareholders alone' (Phillips, Freeman, & Wicks, 2003, in Cooper and Owen 2007 p.16).

The theoretical problem is that surely "economic effects" are also social, and surely "social effects" are also economic. Dividing the world into economic and social ultimately is quite arbitrary. Indeed, one of the original ideas behind the stakeholder management approach was to try to find a way to integrate the economic and the social. Thus, researchers need to find more robust ways of measuring stakeholder effects, measures that may point us beyond the economic and social typology. (Harrison 1999, pp.483-484)

Thus, in conclusion, a wealth of literature exists which can form the basis for further investigation into new forms of stakeholder engagement, and better integration of the role of stakeholders in the establishment of both quantitative and qualitative indicators upon which the whole of project life cycle benefits and impacts can be considered.

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Part IV – Survey Findings

1 Background

This survey was undertaken in order to gain an understanding of the current state of practice, in Australia, with regards to (i) the extent to which project performance measures (both quantitative and qualitative) are integrated with and/or driven by corporate objectives; and (ii) the nature of stakeholder engagement on major economic infrastructure projects. The survey (Appendix E) was sent to thirty-three organisations initially. The Queensland Department of Public Works Building Policy Unit forwarded the survey onto members of their pre-qualified consultants' and contractors' lists (80 Level 3 and 4 contractors, and 47 Level 4 consultants).

Responses were received from 11 recipients. The poor response rate is attributed to:

- The nature of the questions being asked. Terminologies which may not be mainstream, or which may be subject to multiple interpretations were used. Definitions were not provided as it was thought that this would further discourage potential participants.
- Were possible specific contacts with organisations were identified, however in a number of organisations, these were unknown. The response rate from non-specific contacts was particularly low.

In retrospect, further investigation into the current state of the industry would be undertaken via different instruments, such as interview, focus group, or Delphi survey with targeted participants. This is proposed for any future research in this field as each of the above mechanisms would provide opportunity for discussion regarding application and interpretation.

2 Analysis of responses

It is important to note that no definitions were provided for the terms used in this survey. It was considered that this would add an additional barrier to project completion. Thus, terms such as full-cost accounting may mean different things to different respondents.

2.1. Demographics of respondents

Of the 11 respondents, 3 were consultants, 5 contractors and 3 Government agencies. All but two were organisations employing more than 200 people, with an annual turnover of greater than \$100million. All had operations in Queensland and of these 5 had an Australia-wide presence.

2.2. Links between corporate and project objectives

This was exploring if a correlation existing between corporate and project objectives.

Table 1 – Link between corporate and project objectives

	Yes	No
Are you aware of your organisations corporate objectives?	10	1
Do these have direct or indirect influence on project delivery?	11 ¹	
Do you report on project performance explicitly to these corporate objectives?	6	5
Comments: – Everything is compared back to corporate and project indicators. – Monthly internal and client reporting along with regular project meetings drives improvement if below par activity is reported. – Key result areas are reported on which align to corporate objectives. – Corporate KPIs include project performance in terms of on-time and on-budget. – Time, cost, progress, safety, community engagement, environmental are all project issues which are reported		

Table 2 – Links between corporate and project-based performance indicators

	Yes	No
Do your project indicators influence your corporate reporting?	10	1
Does your corporate reporting influence your project reporting?	9	2
Comments: – Both are coordinated through our systems. – Mainly in timing, but significantly in financial and safety aspects. – Through our sustainability policy, sustainability objectives are measured. – Environmental, community and stakeholder engagement and safety reporting particularly. – All projects report on performance against agreed budget and timeline. – Corporate reporting at a higher level tends to be an overall project progress and anything that may have political implications.		

Table 3 – Critical Success Factors or Performance Indicators in use on projects

	Yes	No
Do you have a consistent methodology for identifying key performance indicators for your projects?	10	1
Does this allow for qualitative (i.e. soft or intangible) criteria as well as quantitative (measurable) criteria?	9	2

This indicates a strong awareness of corporate objectives, though reporting explicitly to these objectives is not mainstream.

2.3. Decision-making systems

The following table (Table 4) identifies what decision-making processes are being used within organisations. Additional comments in some cases clarify the nature of this use.

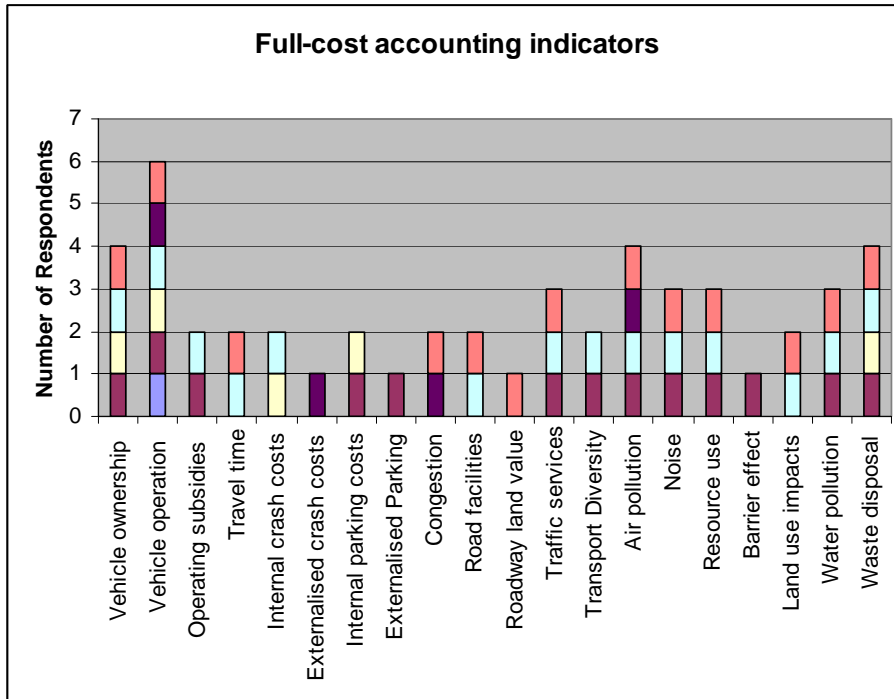
¹ The response to this question by one recipient is not consistent with the answer to Q1

Table 4 – Decision-making processes in use

	Yes	No	Nil	Comments
Cost benefit analysis	6	3	1	<ul style="list-style-type: none"> – Future benefits looked at when tendering. – Development projects. – Occurs in the initial concept phase of a project. – Used as appropriate to the project to deliver successful outcomes.
Multi-criteria analysis	4	5	2	<ul style="list-style-type: none"> – Overall effect on practice and client relationship. – Occurs in the initial concept phase of a project. – Used as appropriate to the project to deliver successful outcomes.
Whole of life costing	7	2	2	<ul style="list-style-type: none"> – Initial investment cost is considered in total return. – Limited to select clients. – As an owner and maintainer this is considered necessary for estimating and tender process – Used as appropriate to the project to deliver successful outcomes.
Full cost accounting / investigation	7	2	2	<ul style="list-style-type: none"> – Standard for all projects. – Independent cost reviewers/verifiers. – Job cost vs budget. – The amount of effort spent on investigation is dependent on project size and its impact on the community and environment. – Used as appropriate to the project to deliver successful outcomes.
Social cost benefit analysis	6	4	1	<ul style="list-style-type: none"> – Community and stakeholder benefit considered vs cost – Sustainability. – This is certainly a consideration as major road projects bisect communities. This is part of the community consultation process. – Used as appropriate to the project to deliver successful outcomes.
Resource flow accounting	2	7	2	<ul style="list-style-type: none"> – Resources available now and in future. – Continual part of project delivery/planning. – Used as appropriate to the project to deliver successful outcomes.
Integrated management system	5	4	2	<ul style="list-style-type: none"> – Through priced order system. – Accounting, project management, stakeholder management, environmental, quality etc. – Used as appropriate to the project to deliver successful outcomes.

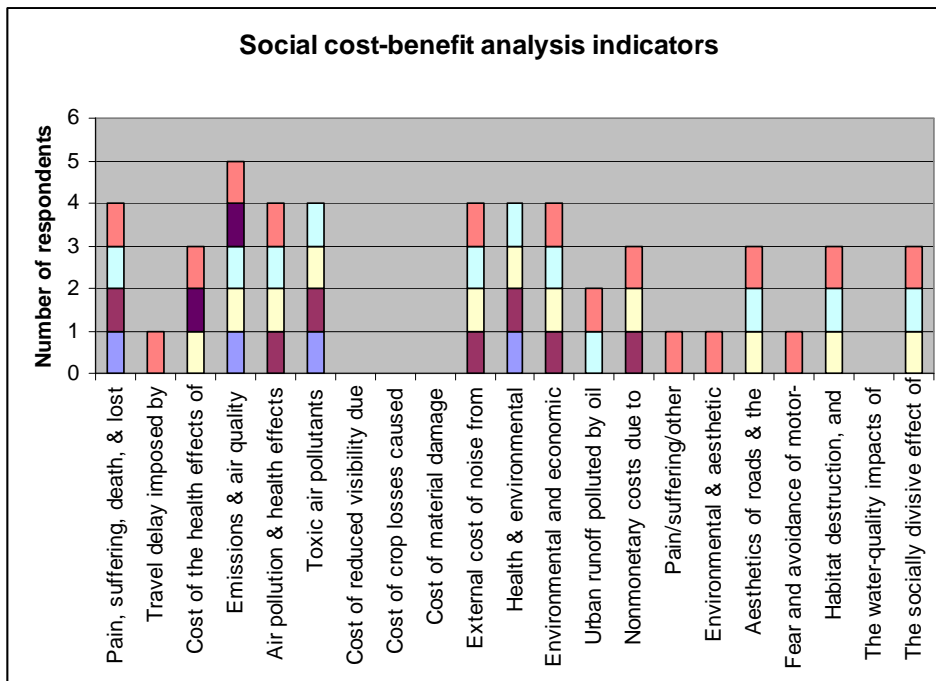
Whole of life costing and full-cost accounting are used in the majority of organisations who completed the survey. Based on the comments provided, and subsequent responses to questions 2.1.1 (Figure 1) and 2.1.2 (Figure 2), further investigation is however required. Of the 11 organisations who submitted responses, only 6 addressed issues which are integral to full-cost accounting in other countries.

Figure 1 – Full-cost accounting indicators in use



Question 2.1.2 asked “if you undertake social cost benefit analysis, identify which areas you consider? Only 5 of the respondents undertake this form of analysis. The following figure illustrates the number of responses to each indicator identified in the survey.

Figure 2 – Social cost-benefit analysis indicators in use



The only other indicator suggested by a respondent not included in the above was community legacy.

With regards to Q 2.1.3 and what resources are accounted for if organisations did full-cost accounted, the following comments were received:

- *All resources available are considered, including staff, premises, equipment, travel availability, long-term effect on practice, relationship with client etc*
- *Staffing*
- *All human, material and environmental impacts of project delivery.*

The extent to which this accounting exists for external as well as internal costs needs to be further investigated.

2.4. Benchmark data

This section sought to reveal the extent of benchmarking undertaken within organisations. A series of indicators were provided, and respondents asked to indicate if they established benchmarks or targets for these, for projects.

Table 5 – Number of organisations with \$ benchmarks and/or targets

Economic	
Job creation (e.g. target for construction; operations)	3
Local supply (i.e. products manufactures in Australia from Australian materials)	4
Risk management	6
Delivery to target cost (e.g. % projects delivered to agreed target cost)	5
Delivery to program (e.g. % projects delivered to agreed program)	3
Supply chain management (e.g. knowledge of key suppliers work practices)	4
Environmental	
Energy use/management (e.g. target reductions; on-site renewables)	4
Water use/management (e.g. potable, recycled and harvested targets)	5
Material use and reuse (e.g. % of recycled materials used)	5
Greenhouse gas emissions (e.g. GGE's monitored and reduction targets identified)	4
Waste management (e.g. & reduction in waste to landfill and hazardous)	4
Biodiversity (e.g. hectares restored)	2
Microclimate impacts (e.g. microclimate assessment and monitoring)	1
Social	
Cultural impacts (e.g. community satisfaction)	5
Aesthetic impacts (e.g. community satisfaction and peer reviews)	5
Boundary affects (e.g. community impacts)	3
Values and behaviours (e.g. team performance, disputes)	5
Stakeholder management (e.g. range of engagement initiatives)	5
Safety (e.g. LTIFR targets during construction; community health post construction)	6

Other benchmarks and targets identified by respondents included:

Table 6 – Additional benchmarks & targets identified by respondents

Quality	Carbon footprint
Donations	Waste emissions per employee
Lost time through injuries	Training
Diversity (gender)	Projects that set sustainability targets

A number of physical measurables were identified by 10 of the 11 respondents (Table 8).

Benchmarks and/or targets for qualitative indicators were also identified (Table 9).

Table 7 – Measures for physical benchmarks and/or targets

Economic	By Respondent									
Job creation (e.g. target for construction; operations)	Yes			10% apprent. indigenous	Maintain current jobs		Yes			Certain projects engage & train indigenous workers
Local supply (i.e. products manufactures in Australia from Australian materials)	Yes			10% materials Aust. made	Where possible use 100% Aust.		Yes		State Procurement policy	Gov policy controls this
Risk management		50%	Report to pre-set criteria		Continually looking at risk profile		Yes			Integral part of every project
Delivery to target cost (e.g. % projects delivered to agreed target cost)	100%	100%	Report against project budget	100%	Based on budget		Yes	10% efficiency		
Delivery to program (e.g. % projects delivered to agreed program)	100%	100%	Meet or better schedule	100%	Based on program requirements	Construction program will push completion date	Yes	100%		
Supply chain management (e.g. knowledge of key suppliers work practices)		50%			Continual discussion with suppliers		Yes			Becoming a problem area now with so much construction occurring
Environmental										
Energy use/management (e.g. target reductions; on-site renewables)		70%	% red		Implement use new energy efficient equipment	Looking to reduce environmental Impacts	Yes			Road projects recycle materials. Part of road building
Water use/management (e.g. potable, recycled and harvested targets)		100%					Yes			Water run-off quality important. Harvesting water is critical in dry western areas.
Material use & reuse (e.g. % of recycled materials used)		50%	% reduction		Buy recycled stationary etc & recycled concrete		Yes			No specific targets. Driven by economics
Greenhouse gas emissions (e.g. GGE's monitored and reduction targets identified)		50%	% reduction			Subject to NGER & other env. performance reporting	Yes			
Waste management (e.g. & reduction in waste to landfill and hazardous)		50%	% reduction		Recycle as much as possible	Look to recycle all waste	Yes			Legal requirement
Biodiversity (e.g. hectares restored)	Yes						Yes			Compensatory habitats sometimes procured. Before, during & after a project, fauna & flora are critical part of our business
Microclimate impacts (e.g. microclimate assessment and monitoring)	Yes						Yes			

Social	By Respondent									
Cultural impacts (e.g. community satisfaction)		80%		0.1% budget to local community project	Develop community needs		Yes			Community consultation important
Aesthetic impacts (e.g. community satisfaction and peer reviews)		100%			Design and consult to satisfy aesthetic require.		Yes			Re-vegetation and functionality
Boundary affects (e.g. community impacts)	Yes	100%					Yes			Part of project design
Values and behaviours (e.g. team performance, disputes)		80%			Good communications. between team members; team meetings		Yes			Can be part of contract type
Stakeholder management (e.g. range of engagement initiatives)	Yes	100%					Yes			Part of project management
Safety (e.g. LTIFR targets during construction; community healthpost construction)	Yes		LTIFR - near miss	specific targets	Lost time	0 harm	Yes	Industry norm targets		

Table 8 – Measures for qualitative benchmarks and/or targets

Economic										
By Respondent										
Job creation (e.g. target for construction; operations)	Target for Indigenous employment					By maintaining present vol. of work	Will the project provide local employment opportunities	Yes		
Local supply (i.e. products man. in Aust. from Aust. materials)	Use Local Industry Participation Plans with varying target levels		Gov clients and local staff	Always attempt to use Aust. Made products		Ensuring orders are placed with Aust. Companies		Yes		
Risk management	Always apply a \$ value and apply targets	Existing client relationship, new market opportunity		Risk Management Plan		By employing in-house legal staff	Most risks even if qual. Can be monetised	Yes		Risks identified, rated and responses documented and implemented
Delivery to target cost (e.g. % projects delivered to agreed target cost)		Our reputation hangs on delivery to budget						Yes		
Delivery to program (e.g. % projects delivered to agreed program)		Our reputation hangs on meeting deadlines						Yes		
Supply chain management (e.g. knowledge of key suppliers work practices)	Apply different measures eg some projects required subcontractors to have QA	We are experts and bring in other experts					Have they performed?	Yes		
Environmental										
Energy use/management (e.g. target reductions; on-site renewables)	Always have targets. Sometimes with \$s	This is a key deliverable which sets us apart					no negative environmental impacts	Yes	Yes	Increased focus on green star design principals
Water use/management (e.g. potable, recycled and harvested targets)	Generally have targets, sometimes with \$s	This is standard in all our facilities		Focus on water management and harvesting			Use non-potable water or recycled wherever possible	Yes	Yes	Increased focus on green star design principals
Material use and reuse (e.g. % of recycled materials used)	Generally have targets, sometimes with \$s	This is subject to client desires		Reuse materia if possible or sell as commodity				Yes	Yes	
Greenhouse gas emissions (e.g. GGE's monitored and reduction targets identified)	Generally have targets, sometimes with \$s	We are at the forefront of this						Yes		

Waste management (e.g. & reduction in waste to landfill and hazardous)	Generally have targets, sometimes with \$ values	Subject to client desires					Yes		
Biodiversity (e.g. hectares restored)	Sometimes have targets, not often with \$ values					Reported against in our NGER report	Yes		
Microclimate impacts (e.g. microclimate assessment and monitoring)							Yes		
Social									
Cultural impacts (e.g. community satisfaction)	All projects have community satisfactions targets, some with \$ value	We regenerate cities and communities	awareness			Survey following completion	Yes	Yes	
Aesthetic impacts (e.g. community satisfaction and peer reviews)	Some projects have targets, some with \$ values	Key to our success		Work with client to achieve outcomes			Yes	Yes	
Boundary affects (e.g. community impacts)	??	Key to our success	Awareness			Surveyed during delivery and reported to client	Yes	Yes	
Values and behaviours (e.g. team performance, disputes)	All projects apply some form of Value and behaviours, may change if they include project partners, some with \$ values	Our teams perform	Guidelines	Conflict resolution procedures		Only alliance projects	Yes	Yes	
Stakeholder management (e.g. range of engagement initiatives)	All projects include stakeholder management targets, some with \$ values	We work with our clients	Guidelines	Leave with better relationship than when first engaged		Reported to client and measured by complaints	Yes	Yes	
Safety (e.g. LTIFR targets during construction; community health post construction)	All projects include safety targets, most with \$ values					Be a consistent leader in LTIFR across construction	Yes	Yes	
Please indicate any other key benchmarks your organisation measures?							Yes		Conformance with Qld Gov env. policies - no trees on site demolished w/o approval from Minister

This data illustrates the nature of data sets which could be established either within organisations or by sector, to better understand, benchmark, and monitor performance to a range of indicators beyond those to which a \$ value can be attributed. Respondents were asked if their organisations had any such existing sets of project objectives, indicators and/or measurables from which new project reporting criteria was established (Table 9).

Table 9– Existing data-sets of objectives, indicators and measurables

	Yes	No	Blank
Project Objectives by project type (e.g. improve cross-city traffic flow)	5	5	1
Project Indicators (e.g. effective road networks)	4	6	1
Measures (e.g. reduced travel costs and travel times)	6	4	1
Targets (e.g. achieve x% reduction in travel time)	6	4	1
Are these archived and accessible from project to project?	4	6	1
If not would this be useful?	2	4	5

One respondent indicated that a consulting firm would be used to provide advice on these issues.

2.5. Identifying and prioritising stakeholders

This initial investigation was designed to better understand, what tool, if any, are used by organisations to identify and monitor stakeholder engagement processes and activities. This is linked to enhancing accountabilities in the context of corporate responsibilities.

Table 10 – Auditable process for stakeholder identification and prioritisation.

	Yes	No	Blank
Does your organisation have a formal auditable process for identifying and prioritising stakeholders?	6	4	1
Do you use one of the following tools?			
– Expert knowledge	2	8	1
– World Business Council for Sustainable Development's Stakeholder Footprint	1	8	2
– Stakeholder Circles™	0	9	2
– Stakeholder 360	0	9	2
– The Stakeholder Engagement Manual	1	9	1

In addition to the above, 2 organisations indicated they used their own in-house tools and systems and another that they had a Consultation Manager.

2.6. Mechanisms for engaging with stakeholders

The final question was seeking to better understand how existing mechanisms for communications with stakeholders are used. This is a prelude to further investigation on the nature of engagement and communication, and how this might be enhanced in order to build shared values between various contractual and non-contractual stakeholders. The inclusion of

‘social learning’ (a quite recent phenomenon) was to gauge if this mechanism was in use as yet in Australia.

Table 11 – Mechanisms for stakeholder engagement

Contract	
– For 2-way communication	6
– For decision-making	3
Memorandum of Understanding	
– For 2-way communication	6
– For decision-making	6
Public meetings	
– For 2-way communication	7
– For decision-making	2
– 1 way communication	2
Information sessions	
– For 2-way communication	8
– For decision-making	5
– 1 way communication	3
Newsletters and web-site	
– For 2-way communication	6
– For decision-making	1
– 1 way communication	6
Tri-partite agreements	
– For 2-way communication	1
– For decision-making	2
Social learning	
– For 2-way communication	1
– 1 way communication	1

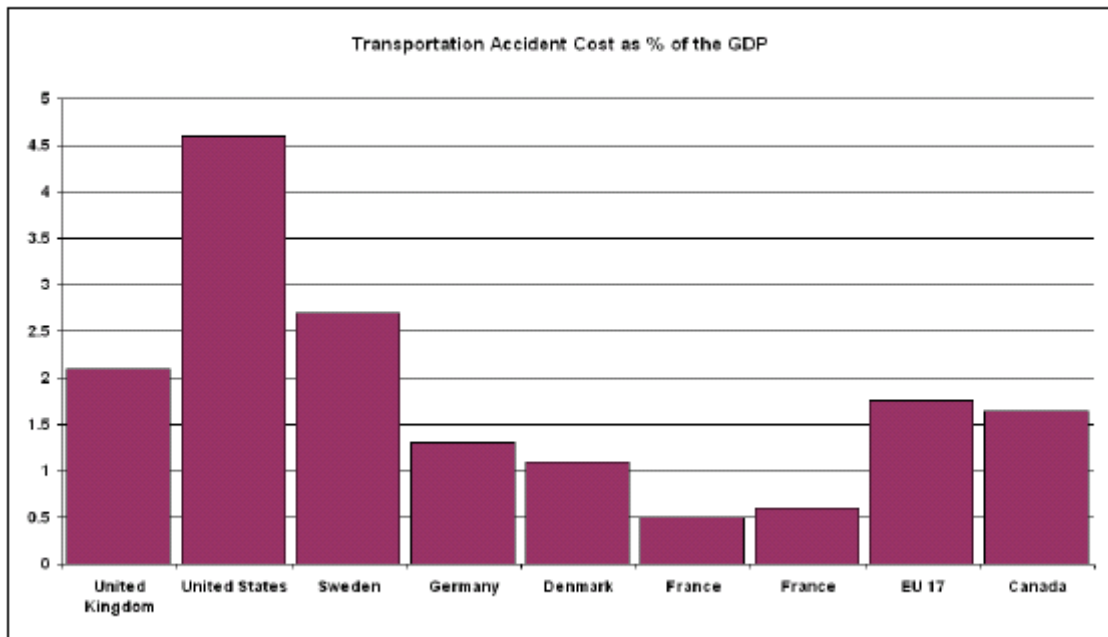
3 Conclusion

Whilst the poor response rate to this survey is disappointing, the process itself, and the outcomes, have provided the researcher with considerable material for reflection. The first reflection relates to the need for a more interactive instrument to gain an accurate picture of the current state of the Australian industry with regards to these two topics. The second relates to the need for a hierarchy of questioning, which initially identifies the broad issues and business-as-usual responses, but then is able to further examine motivations and intents under-pinning this practice. This reinforces the position that further research in this field needs to be based upon medium to long term engagement with a group of partnering organisation.

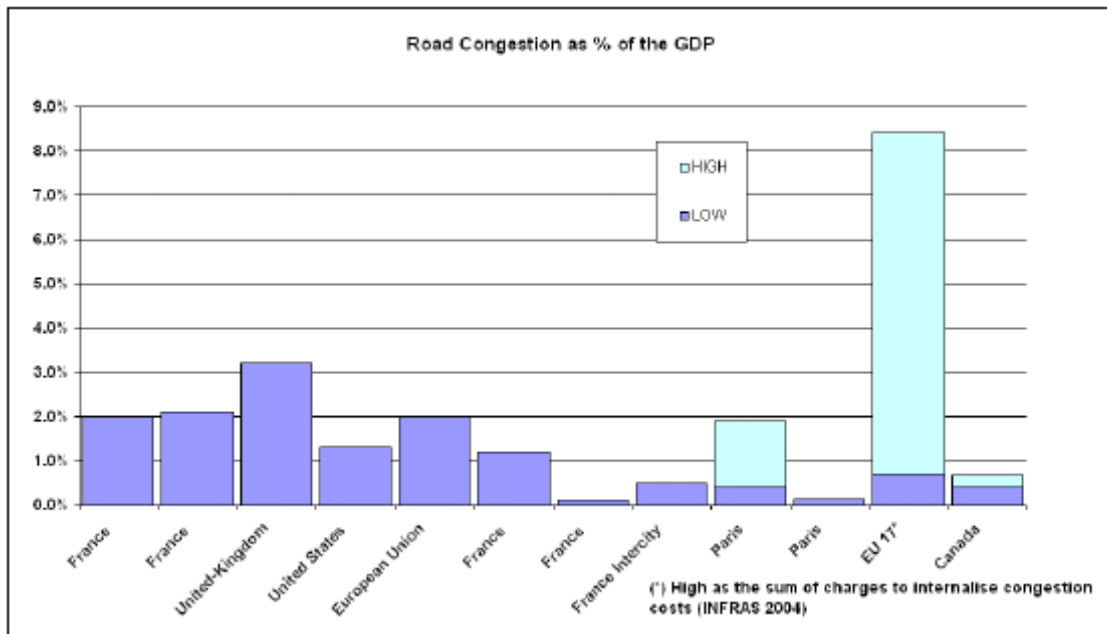
Appendix A – International Comparisons

The following tables focus on international comparisons of transportation costs, produced by Transport Canada (2008)

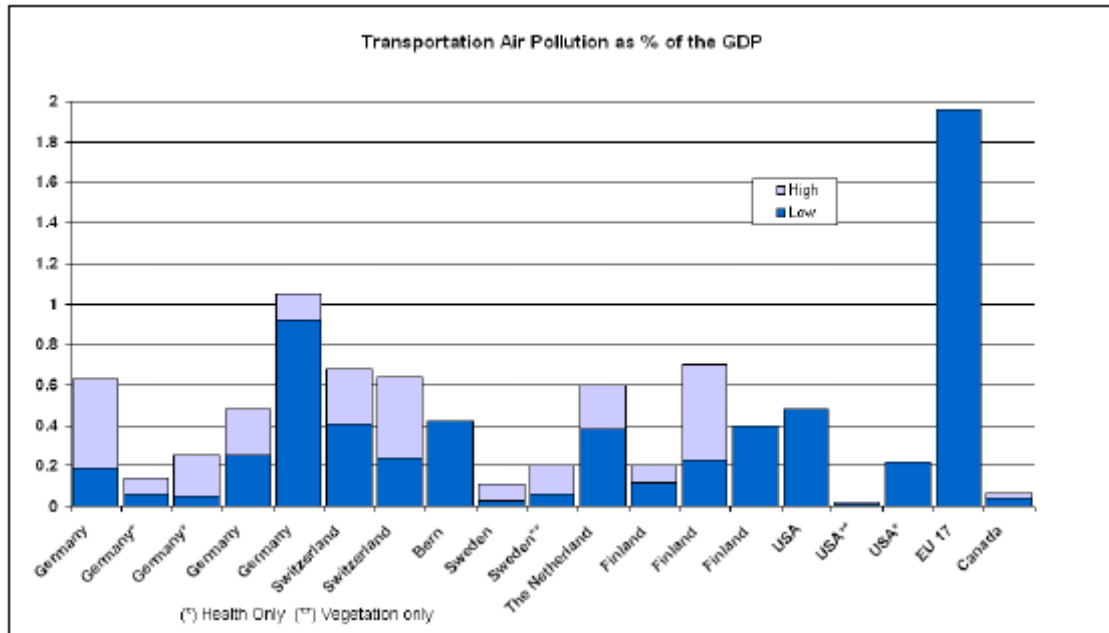
Appendix A 1- International comparison of transportation accident costs (Transport Canada 2008, p. 38)



Appendix A 2 - International comparison of congestion costs (Transport Canada 2008, p. 39)

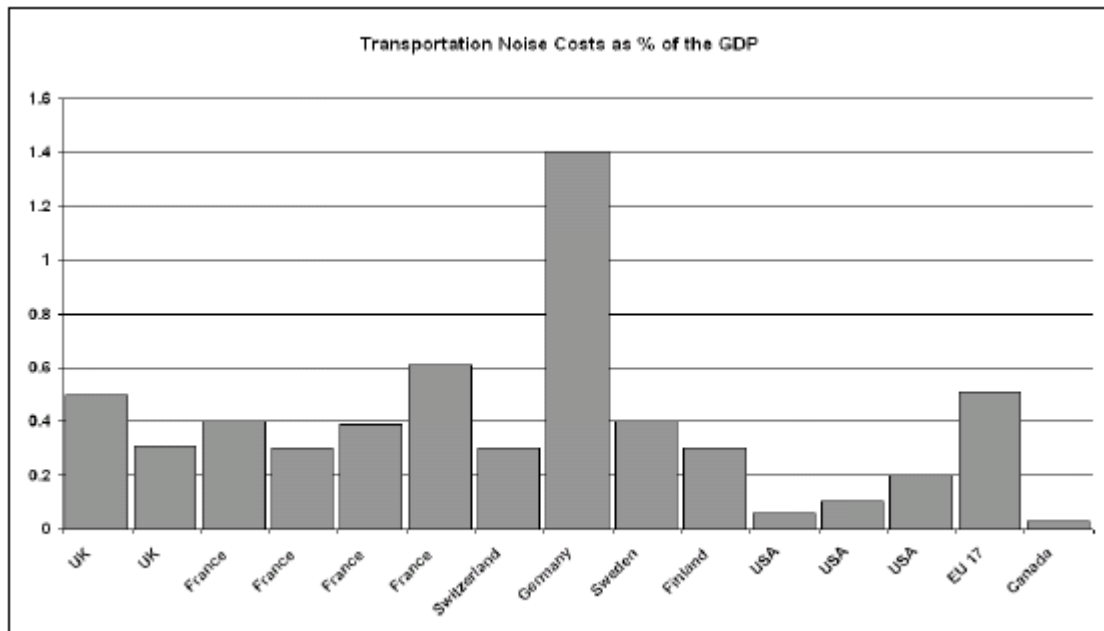


Appendix A 3 - International comparison of transportation air pollution as % of the GDP



(Transport Canada 2008, p. 39)

Appendix A 4 - International comparison of transportation noise costs as % of the GDP
(Transport Canada 2008, p. 39)



Appendix B – Annualised social costs of transportation

A selection of tables from Delucchi (2004a) are included here to provide an example of the information presented in that report. The first provides a summary of the various non-monetary and external costs on motor-vehicle use identified by that author. The following three tables then provide details of some of these elements.

TABLE 1-10. SUMMARY OF THE COSTS OF MOTOR-VEHICLE USE

	Total cost (10 ⁹ \$)		Percentage of total	
	Low	High	Low	High
(1) Personal nonmonetary costs of motor-vehicle use	\$527	\$968	32%	29%
(2) Motor-vehicle goods and services produced and priced in the private sector (estimated net of producer surplus, taxes, fees)	\$827	\$980	49%	30%
(3) Motor-vehicle goods and services bundled in the private sector	\$76	\$279	5%	8%
(4) Motor-vehicle infrastructure and services provided by the public sector ^a	\$131	\$247	8%	7%
(5) Monetary externalities of motor-vehicle use	\$43	\$104	3%	3%
(6) Nonmonetary externalities of motor-vehicle use	\$68	\$730	4%	22%
Grand total social cost of highway transportation	\$1,673	\$3,308	100%	100%
Subtotal: monetary cost only (2+3+4+5)	\$1,077	\$1,610	64%	49%

For details, see other summary tables in this report, the text in this report, and other reports in the social-cost series.

^aIncludes items in Table 1-1 that straddle columns 4 and 5.

TABLE 1-4. PERSONAL NONMONETARY COSTS OF MOTOR-VEHICLE USE, 1991 (BILLION 1991\$)

Cost item	Low	High	Q ^a
Travel time, excluding travel delay imposed by others, that displaces unpaid activities	406.8	629.0	A2
Accidental pain, suffering, death, and lost nonmarket productivity inflicted on oneself	70.2	227.0	A2/B
Personal time spent working on motor vehicles and garages, and refueling motor vehicles	49.5	109.6	A3
Personal time spent buying and selling and disposing of vehicles, excluding dealer costs	0.8	2.6	A3
Motor-vehicle noise inflicted on oneself	included with external noise costs		
Motor-vehicle air pollution inflicted on oneself	included with external pollution costs		
Total	527.3	968.2	

See Report #4 for details.

^aQ = Quality of the estimate (see Table 1-3).

TABLE 1-7. MOTOR-VEHICLE INFRASTRUCTURE AND SERVICES AND SERVICES PROVIDED BY THE PUBLIC SECTOR, 1991 (10⁹ \$)

<i>Cost item</i>	10% ΔMVU ^a		100% ΔMVU ^a		<i>Q^b</i>
	<i>Low</i>	<i>High</i>	<i>Low</i>	<i>High</i>	
Annualized cost of public highways, including on-street parking and private off-site investment in roads	10.4	20.7	104.0	207.4	A2
Annualized cost of municipal and institutional offstreet parking	n.e.	n.e.	11.9	19.8	A2/3
Highway law enforcement and safety, as estimated by FHWA	0.45	0.70	7.4	8.7	A3
Other police-protection costs (not included in FHWA estimates) related to motor-vehicle use	0.10	0.47	0.8	4.1	A2
Fire-protection costs related to motor-vehicle use	0.07	0.27	0.7	2.8	A2
Emergency-service costs of motor-vehicle accidents included in police and fire costs above	(0.17)	(0.17)	(1.1)	(1.1)	A2/B
Judicial and legal-system costs related to motor-vehicle use	0.46	0.59	4.8	6.2	A2
Jail, prison, probation, and parole costs related to motor -vehicle use	0.39	0.61	3.9	6.2	A2
Regulation and control of air and water pollution and solid waste, related to motor-vehicle use	0.17	0.56	2.1	5.9	A2
Energy and technology research and development related to motor-vehicle use	n.e.	n.e.	0.3	0.5	A3
Motor-vehicle related costs of other government agencies	n.e.	n.e.	0.1	0.1	D
Military expenditures related to the use of Persian-Gulf oil by motor vehicles	n.e.	n.e.	0.8	8.5	B, D ^c
Annualized cost of the SPR: investment, operation and management, and oil-holding costs	0.01	0.06	0.1	0.7	A2
Total	n.e.	n.e.	134.8	268.7	

^aCosts are shown for a 10% reduction in motor-vehicle use, and a 100% reduction (Report #7).

^bQ = Quality of the estimate (see Table 1-3).

^cA review and analysis of the literature with a good deal of supposition.

TABLE 1-8. MONETARY EXTERNALITIES OF MOTOR-VEHICLE USE, 1991 (BILLION 1991\$)

<i>Cost item</i>	<i>Low</i>	<i>High</i>	<i>Q^a</i>
Monetary costs of travel delay imposed by others: foregone paid work	9.1	30.5	A2
Monetary costs of travel delay imposed by others: extra consumption of fuel	2.3	5.7	A2
Accident costs not accounted for by economically responsible party: property damage, medical, productivity, legal and administrative costs	26.0	28.0	A2/B
Expected loss of GNP due to sudden changes in the price of oil	1.8	31.5	C [A1]
Price effect of using petroleum fuels for motor vehicles: increased payments to foreign countries for oil used in other sectors	3.8	8.0	A3
Monetary, non-public-sector costs of net crimes related to using or having motor-vehicle goods, services, or infrastructure	0.1	0.4	A3
Monetary costs of injuries and deaths caused by fires related to motor-vehicle use	0.0	0.1	A3
Total	43.1	104.2	

See Report #8 for details.

^aQ = Quality of the estimate (see Table 1-3). Ratings in brackets refer to the quality of the analysis in the literature reviewed.

Appendix C – Non-monetary external costs of motor-vehicle use

The following findings are those of Delucchi (2004b) relating to the non-monetary external costs of motor-vehicle use

A. THE NONMONETARY EXTERNAL COSTS OF MOTOR-VEHICLE USE, 1990-91 (10⁹ 1991\$)

<i>Cost item</i>	<i>Low</i>	<i>High</i>	<i>Q^a.</i>
Accidental pain, suffering, death, and lost nonmarket productivity not accounted for by economically responsible party	9.5	97.7	A2/B
Travel delay, imposed by others, that displaces unpaid activities	22.5	99.3	A2
Air pollution: human mortality and morbidity due to particulate ^b emissions from vehicles	16.7	266.4	A1
Air pollution: human mortality and morbidity due to all other pollutants from vehicles	2.3	17.1	A1
Air pollution: human mortality and morbidity, due to all pollutants from upstream processes	2.3	13.0	A1
Air pollution: human mortality and morbidity from road dust	3.0	153.5	A1
Air pollution: loss of visibility, due to all pollutants attributable to motor vehicles	3.6	27.4	A1
Air pollution: damage to agricultural crops, due to ozone attributable to motor vehicles	3.3	5.7	A1
Air pollution: damages to materials, due to all pollutants attributable to motor vehicles	1.0	8.0	B [A1]
Air pollution: damage to forests, due to all pollutants attributable to motor vehicles	0.2	2.0	B [A2]
Climate change due to lifecycle emissions of greenhouse gases (U. S. damages only)	0.0	3.5	A1, B [A1] ^c
Noise from motor vehicles	0.5	15.0	A1
Water pollution: health and environmental effects of leaking motor-fuel storage tanks	0.1	0.5	D
Water pollution: environmental and economic impacts of large oil spills	0.2	0.5	C [A1]
Water pollution: urban runoff polluted by oil from motor vehicles	0.1	0.5	D ^d
Nonmonetary costs of net crimes related to using or having motor-vehicle goods, services, or infrastructure	0.7	2.8	A3
Nonmonetary costs of fires related to using or having motor-vehicle goods, services, or infrastructure	0.0	0.2	A3
Total	65.6	714.7	

Appendix D – Contributions to stakeholder theory

The following table details literature relating to the history of stakeholder engagement, as compiled by Agle, Donaldson et al. (2008)

TABLE 1
Superior Stakeholder Theory: Some Contributions 1999-2007
 (arranged chronologically by major theme)

<i>Normative Stakeholder vs Stockholder Theory</i>			
Author(s)	Year	Outlet	Some Key Ideas
Maren & Wicks	1999	BEQ	“This fiduciary duty requires the exercise of care, loyalty, and honesty with regard to the financial interests of stockholders. Such obligations do not conflict with the normative goals of stakeholder theory...”
Palmer	1999	BEQ	“First, I show that utilitarian considerations clearly favor the stakeholder theory. I then argue that though Hasnas rightly accents the basic deontological constraint at the core of the stockholder theory, he is wrong to think that acknowledging such a constraint necessarily counts against the stakeholder theory.”
Hendry	2001	BEQ	“The paper identifies three distinct kinds of normative stakeholder theory and three different levels of claim that can be made by such theories, and uses this classification to argue that stakeholder theorists have consistently pitched their sights too high or too low to engage effectively with the rival shareholder theory.”
Jensen	2002	BEQ	“Since it is logically impossible to maximize in more than one dimension, purposeful behavior requires a single valued objective function. Two hundred years of work in economics and finance implies that in the absence of externalities and monopoly (and when all goods are priced), social welfare is maximized when each firm in an economy maximizes its total market value”
Marcoux	2003	BEQ	“I advance an argument that seeks to demonstrate both the special moral status of shareholders in a firm and the concomitant moral inadequacy of stakeholder theory”
Phillips, Freeman, & Wicks	2003	BEQ	“The goal of the current paper is like that of a controlled burn that clears away some of the underbrush of misinterpretation in the hope of denying easy fuel to the critical conflagration that would raze the theory.”

Smith	2003	Sloan Mgt Review	“Should companies seek only to maximize shareholder value or strive to serve the often conflicting interests of all stakeholders? Guidance can be found in exploring exactly what each theory does and doesn’t say.”
Freeman, Wicks, & Parmer	2004	Org Science	“This paper offers a response to Sundaram and Inkpen’s article ‘The Corporate Objective Revisited’ by clarifying misconceptions about stakeholder theory and concluding truth and freedom are best served by seeing business and ethics combined.”
Velamuri & Venkataraman	2005	JBE	“The normative foundations of the investor centered model of corporate governance, represented in mainstream economics by the nexus-of-contract view of the firm, have come under attack, mainly from the proponents of normative stakeholder theory. We argue that the nexus of contracts view is static and limited due to its assumption of price-output certainty.”
Heath	2006	BEQ	“The question posed in this paper is whether the stakeholder paradigm represents the most fruitful way of articulating the moral problems that arise in business. By way of contrast, I outline two other possible approaches to business ethics: one, a more minimal conception, anchored in the notion of a fiduciary obligation toward shareholders; and the other, a broader conception, focused on the concept of market failure.”
Charron	2007	Cato Journal	“I describe and critique “stakeholder theory,” the revisionist’s chosen weapon for gaining control of the corporation. Stakeholder theory currently dominates textbooks and syllabi of courses in business management, human resources management, marketing, and public policy.... Aware of its reach, I adumbrate a strategy for reversing the destructive inroads of stakeholder theory.”
<i>Instrumental Stakeholder Theory</i> Agle, Mitchell, & Sonnenfeld	1999	AMJ	“We found strong support for the attribute-salience relationship and some significant relationships among CEO values, salience, and corporate social performance but found no support for a salience-financial performance link.
Berman, Wicks, Kotha, & Jones	1999	AMJ	“The results provide support for a strategic stakeholder management model but no support for an intrinsic stakeholder commitment model.

Luoma & Goodstein	1999	AMJ	This study examined the relationships between institutional influences and stakeholder representation on boards of directors.
Ogden & Watson	1999	AMJ	This study examined a major contention of stakeholder theory: namely, that a firm can simultaneously enhance the interests of its shareholders and other relevant stakeholders... We interpret this finding as being consistent with stakeholder theory.
Hillman & Keim	2001	SMJ	“We... find evidence that stakeholder management leads to improved shareholder value, while social issue participation is negatively associated with shareholder value.”
Omran, Atrill, & Pointon	2002	Business Ethics: A European Review	“The overall conclusion is that there is no significant difference in shareholder returns between stakeholder-oriented and shareholder-oriented companies”
Bartkus, Glassman, & McAfee	2006	EMJ	“Mission statements that include phrases that refer to what many may view as the fundamental rules of business have a significant positive relationship with financial performance: be concerned with your employees, be responsible to the society in which you do business, and emphasize and communicate your value system.”
Moneva, Rivera-Lirio, & Munoz-Torres	2007	Industrial Management and Data Systems	“the main conclusion drawn from the analysis shows that the financial performance of the sectors or organizations with a greater stakeholder strategic commitment, is not inferior to that of the sectors or organizations with a shareholder approach...”
<i>New Questions: Further Development Stakeholder Theory</i> Cludts	1999	BEQ	“While we do not challenge the principle of fairness itself, we claim that when this principle is applied only to those who invest in the corporation, it cannot serve as the ground for an ethical stakeholder theory”
Donaldson	1999	AMR	“The most interesting question in stakeholder theory today is whether a conceptual glue can be found that is strong enough to bind the separate methodological strands of stakeholder theory into a whole.”

Donaldson & Dunfee	1999	HBS Press	“Our aim is to extend significantly the application of social contracts to business. . . . Business ethics, we assert, is more a bundle of shared understandings than a set of fixed pronouncements.”
Frooman	1999	AMR	“When seeking to influence firm decision-making, what types of influence strategies do stakeholders have available and what determines which type the stakeholders choose to use?”
Jones & Wicks	1999	AMR	“Since neither approach is complete without the other, we propose a new way of theorizing about organizations: the development of normatively and instrumentally sound convergent stakeholder theory.”
Trevino & Weaver	1999	AMR	“We disagree with Jones and Wicks’ contention that they have developed a ‘convergent stakeholder theory’ that moves stakeholder research toward theoretical integration”
Scott & Lane	2000	AMR	We develop a model of organizational identity construction that reframes organizational identity within the broader context of manager-stakeholder relationships and more effectively integrates theory on organizational identity and organizational identification.
Van Buren	2001	BEQ	“In this essay, I propose that a reconstructed principle of fairness can be combined with the idea of consent as outlined in integrative social contracts (ISCT) to bring about a more normative stakeholder theory that also has ramifications for corporate governance.
Jawahar & McLaughlin	2001	AMR	“We integrate theory and research from disparate areas to develop a descriptive stakeholder theory.
Kochan & Rubinstein	2000	Org Science	“The idea that the firm should be accountable not only to shareholders but also to a broader set of stakeholders is “in the air.” But what would such a firm look like?”
Post, Preston, & Sachs	2002	Stanford University Press	“This book presents a stakeholder view of the corporation in both theoretical and practical terms. Its central proposition is that organizational wealth is created (or destroyed) through a corporation’s interactions with its stakeholders.”
Schneider	2002	Org Science	“The stakeholder model of organizational leadership helps to predict leader effectiveness In organizations characterized by fuzzy organizational boundaries, flattened hierarchies, and work relationships sometimes brought about through contracts instead of employment”

Wolfe & Putler	2002	Org Science	We argue that a powerful implicit assumption within the stakeholder literature—that priorities within role-based stakeholder groups are relatively homogeneous-blurs our understanding of organization-stakeholder relationships.
Phillips	2003	Berrett-Kohler	“...obligations of stakeholder fairness create direct moral (normative) obligations.”
Richards	2004	Journal of Mass Media Ethics	“A further concept from business and management that appears to be directly applicable to the news media is the notion of stakeholders...”
Hall & Vrendenburg	2005	Sloan Mgt Rev	“Stakeholder management—especially that of secondary stakeholders—is becoming increasingly important in many industries”
Pajunen	2006	Journal of Management Studies	“This paper provides a theory and a historical case study that show how the most influential stakeholders can be identified and managed during an organizational survival.”
Barnet	2007	AMR	“I argue that research on the business case for corporate social responsibility must account for the path-dependent nature of firm-stakeholder relations, and I develop the construct of stakeholder influence capacity to fill this void.”
Vilanova	2007	EMJ	“This paper proposes an alternative theory on the role of management in corporate governance, the so-called short term salient stakeholder theory, and illustrates it with a longitudinal case study of Eurotunnel...”

APPENDIX E – SURVEY INSTRUMENT

Enhancing key value-mapping inputs for major economic infrastructure projects (transport)

Background to survey

This survey forms a part of current research being undertaken for the **Construction Industry Institute of Australia** (CIIA). This research is into two aspects of the value-mapping process. This process is starting to be implemented during the planning, design and delivery of major economic infrastructure projects (e.g. transport and water network projects), and links project outcomes to corporate reporting requirements for an organization. This is achieved through identifying and reporting on project accountabilities, objectives, indicators and measurables throughout the project life cycle.

One aspect of this research relates to stakeholder engagement, focusing on how better to engage with those who have an interest or a stake in the project, but with whom no contractual or financial relationship exists with the project proponent. The second aspect of this research investigates how project performance measures, both measurable (i.e. quantitative) and intangible (i.e. qualitative), can be more effectively integrated into corporate reporting frameworks.

The researcher requests your assistance in undertaking this survey to obtain information regarding current industry practice in the Australian context.

The outcomes of this survey, along with (i) details of a review of academic literature and (ii) the identification of potential future research partners, will form the basis for further investigation in this field. This current project is funded by the CIIA. The funding body will be provided with a report detailing the information and knowledge gained during this project.

Participation

Your participation in this project is voluntary. Your decision not to participate will in no way impact upon your current or future relationship with the CIIA.

If you agree to participate, completion of this survey will require approximately 20 minutes of your time. Please return via email or post, to Judy Kraatz, who is undertaking this research on behalf of the CIIA.

Expected benefits

It is expected that this project may benefit the construction industry in the medium to long terms as additional tools and data-sets become available, as an outcome of this research.

Confidentiality

All comments and responses will be treated confidentially in the context of the CIIA. Where surveys are returned via email, the completed survey form will be used in such a way that the results cannot be identified back to an individual or an organisation.

Questions / further information about the project

Please contact Judy Kraatz (j.kraatz@bigpond.net.au or Mob: 0438 540 083) to have any questions answered or if you require further information about the project.

Your Business / Company profile

Business / Company type (tick box):

Engineering Architectural Contractor Government Other

Please Specify.....

Role in projects (tick box):

Procurer Client Consultant Contractor Sub-contractor Other

Please Specify.....

Business / Company size (tick box):

1-25 25-50 50-100 100-200 Over 200

Turnover (tick box):

<\$5m \$5-15m \$15-50m \$50-100m over \$100m

Please return survey to:

Judy Kraatz via email:

j.kraatz@bigpond.net.au

(If returned via email, the survey file will be saved to a working folder, with no reference or link to your name or organisation, to ensure anonymity)

or via post to:

CIIA Industry Survey

ATT: Judy A Kraatz

PO Box 557

Coorparoo Qld 4151

Please return by 31 July 2009

Note – Data included in this survey is drawn from literature reviewed as a part of this research. Specific references can be obtained by contacting Judy Kraatz.

1. Links between your organisation’s corporate and project objectives

1.1. Corporate objectives and performance indicators.

Are you aware of your organisations corporate objectives? Yes No

Do these have direct or indirect influence on project delivery? Yes No

Do you report on project performance explicitly to these corporate objectives? Yes No

1.2. Links between corporate and project performance indicators.

Do your project indicators influence your corporate reporting? Yes No

How?

.....

Does your corporate reporting influence your project reporting? Yes No

How?

.....

1.3. Project-based critical success factors / performance indicators used on your projects.

Do you have a consistent methodology for identifying key performance indicators for your projects? Yes No

Does this allow for qualitative (i.e. soft or intangible) criteria as well as quantitative (measurable) criteria? Yes No

Your organisation’s decision making systems

1.4. What of the following processes do you utilise in project delivery?

If yes please provide details of scope

Cost benefit analysis

Multi-criteria analysis

Whole of life costing

- Full cost accounting / investigation
- Social cost benefit analysis
- Resource flow accounting
- Integrated management system

1.4.1. If you undertake full cost accounting, please identify what areas you account for. (Place x in box for which this is undertaken)

- | | | | | | |
|------------------------|--------------------------|----------------------|--------------------------|--------------------------|--------------------------|
| Vehicle ownership | <input type="checkbox"/> | Vehicle operation | <input type="checkbox"/> | Operating subsidies | <input type="checkbox"/> |
| Travel time | <input type="checkbox"/> | Internal crash costs | <input type="checkbox"/> | Externalised crash costs | <input type="checkbox"/> |
| Internal parking costs | <input type="checkbox"/> | Externalised Parking | <input type="checkbox"/> | Congestion | <input type="checkbox"/> |
| Road facilities | <input type="checkbox"/> | Roadway land value | <input type="checkbox"/> | Traffic services | <input type="checkbox"/> |
| Transport Diversity | <input type="checkbox"/> | Air pollution | <input type="checkbox"/> | Noise | <input type="checkbox"/> |
| Resource use | <input type="checkbox"/> | Barrier effect | <input type="checkbox"/> | Land use impacts | <input type="checkbox"/> |
| Water pollution | <input type="checkbox"/> | Waste disposal | <input type="checkbox"/> | | |

Others, please specify

.....

1.4.2. If you undertake social cost benefit analysis, identify which areas you consider. (Place x in box for which analysis is undertaken)

- Pain, suffering, death, & lost nonmarket productivity due to accidents
- Travel delay imposed by other drivers that displaces unpaid activities
- Cost of the health effects of air pollution from motor vehicles
- Emissions & air quality
- Air pollution & health effects
- Toxic air pollutants
- Cost of reduced visibility due to particulate air pollution from motor vehicles

Cost of crop losses caused by ozone air pollution from motor vehicles

—

Cost of material damage caused by air pollution from motor vehicles

External cost of noise from motor vehicles

Health & environmental impacts of leaking motor-fuel storage tanks

Environmental and economic impacts of large oil spills

Urban runoff polluted by oil from motor vehicles, and nitrogen deposition

Nonmonetary costs due to crimes related to using/having vehicle goods/services/infrastructure

Pain/suffering/other nonmonetary costs due to fires related to vehicle goods/services/infrastructure

Environmental & aesthetic impacts of motor-vehicle waste

Aesthetics of roads & the motor-vehicle service infrastructure

Fear and avoidance of motor-vehicles

Habitat destruction, and effects on plants and animals (not estimated in this report)

The water-quality impacts of highway deicing

The socially divisive effect of roads as barriers

Other, please specify

.....
.....
.....

1.4.3. If your organisation undertakes resource flow accounting/analysis, please indicate the resources accounted for.

.....

.....

.....

.....

Benchmark data

1.5. Data-sets

1.5.1. Your organisation most likely has existing benchmarks and/or targets for various aspects of project performance? Please specify if you have monetised benchmarks (\$ savings), physical benchmarks (% reductions) or other qualitative benchmarks (satisfaction levels) for the following.

For example:

Economic	\$'s	Physical	Qualitative
Energy use/management	√ or x	Indicate measure e.g. 20% reduction on current energy consumption	Leave blank means not applicable

Economic	\$'s	Physical	Qualitative
Job creation (e.g. target for construction; operations)			
Local supply (i.e. products manufactures in Australia from Australian materials)			
Risk management			
Delivery to target cost (e.g. % projects delivered to agreed target cost)			
Delivery to program (e.g. % projects delivered to agreed program)			
Supply chain management (e.g. knowledge of key suppliers work practices)			

See more over page

Environmental	\$'s	Physical	Qualitative
Energy use/management (e.g. target reductions; on-site renewables)			
Water use/management (e.g. potable, recycled and harvested targets)			
Material use and reuse (e.g. % of recycled materials used)			
Greenhouse gas emissions (e.g. GGE's monitored and reduction targets identified)			
Waste management (e.g. & reduction in waste to landfill and hazardous)			
Biodiversity (e.g. hectares restored)			
Microclimate impacts (e.g. microclimate assessment and monitoring)			
Social	\$'s	Physical	Qualitative
Cultural impacts (e.g. community satisfaction)			
Aesthetic impacts (e.g. community satisfaction and peer reviews)			
Boundary affects (e.g.			

community impacts)			
Values and behaviours (e.g. team performance, disputes)			
Stakeholder management (e.g. range of engagement initiatives)			
Safety (e.g. LTIFR targets during construction; community healthpost construction)			

Please indicate any other key benchmarks your organisation measures?

<i>Others</i>	<i>\$'s</i>	<i>Physical</i>	<i>Qualitative</i>

Benchmark data continued

1.5.2. Do you have existing sets of project objectives, indicators and/or measurables from which new project performance / reporting criteria are established?

- Project Objectives by project type (e.g. improve cross-city traffic flow) Yes No
- Project Indicators (e.g. effective road networks) Yes No
- Measures (e.g. reduced travel costs and travel times) Yes No
- Targets (e.g. achieve x% reduction in travel time) Yes No
- Are these archived and accessible from project to project? Yes No
- If not would this be useful? Yes No

Any comments regarding benchmarks and targets:
.....
.....
.....

Stakeholders

1.6. Identifying and prioritising stakeholders

Does your organisation have a formal auditable process for identifying and prioritising stakeholders?

Yes No

Do you use one of the following tools?

Expert knowledge

World Business Council for Sustainable Development’s Stakeholder Footprint

Stakeholder Circles™

Stakeholder 360

The Stakeholder Engagement Manual

Other, please specify (including if own in-house tool)

.....

1.7. Engagement with stakeholders

Please identify below which of the mechanisms for stakeholder engagement (Column 1) are used by your organisation, and the purpose of this engagement.

Engagement Mechanism	Yes / No	Purpose of engagement			
		1 way flow of information	2 way flow of information	Contractual obligations	Decision-making
Contract					
Memorandum of Understanding					
Public meetings					
Information sessions					
Newsletters and web-site					
Tri-partite agreements					
Social learning					

Thank-you for your assistance.

Please return survey to:

Judy Kraatz via email at j.kraatz@bigpond.net.au

(If returned via email, the survey file will be saved to a working folder, with no reference or link to your name or organisation, to ensure anonymity)

or via post to:

CIIA Industry Survey
ATT: Judy A Kraatz
PO Box 557
Coorparoo Qld 4151

