DECLARATION

I hereby declare that the submission is in my own work and that, to the best of my knowledge and belief, it contains no materials previously published or written by another person, nor material which, to a substantial extent, has been accepted for any other academic award, except where an acknowledgement is made in this text. The content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program.

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

A.J.J. Johnson

Date: ....................
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I would also like to express my sincere thanks to Professor Peter Stewart and Associate Professor Peter Edwards for their guidance during progress review meetings. Further, I would take this opportunity to thank Marsha Lamb for her support in the administrative activities.
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ABSTRACT

It can be stated that performance measurement is the foundation of performance management in any construction organisation. Traditional financial performance measurement is not capable of capturing the true performance of an organisation. Thus the results of such financial performance measurement can not be used by managers to derive future performance in their organisations. The balanced scorecard (BSC) performance measurement approach used in other industries has been proposed for construction, as it takes into account critical wider perspectives. However, the construction BSC consists of four perspectives that are highly suitable for construction industry, namely business development, stakeholder management, process management, and innovation and learning. The primary objective of the research is to develop a balanced scorecard framework for construction contractors and measure performance of contractors using that framework. The results of the questionnaire survey carried out and follow-up interviews conducted among 34 senior managers in Melbourne revealed that the above performance measurement framework is appropriate to use in a contracting organisation. The respondents perceive that the process management perspective measurement is more desirable than others. The stakeholder management perspective received moderate rating, while business development and innovation and learning perspectives both received average importance rating by the respondents. An actual performance measurement carried out on seven contractors in Melbourne to illustrate the use of the BSC performance as a strategic performance management tool in construction reveals the following:

1. Contractors' current performance levels in regard to process management and business development are moderately high, while stakeholder management and innovation and learning performance are perceived to be average. The contractors also perceive that performance in regard to stakeholder management is of higher significance for their business success, and

2. Performance with regard to managing employees and launching knowledge management initiatives was found to be low, so there is much room for improvement.
Abstract

Human resource management (HRM) is managing employees to develop and utilise their full potential in alignment with organisational objectives. It is recommended that contractors have to introduce new strategies for HRM. The HRM strategies should focus on recruitment, training and development activities of employees. Apart from HRM, the knowledge management (KM) also needs attention. The KM can be stated as effective use of available resources to increase the level of learning and innovation in the organisation. To enhance performance of KM contractors have to conduct project reviews on completion of every project and document useful information. This would enable managers to discuss company-wide performance at management meetings and further scrutinise this information. Having separate Balanced Scorecards for HRM and KM is expected to bring enormous advantages for a contracting company.
ABBREVIATIONS

1. AI - Artificial Intelligence
2. BSC – Balanced Scorecard
3. DSS - Decision Support Systems
4. ES - Expert Systems
5. EQA – European Quality Awards
6. EMS – Environmental Management Systems
7. HRM – Human Resource Management
8. ITC – Information Technology and Communication
9. KM – Knowledge Management
10. KBS - Knowledge Based Systems
11. OHS & R – Occupational Health, Safety and Rehabilitation Management
12. QA – Quality Assurance
13. QM – Quality Management
14. PDCA – Plan Do Check Act
15. PR – Personnel Relations
16. PBPS – Performance-Based Procurement System
17. R&D – Research and Development
18. SQA – Singapore Quality Awards
CHAPTER 1

INTRODUCTION

1.1 Research Background

1.1.1 Business Performance- a general view

Performance Management and Measurement

In the past, organizations have made several attempts to gain and sustain competitive advantage in the relevant industry all over the world (Kagioglou, et al., 2001; Kaplan and Norton, 1996b). This has often resulted in the adoption of new philosophies, e.g. concurrent engineering, lean production and many others such as just-in-time (JIT), total quality management (TQM), benchmarking, business process re-engineering (BPR) etc. in manufacturing and service sectors (Kagioglou, et al., 2001 and De Wilde De Ligny and Smook, 2001). The main driver behind those philosophies is the optimisation of an organisation’s performance both internally and externally within its respective market place and also “rethinking” of performance management system through effective performance measurement (Kagioglou et al., 2001).

In the performance management process a company manages its performance in line with its corporate and functional strategies and objectives (Bititci et al., 1997a). The main objective of this process is to provide a proactive closed-loop control system, where the corporate and functional strategies are deployed to all business processes, activities, tasks and personnel, and feedback is obtained through a performance measurement system. Therefore, this process supports and co-ordinates the process of appropriate management decision-making and taking action throughout the organisation (Schalkwyk, 1998).

Performance measurement process determines how successful organisations or individuals have been in attaining their objectives (and strategies).
In this process the outputs of organisational strategies and operational strategies are measured in a quantifiable form to monitor the ‘vital signs’ of an organisation (Hronec, 1993 and Euske, 1984 from Kagioglou et al., 2001). Thus, as suggested by Bititci et al. (1997a), it can be said that the performance measurement system is the information system which is at the heart of the performance management process and it is of critical importance to the effective and efficient functioning of the performance management system.

There is a criticism that traditionally businesses have tended to judge their performance on a singular measure, profit, (gross or pre-tax) because the traditional performance measurement systems rely solely on financial measures such as return on investment, sales per employee, profit per unit production (profitability), efficiency, etc. (Ellis and Williams, 1993 from Sommerville and Robertson, 2000; Love and Holt, 2000; Amaratunga et al., 2000). Organisations that rely on financial measures alone can identify their past performance but not what contributed to achieve that performance (Kagioglou et al., 2001).

It has also been observed that exclusive reliance on these financial indicators/measures in management systems promoted short-term behavior. This short-term focus, where long-term value creation was sacrificed short-term performance, was causing organisations to neglect long-term viability issues (Kaplan and Norton, 2000a).

Problems with the performance measures used by organisations as discussed by numerous authors (Kagioglou et al., 2001; Kaplan & Norton, 2000a and 1994; Love and Holt, 2000) can be summarised as follows. These financial measures encourage short-termism; are retrospective and hence are always to some extent out-of-date; do not accurately reflect the interests of stakeholders; fail to provide information on what customers really want and what they are actually getting; do not identify how competitors are performing; lack strategic focus and fail to provide data on quality, responsiveness and flexibility; give misleading signals for continuous improvement and innovation activities; encourage local optimization; and report on outcomes but do not communicate the derivatives of future performance.
Chapter 1: Introduction

It has been suggested that business performance measurement should look beyond traditional financial metrics and embrace essential business drivers that determine and influence a company’s future business (Love and Holt, 2000). According to Neely (1999), in today’s business environment, where organisations compete on the basis of non-financial factors, they need information on how well they are performing across a broader spectrum of dimensions, not only financial but also operational. It has been suggested that the Balanced Scorecard performance measurement system, which was introduced by Kaplan and Norton (1992), fulfills this requirement.

1.1.2 Performance Management and Strategic Management in Construction- a specific view

Traditionally the construction industry has been concerned about project performance (Ward et al., 1991; Mohsini and Davidson, 1992). However, the performance of construction projects and contractors has been assessed mostly on the extent to which the client’s objectives like cost, time and quality were achieved on those projects (Ward et al., 1991; Mohsini and Davidson, 1992; Smallwood and Venter, 2001). Although these three measures provide an indication of the success or failure of a project they do not, in isolation, provide a balanced view of the project’s performance, and their implementation in construction projects is apparent only at the end of the project. Therefore, as suggested by Kagioglou et al. (2001), these three measures can only be classified as “lagging” rather than “leading” indicators of performance. International research also supports this argument, which indicates that performance relative to cost, quality and schedule is influenced by other factors like health and safety, productivity, performance relative to the environment, and worker satisfaction (Smallwood and Venter, 2001).

Ward et al. (1991) mention that the evaluation of projects, contractors, professionals or procurement methods solely on the extent to which client objectives are achieved is problematic, essentially because of the problems associated with measuring goal attainment (bias, wrong measurement systems, measuring intangibles and invisible aspects), allowing for trade-offs (establishing priorities among objectives), effects of
procurement processes that are needed to accomplish those objectives, effects due to external factors (such as adverse weather conditions and business environment), and ultimately the question of whether the goals were set at an appropriate level (setting unrealistic objectives, interdependencies between objectives and the like).

Additionally, they pointed out the importance of good relationship management in construction, in addition to cost, time and quality, enriched by the special features of harmony, trust and goodwill, to be successful in the market (Ward et al., 1991).

As in other industries, there is also criticism in construction that performance measurement primarily focuses on traditional bottom-line performance measures such as efficiency, return on capital employed, and profitability, and therefore fails to assess the true performance of construction projects and organisations (Kagioglou et al., 2001). The result obtained from such a financial performance measurement system also provides limited use for the long-term strategic construction business planning (Love and Holt, 2000). There is a consensus among researchers and industry experts that one of the principal barriers to promote improvement in construction projects is the lack of appropriate performance measurement (Alarcon and Serpell, 1996).

To sustain competitiveness, indeed, in order to survive in a national and international market, requires more than ever before that construction businesses properly understand how they are currently performing and how they need to perform in the future (long-term view). This has arisen mainly as a result of an increasingly competitive and shrinking global market place (Love and Holt, 2000). According to Langford and Male (2001), in international construction the stakeholders needing to be satisfied would expand and this poses fresh challenges to the strategy-making process. This statement supports the earlier view of Love and Holt (2000) and also implies the need for an appropriate wider performance measurement/management system concerned about not only paying customers but also other stakeholders all being critical for business viability in the short and longer terms (Love and Holt, 2000). The results derived from the wider performance measurement process may be used as inputs for a continuous strategic management process in order to form a competitive base in a fiercely competing construction business environment. This will be highly beneficial for construction
organisations that are sometimes criticised for a lack of long-term strategic planning and management (see Veshosky, 1994; Chinowsky and Meredith, 2000).

1.1.3 Evaluation and selection of Contractors based on their wider performance – an evolving issue

The most frequently used criteria for selecting construction contractors are tender price, financial capability, technical ability, management capability, relationships with stakeholders, availability of resources, health and safety performance, and reputation (Hatush and Skitmore, 1997a and 1997b; Fong and Choi, 2000; Palaneeeswaran, 2000).

Further, several researchers have criticised that tender price is usually the most significant criterion in contractor selection (Fong and Choi, 2000; Hatush and Skitmore, 1997; Kumaraswamy and Walker, 1999) though it has been increasingly recognised that the lowest bid is not necessarily the most economical solution in the longer term (Kumaraswamy, 1996 from Fong and Choi, 2000; Wong et al., 2000). As a result of higher emphasis on lowest tender price, less attention has only been placed on the quantitative evaluation of contractors' quality attributes (Jennings and Halt, 1998 from Wong et al., 2000). Research by Wong et al. (2000) reveals that public and private clients assigned more than 60 % importance on 'lowest-price' and a maximum of 30 percent importance on project specific criteria comprising contractors' quality attributes. Wong et al. (2000) conclude that the industry is moving from 'lowest bid selection' towards 'value based selection'. The driving forces behind the emerging trend are derived again from the following valid perceptions such as: low price may not yield value; low price may not be ultimately cost saving; price has significant linkages to quality and overall performance; multiple criteria would contribute to the value; justifiable decision making systems could be constructed; advance decision making systems could facilitate faster decision making; and value is paramount when using public money (Palaneeeswaran, 2000). The public sector clients in Australia are now stressing value for money in their procurement processes (see for an example Queensland Government Purchasing Policy at www.qgm.qld.gov.au).
Chapter-1: Introduction

Such value-based procurement focuses on selecting the contractor with the offer most advantageous to the client, when price and other factors (such as continuous improvements, greater client satisfaction, enhanced productivity through harmony, resource optimisation, etc.) are considered. Kashiwagi (1997) encourages such a Performance Based Procurement System (PBPS) in which contractors are selected on the basis of their performance information. The performance information assists the decision makers in differentiating and assigning value to bidders and thus leading to the selection of the “best” available contractor and designer. The performance information may comprise information in relation to the expertise and experience of the bidders; prices; contractor margins, financial stability, and payment of subcontractors; previous size of jobs; previous types of jobs; completion rates on time and bellow budget; performance of previously constructed facility or facility systems; construction management personnel etc.

According to Kumaraswamy and Walker (1999) contractor selection should be based on a demonstration of potentials to perform better against broader definitions of project success than just capital cost. However, a question arises: how can contractors best prove their performance against such wider performance criteria? The leading contractors who participated in the tendering of the National Museum of Australia even found it difficult to prove their performance against the contractor (alliance partner) selection criteria due to lack of availability of evidence (Walker et al., 2001). It is expected that the BSC perspectives can be effectively used as the contractor selection criteria as it comprises wider performance criteria and, on the other hand, the contractors who implement the BSC performance measurement system in their organisation will be in a better position to provide evidence to substantiate their actual performance against the selection criteria.

1.2 Research Problem

The research problem can therefore be stated as follows:

Wider performance measurement systems are lacking in construction organisations. The results achieved from the existing bottom-line performance measurement systems can not be used to derive future performance. Further, the best-value contractor selection method
emerging in the industry requires contractors to prove their performance against wider performance criteria to secure projects. In the absence of a wider performance measurement system in their organisations, it will be difficult for them to substantiate the status of their organisational performance against the best-value contractor selection criteria.

1.3 Research Questions

The following are the basic research questions that led to the formulation of this research proposal:

1. How do we better measure the long-term performance of construction contractors to accommodate a wider range of critical criteria?

2. How can we better identify leading rather than lagging performance indicators to improve monitoring and control of contracting organisations in the long term?

3. What are the appropriate best-value tender evaluation and contractor selection criteria?

4. What are the difficulties that may arise for prospective contractors to substantiate their performance against such criteria?

1.4 Objectives of the Research

The research primarily aimed at measuring the wider performance of construction contractors using a Balanced Scorecard approach. Other objectives were to:

- Find out the desirability of each of the issues relating to wider performance of the contractors being adopted for best-value contractor selection criteria from the contractors’ as well as clients’ point of view,
• Examine the extent to which the information with regard to each criterion in the best-value contractor selection criteria is currently available to demonstrate the evidence of the contractors’ ranking of their delivery on the criteria,

• Investigate the status of their wider performance against the relevant best practices, and subsequently carry out a gap analysis and explore the possible ways and means of filling the gaps (if they exist),

• Develop an appropriate PDCA (Plan – Do – Check – Act) cycle for construction contractors to help boost their wider performance in the industry, and

• Develop a template for the assessment of contractors based on the best-value selection criteria.

1.5 Research Method

A focused literature review was carried out to develop a preliminary Balanced Scorecard framework. Subsequently, a questionnaire survey was conducted using the framework.

Literature Review

The literature review comprised the following:

• Review of literature on business performance measurement and management both in general and specifically in construction,

• Review of current construction procurement procedures to determine the extent of best-value contractor selection criteria used within Australia, and

• Review of construction procurement procedures to determine the contractor selection criteria used outside Australia.

Questionnaire Survey

A questionnaire was designed based on the above-mentioned literature review and a one-to-one survey conducted among senior construction managers and client representatives to achieve the research objectives. The questionnaire facilitated both quantitative and qualitative methods employed in the analysis of data. For the quantitative analysis the relative important index (RII) previously used by
Kumaraswamy and Chan (1998) was used and for the qualitative analysis the guidance given in the CIDA (1993) on carrying out a gap analysis was followed.

1.6 Limitation of the Research

Data was collected from mid-sized building contracting organizations (with annual turnover between 500 million and 1 billion Australian dollars) in Victoria, Australia.

1.7 Organisation of the thesis

Chapter 1: Background of the research

Chapter 2: 2.1 Literature review on the following:
- New management directions,
- Use of Balanced Scorecard as a key management system in an organisation,
- Use of Balanced Scorecard as a key strategic performance measurement / management system in construction,
- Wider Performance Measurement in Construction using a BSC,
- Critical Success Factors and Performance Indicators/Measures,
- Business excellence models,
- Tender Evaluation Models or Contractor Selection Models in Construction, and
- Perceptions of Australian contractors about their business success.

2.2 Development of a Balanced Scorecard framework for construction

Chapter 3: Research design, analysis of research findings and discussion

Chapter 4: Managing business performance using a Balanced Scorecard approach

Chapter 5: Conclusion and recommendations for future research
CHAPTER 2

LITERATURE REVIEW AND DEVELOPMENT OF BALANCED SCORECARD PERFORMANCE MEASUREMENT FRAMEWORK FOR CONSTRUCTION CONTRACTORS

<table>
<thead>
<tr>
<th>Review of literature on:</th>
<th>1 New management directions</th>
<th>2 Balanced Scorecard (BSC) system</th>
<th>3 Wider performance measurement in construction using a BSC</th>
<th>4 Critical success factors and performance indicators/ measures Business excellence models</th>
<th>5 Tender evaluation models or contractor selection models in construction</th>
<th>6 Perception of Australian contractors about their business success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives were to:</td>
<td>Explore evolving management blueprints and emphasis on the need for wider performance measurement</td>
<td>Increase the understanding of BSC performance measurement system</td>
<td>Discuss available wider performance measurement models and research results. Formulate a preliminary BSC framework for contractors</td>
<td>Decide on the sub-elements of the preliminary BSC. Make it compatible with universally accepted business excellence models</td>
<td>Further scrutinise the preliminary BSC framework. Identify best-value contractor selection criteria and performance indicators. Explain how a BSC can be used in a best-value contractor selection system</td>
<td>Make the preliminary BSC framework to suit Australian contractors and use it in the survey</td>
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Road Map of the Literature Review

The above road map provides a structure of the literature review discussed in this Chapter. The initial literature review explores the evolving management blueprints, which give a bigger picture of the critical performance issues of an organisation operating in the current business environment.

Then the literature review focuses on Balanced Scorecard performance measurement system and moves on to discuss advantages and shortfalls of BSC.

Subsequently, details of important research works carried out on performance measurement and management in construction are summarised.
The literature dealt with conceptual models of the wider performance measurement developed by academics, writers and researchers. This review provides some useful knowledge and establishes a foundation for the development of preliminary ideas towards a wider performance measurement framework in construction.

Critical success factors and performance indicators are reviewed to determine sub-elements of the preliminary BSC. Business excellence models are also examined in this regard. Review of business excellence models makes the preliminary BSC framework compatible with those models and leads to acquiring more insights into the general performance measurement best practices.

Literature relating to tender evaluation or contractor selection in the construction industry further reinforces the BSC framework and its need these days. It also determines the extent of currently used best-value contractor selection criteria and relevant performance indicators.

Perceptions of Australian contractors are examined with the use of a content analysis of their publications and then their common perceptions are compared with other industry best practices, business excellence models and views of academics in construction. This is to arrive at an appropriate preliminary BSC framework for the Australian construction contractors and to use that BSC framework in the questionnaire survey.

2.1 Literature Review

2.1.1 New Management Directions

Intellectual Capital and Intangible Assets

Roos and Roos (1997) state that management theory has gradually accepted that ‘hidden’ assets (intellectual capital) increasingly play a major role in the survival of companies and, additionally, intellectual capital performance is increasingly interpreted as an early warning signal of subsequent financial performance. Kaplan and Norton (1996a) argue that in the last decades of the twentieth century it became clear that no longer could companies gain sustainable competitive advantage by merely deploying new technology into physical assets rapidly and by excellent management of financial assets and
liabilities. The information age environment for both manufacturing and service organisations requires new capabilities for competitive success.

Further, Kaplan and Norton (1996b) assert that the ability of an organisation to mobilise and exploit its intangible or invisible assets has now become far more decisive than investing and managing physical, tangible assets. Furthermore, Allee (2000) seems to view the intellectual capital performance as an essential ingredient in the present day business context. He emphasises that intellectual capital and intangibles offer a possible pathway for reconciling our business and economic models in an environment of global interdependencies, environmental concern and larger social responsibility. Therefore, the importance of intellectual capital performance for continuous business success and survival of organisations becomes much clear.

According to Egbu and Botterill (2001), intellectual capital comprises human, structural and customer components. They also assert that among these components the human capital is the most important intangible asset, especially in terms of innovation in an organisation. Ultimately it provides goods and services that customers require or solutions to their problems. Sveiby (2001) also stresses that people are the only true agents in business; all tangible physical products, assets as well as the intangible relations, are results of human actions and depend ultimately on people for their continued existence. Structural capital encompasses internal structure of an organisation, such as its strategies, core competencies and culture. Finally, customer capital consists of the external intangible assets that determine the market position and strength of an organisation (Egbu and Botterill, 2001). On the other hand, Joia (2000) identifies human capital, innovation capital, process capital and relationship capital (which includes customer and other stakeholder relationships) as the main components of a company's intellectual capital.

Though different people suggest different categorisation of intellectual capital, the most commonly addressed categories of intellectual capital are as follows (Allee, 2000):

- **customer or external capital**: alliances and relationships with customers, strategic partners, suppliers, investors and the communities;

- **human capital**: individual capabilities, knowledge, skills, experience and problem-solving abilities that reside in people in an organisation;
• **structural capital**: systems and work processes that leverage competitiveness, including IT, communication technologies, images, concepts and models of how the business operates, data bases, documents, patents, copyrights and other “codified” knowledge;

• **social citizenship**: growing customer base, innovation, community involvement, ethical practices, image development;

• **corporate identity**: leadership and decision-making, values alignment, employee retention and recruitment; and

• **environmental health**: waste reduction, regulatory compliance, renewal of used resources, local quality of life where operating, green brand recognition, environmental best practices, quality of both local and global environment, growth of non-renewable needed resources.

Allee (2000) further states that an economic activity of a business impacts on and is influenced by the potential health and wellbeing of society and the environment. In an organisation, everyday business concerns are closely connected to the larger social system. Thus, integrating the economic, social and environmental aspects of everything organisations do and balancing short-term wants with long-term needs is vital. This would only lead to meet the needs of the present without compromising the ability of future generations to meet their own needs - the main theme of Triple Bottom Line. (Allee, 2000). Hence, inclusion of components like social citizenship, corporate identity, and environmental sustainability as the main categories of intellectual capital is clearly justifiable.

To sum up, intellectual capital and intangible assets help an organisation (Kaplan and Norton, 1996):

• engage successfully in collaborative learning with its key stakeholders and broaden its knowledge base leading to competitive advantage and wealth creation;

• develop customer relationships that while retaining the existing customers serve new customers effectively and efficiently;
• introduce innovative products and services desired by targeted customer segments and also produce customised high-quality products and services at low cost and with short lead times;
• mobilise employee skills and motivation for continuous improvements in process capabilities, quality, and response times;
• deploy information technology, data bases, and systems to get competitive advantages in the industry;
• enhance its reputation or image; and also
• emphasise the Triple Bottom Line.

Moreover, Joia (2000) has found that there is good correlation between the intellectual capital ratings and the market value of the company. He says the current balance sheet and income statement are able to present an X-ray of a firm, i.e. how it is today, but are not reliable tools to perceive its performance in the very near future.

This supports the view of Amaratunga et al. (2000) who criticise traditional accounting models because they do not incorporate the valuation of an organisation's intangible and intellectual assets, which are more critical to the long-term future of the organisation than traditional physical and tangible assets. However, Kaplan and Norton (1996b) state that this is because of the difficulties in placing a reliable financial value on such assets. Many accounting professionals argue against the inclusion of intangibles on balance sheets. They state much of it is not owned or controlled by the organization. In addition, there are ethical concerns about including human capital on balance sheets because placing a price on individuals or quantifying the value of employees is a risk. It can give the impression that employees are, to certain extent, substituted for other forms of capital. But not measuring intangible assets also creates problems, for example, under-investment, misallocation and information inequality between companies and investors.

Finally it can be stated that, as per ISR (2001), measuring and reporting information on their intangibles has the potential to improve management and decision-making in organisations and also creates significant business opportunities. Models have been developed to track the development of intellectual capital assets, which to a certain extent counteract the need for assessing them in financial terms (for example, refer to Joia, 2000).
Many researchers have emphasised the need for developing a way to measure intellectual capital assets as they are rapidly becoming a very important measure of the company’s future performance (Liebowitz and Suen, 2000; Roos and Roos, 1997).

**Stakeholder Management**

Stakeholder theory emphasises that “if an organisation wants to maximise the shareholder value (improving financial bottom line) it should pay attention to key stakeholders”. Usually stakeholders of an organisation include investors, customers, employees, suppliers, governments, trade associations, communities, political groups etc. (Freeman, 1999; Donaldson and Preston, 1995).

According to Halal (2000), traditional emphasis of management has evolved from “profit” to “social responsibility”, and now seems to be moving toward “collaborative working relations” with all stakeholders of the project. He claims the starting point is the emerging partnering and alliance set-ups. He also states that, although the general concept of stakeholder management seems to be widely accepted, its central tenet of “balancing” interests was predominantly abandoned during the 1990s. Under his model, called the “corporate community model”, all stakeholders work collaboratively with managers to improve their own benefits while also enhancing corporate profitability.

Neely *et al.* (2001b) also stress the importance of stakeholder perspective measurement using a stakeholder-centric performance measurement system, which not only measures stakeholder satisfaction but also stakeholders’ contribution to the organisation’s wants and needs. They say the ‘Performance Prism’ performance measurement framework (see Figure 2.1) satisfies this requirement. At a glance, this performance measurement system contains measures to make sure that all stakeholders have been identified, strategies have been put in place to satisfy the wants and needs of these key stakeholders, critical processes that are necessary to execute these strategies have been identified, necessary capabilities are developed to operate and enhance those processes, and contributions are obtained from stakeholders to maintain and develop these capabilities.
Figure 2.1: The five facets of the Performance Prism (Source: Neely et al., 2001b)

Therefore, the facets of the performance prism are as follows:

- **Stakeholder satisfaction**: investors, customers and intermediaries, employees, suppliers, alliances, regulators and communities
- **Strategies**: corporate, business unit, brands/products/services and operating
- **Processes**: developing products and services, generating demands, fulfilling demands, and planning and managing enterprise
- **Capabilities**: people, practices, technology and infrastructure
- **Stakeholder contributions**: relationships and loyalty building, ideas and suggestions, developing expertise

Seemingly, this approach tries to balance stakeholders' interests and add value to the services and/or products in this relationship age.

Halal (2000) further states that “just as the Industrial Revolution shifted the critical factor of production from labour to capital, the Information Revolution is moving the critical focus from capital to knowledge”. He argues that, as knowledge behaves differently than capital (e.g. knowledge increases when shared), collaborative partnerships between management and stakeholders can be economically productive. Galbreath (2002) also supports this argument and further states that the information age has now given way to the Relationship Age, where knowledge is derived from hidden or intangible relationship assets with stakeholders.
This argument leads to pinpoint that balancing stakeholders’ interests in an organisation is a new management issue. Effective management of stakeholders will result in significant collaborative learning and cooperation with key stakeholders such as customers, employees, partners, suppliers, regulators and communities in an organisation.

It is important that appropriate strategies are put in place in order to capitalise on stakeholder relationships to achieve desirable outcomes. Transferring and converting knowledge internally and externally to the organisation can expand its knowledge base. Knowledge transfers can take place in the following ways (Sveiby, 2001): between individuals, from individuals to external structure, from external structure to individuals, from individual competence to internal structure, from internal structure to individual competence, within the external structure, from external to internal structure, from internal to external structure, and within the internal structure. Therefore, it can be stated that stakeholder collaboration is highly valuable for sustainable business success.

Galbreath (2002) provides a framework, which can be used to manage relationships with certain stakeholders, and also help understand the possible value generation through stakeholder relationships. Figure 2.2 provides the primary defining attributes of relationships with the stakeholders. Here the ‘goal’ of the relationship is the ultimate objective that the organisation is going to achieve from enhanced relationships with the particular stakeholder (for example, customers); the ‘value outcomes’ are expected to result out of such relationships, and can also be considered as the measures of its success in achieving goals; and the ‘enablers of success’ are the key ingredients that should be in place for the relationships to flourish.
<table>
<thead>
<tr>
<th>Relationship</th>
<th>Goal</th>
<th>Value outcomes</th>
<th>Enablers of success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customers</td>
<td>Feedback of product/service &quot;experiences&quot; Customer share Loyalty</td>
<td>Captured lifetime revenue Higher profitability</td>
<td>Knowledge of the customer Job rotation with customers Good personal relationships</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Referral source Flexibility</td>
<td>Gaining trust, respect and confidence Understanding and anticipating customer needs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Integrated, multi-channel business model Alliances</td>
</tr>
<tr>
<td>Employees</td>
<td>Personal growth/development Competence development Career opportunities Retention</td>
<td>Improved value contribution Higher productivity Reduced costs</td>
<td>Organisational leadership and design Training Knowledge tools and infrastructure Trust building</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Team activities/ team learning Face-to-face and IT communication (open) across all levels</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Induction programs Job rotation, etc.</td>
</tr>
<tr>
<td>Partners and suppliers</td>
<td>Speed to market Improved innovation Accelerate business velocity Maximum quality Efficient inventory management</td>
<td>Revenue growth Profit improvements Increased customer share Fewer complaints Decreased costs Higher customer satisfaction Increased reliability Access to new markets</td>
<td>Electronic integration Collaboration Continuous communications Alliances and partnerships</td>
</tr>
<tr>
<td>Investors / analysts</td>
<td>Full economic valuation</td>
<td>Highest share price and availability of capital</td>
<td>Continuous measurement Education Communication of relationship assets</td>
</tr>
</tbody>
</table>

**Figure 2.2**: Framework for relationship management leading to value outcomes (Source: adopted from Galbreath, 2002; McCabe, 2001; Walker et al., 2000 and Sveiby, 2001)

Furthermore, the new management model that was recommended for the 21st century while reinforcing the above-mentioned management issues also identified other new valuable management directions. Issues identified in the model comprise: collaborative organisations; loosely coupled networks and alliances; empowerment and collaborative individualism; management of meaning; empathetic, proactive, social sustainability; and ecological balance (Walker and Johannes, 2001).

The new management directions provided in the model were subsequently extended considering a few other important concerns that emerged in the advancing relationship age (see Figure 2.3).
<table>
<thead>
<tr>
<th>Blue print</th>
<th>Third - Information age</th>
<th>Fourth – Relationship age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic plans</td>
<td>Systems</td>
<td>Collaborative organisations</td>
</tr>
<tr>
<td>Strategic resource</td>
<td>Three years</td>
<td>Perpetual</td>
</tr>
<tr>
<td>Organisational forms</td>
<td>Information</td>
<td>Relationship assets</td>
</tr>
<tr>
<td>Management principles</td>
<td>Contingency</td>
<td>Loosely coupled networks and alliances</td>
</tr>
<tr>
<td>Managerial processes/forms</td>
<td>Divisional</td>
<td>(Virtual management structure)</td>
</tr>
<tr>
<td>Managerial skills</td>
<td>Differentiation</td>
<td>Empowerment and collaborative individualism</td>
</tr>
<tr>
<td>Managerial values</td>
<td>Open systems analysis</td>
<td>Management of meaning</td>
</tr>
<tr>
<td>Economic output / outcomes</td>
<td>Rational / diagnostic</td>
<td>Empathetic</td>
</tr>
<tr>
<td>Nature of production</td>
<td>Self-regulation</td>
<td>Proactive</td>
</tr>
<tr>
<td>Nature of competition</td>
<td>Goods and services</td>
<td>Knowledge management</td>
</tr>
<tr>
<td>Basis of market valuation</td>
<td>Specialisation</td>
<td>Social sustainability</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ecological balance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Basis of value creation is ‘better knowledge’</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Satisfaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experiences</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Business success</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reputations and image (intangibles)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Customisation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Personalisation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Collaboration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trust</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Market-to-book ratio</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Market capitalisation</td>
</tr>
</tbody>
</table>

**Figure 2.3** : Evolving Management Blueprints (Source: Walker and Johannes, 2001; Walker, 2000a; and Galbreath, 2002)

This new management model provided in Figure 2.3 seems to reveal the urgent need for organisational learning (preferably creating a collaborative learning community), efficient management of intangible assets (e.g. knowledge, stakeholder relationships, corporate identity, environmental health, etc.), being proactive rather than reactive, as well as moral and ethical practices in an organisational and business context. All of these should be managed simultaneously to reap better performance outcomes in the long term.

In order to provide a continuous proactive support for the organisational developments in respect of all important concerns addressed in the above-mentioned management models, it is paramount that organisations are required to use a wider performance measurement system. Such a system should necessarily comprise both leading and lagging indicators of performance. Those indicators should sufficiently track the organisation’s progress in the respective areas, while appropriately balancing the whole organisation’s interests.
The Balanced Scorecard has been found as an appropriate measurement system in the new era of effective management. It calls on managers to first make a commitment to introduce an array of measures or scorecards that will guide their decisions away from narrowly focused financial measures. Ultimately, the Balanced Scorecard guides businesses into greater profitability as managers position themselves to better serve their employees, customers, shareholders and other stakeholders at large (Sim and Koh, 2001). The following section provides more insights into the performance measurement and management system as well as the Balanced Scorecard approach.

2.1.2 The Balanced Scorecard as a wider Performance Measurement and Management System

2.1.2.1 Performance Measurement / Management System – An overview

Chapter 1 provides definitions for the performance measurement and management processes. The clear relationship between performance measurement and management can been seen in its wider context from a process view, i.e. input-process-output, as follows:

![Figure 2.4: Performance management / measurement process (Source: Kagioglou et al., 2001).](image)

It has been widely accepted that measurement is the foundation of good management practice (Love et al., 1999) and performance measures influence behaviour (Neely, 1999) of people inside and outside the organization. It is accepted that companies often fail to
turn strategy into effective action due to inadequate or inappropriate measures. In addition, business today requires better information across a wider scope than that of traditional, and often linear, financial measures to achieve understanding of the factors that create the foundations of future success (McAdam and Bailie, 2002). Thus according to Neely (1999), (wider) performance measurement is now on the management agenda. Barnard (1962) asserts that it has long been recognised that performances measures are an integral part of the planning and control cycle (quoted in Neely, 1999).

![Performance measurement process cycle](image)

**Figure 2.5**: Performance measurement process cycle (Source: adapted from Bond, 1999)

In general, the performance measurement process as shown in Figure 2.5 is cyclical. It starts with clarification of the company’s mission and strategy in line with the company’s success factors and moves on to establishing consensual objectives and goals (usually in the short term). After establishing clear objectives that the organisation strives to achieve, a strategy map may be drawn to adequately show cause and effect links. The cause and effect relationships introduce dynamic systems thinking. Following the strategy map appropriate performance measures are identified and relevant targets are established across a balanced set of outcomes and performance drivers. Then strategic objectives and measures are communicated throughout the entire organisation. Subsequently, responses are obtained from different functional perspectives, analysed and reported to the management to take necessary action. The management compares the desired performance goals with current levels in order to establish strategic performance gaps. This enables the organisation to monitor the viability of the existing strategy and adjust its implementation and, if necessary, to make fundamental changes in the strategy itself.
in a continually changing environment in a quick and timely fashion. Strategic initiatives
are then designed to close the performance gap. This cyclical process continues with
reviewing, updating and replacing the objectives in the various perspectives in
accordance with the most current view of the strategic outcomes and required
performance drivers for the upcoming periods (Bond, 1999 and Kaplan and Norton,
1996b).

Deciding on an appropriate set of performance measures in an organisation is an
important task. It is paramount that this set of performance measures should support
rather than contradict the business objectives of that particular organisation (Bittitci et al.,
1997b). The measures used shall comply with the following general guidelines as
suggested by previous researchers and commentators:

- They shall be derived from the strategic objectives and goals of the organisation
  (Kaplan and Norton, 1993; Neely et al., 1997; and Roest, 1997);
- They shall reflect the interests of the important stakeholders of the organisation
  (Love and Holt, 2000);
- They shall relate to specific, stretching, but achievable goals (targets) ( Neely et al.,
  1997);
- They must enable the organisation to measure its competitive position in the
  industry (quoted in Love and Holt, 2000);
- Each of the essential drivers of business success must be included but usually it is
  not advisable to have too many measures (according to Kaplan and Norton,
  2000a 20 to 25 strategic scorecard measures are enough, and out of this eight
  internal measures, and five each of financial, customer and learning and growth
  perspective measures);
- They should be transparent, that means: simple to understand, have visual
  impact and visible to all;
- They shall provide timely , fast and accurate feedback in the form of standard
  information;
- They shall be based on the quantities that can be influenced, or controlled, by the
  user alone or the user in corporation with others;
- They shall be clearly defined, objective (not based on opinion) and precise, be
  exact about what is being measured;
• They shall be part of a closed management loop;
• They shall have an explicit purpose;
• They shall be based on an explicitly defined formula and source of data;
• They shall employ ratios rather than absolute numbers (to protect privacy of information); and
• They shall use data which are automatically collected as part of a process whenever possible (Neely et al., 1997).

In response to such a call for an improved business performance measurement (BPM) system, several new performance measurement frameworks have emerged in the management literature. Those frameworks take into account all wider perspectives of an organisational performance and address the limitations of the currently available traditional performance measurement systems. They incorporate both financial and business drivers. Some examples of the wider performance measurement frameworks include: the Balanced Scorecard, performance measurement matrix, performance pyramid, and “Baldrige” Award. In addition to these overall performance measurement approaches, specific attention to the measurement of a few important business performance dimensions has also been drawn in the recent past. Some examples are customer satisfaction (Berry et al., 1994), employee satisfaction (House and Price, 1991) and business success (Chakaravarthy, 1988, Love and Holt, 2000).

Of the above performance measurement approaches, the Balanced Scorecard (BSC) to a greater extent provides solutions to the problems that have been experienced with traditional bottom line performance measurement systems. The BSC also meets most of the above-mentioned guidelines pertaining to appropriate performance measures. The BSC demonstrates a project’s (or company’s) performance based on satisfying a wide range of needs other than profit to the organisation delivering the project or lowest cost (financial bottom line) (Walker and Walker, 2002).
2.1.2.2 The Balanced Scorecard (BSC)

**Figure 2.6**: Balanced Scorecard (Source: Kaplan and Norton, 1994)

In the market-driven competitive world, businesses are continually seeking new strategies and business models to excel in as well as seeking to update the process and metrics used to measure and improve performance (Basu, 2001). The Balanced Scorecard (BSC) as a performance measurement system includes financial measures that show the results of the actions already taken, and it complements the financial measures with operational measures on customer satisfaction, internal processes, and the organisation’s innovation and improvement activities (see Figure 2.6). According to Kaplan and Norton (1994) this set of measures gives managers a fast but comprehensive view of the business (Kaplan and Norton, 1994). It is based on the fact that the financial measures are lagging indicators and are the results of the other three leading indicators (also known as “operational measures”) (Kaplan and Norton, 1992). These three leading indicators, while being drivers of financial performance of a business provide an early indication of future financial performance of the business, and therefore should not be neglected by organisations. Therefore a complete performance measurement framework should comprise not only financial measures but also operational measures, as portrayed in Figure 2.6.

Amaratunga et al. (2000) assert that the concept of BSC came out of the realization that no single performance indicator can capture the full complexity of an organisation’s performance. The BSC has been designed to provide a balanced picture of financial and intellectual capital. It provides a framework for implementing and managing a strategy
at all levels of an organisation by linking objectives, initiatives, and measures of an organisation’s vision and strategy. As it translates the organisation’s vision and strategy into objectives and measures across four balanced perspectives it is consistent with the organisation’s corporate strategy (ISR, 2001; Amaratunga et al., 2000). The following section explores each BSC perspective and provides more insights into the role of the BSC in strategic management of an organisation.

2.1.2.2.1 Balanced Scorecard Perspectives

Financial Perspective – To succeed financially, how do we appear to our shareholders?

The financial performance measures indicate whether the company’s strategy, implementation and execution are contributing to bottom-line improvement. Typical financial goals have to do with profitability, growth, and shareholder value (Kaplan and Norton, 1992). The scorecard tells the story of the strategy, starting with the long-term financial objectives, and then linking them to the sequence of actions that must be taken with financial processes, customers, internal processes and finally employees and systems to deliver the desired long-term economic performance. The financial objectives reflect the financial performance expected from the strategy and also serve as the ultimate targets for objectives and measures of all the other scorecard perspectives. Measures of financial performance of a company are: increase in revenues and profitability, market value, cost reduction, productivity improvement, enhancement of asset utilization/profit per total assets, uncompleted work in hand, economic value added, reliability of performance and reduction in risk (Kaplan and Norton, 1996b; Liebowitz and Suen, 2000). However, it is argued that overemphasis on financials leads to an “unbalanced” situation with regard to other perspectives (Balanced Scorecard Organisation, 2001). Schneiderman (2001) states that companies that really benefit from a scorecard process would inevitably move the focus of their attention to the non-financial scorecard metrics. It is understandable that overemphasis on achieving and maintaining short-term financial results can cause companies to overinvest in short-term fixes and to underinvest in long-term value creation, particularly in the intangible and intellectual assets that generate future growth (Kaplan and Norton, 1996b).
Customer Perspective – To achieve our vision, how do we appear to our customers?

Many organisations today have corporate missions which focus on their customers because of an increasing realization of the importance of customer focus and customer satisfaction in any industry. How an organisation is performing through the eyes of its customers has therefore become a priority for business managers and this perspective captures the ability of the organisation to provide quality goods and services, and achieve overall customer satisfaction (Amaratunga et al., 2000; Balanced Scorecard Organisation, 2001). Research by Robson and Prabhu (2001) revealed that leaders in the service industry are good at customer orientation (listening to customers, establishing quality values, etc.), meeting customer requirements (service delivery and quality, etc.) and performance measurement. Earlier researchers concluded that customer orientation is positively associated with performance of the company (Appiah-Adu and Singh, 1998). According to Kaplan and Norton (1993 and 1996b), an organisation should be aimed at following objectives such as value for money, competitive price, hassle free relationship, high-performance professional image and reputation, and innovation, in order to be perceived as the best in the industry among both current and potential customers. Therefore, the customer perspective on the Balanced Scorecard enables an organisation to be highly customer oriented by offering products and services that are valued by customers. The core outcome measures in this perspective include customer satisfaction, customer retention/repeated businesses/average customer duration, loyalty, new customer acquisition, customer claims/complains, customer profitability/annual income per customer, short lead times, delivery on time, and market and account share in targeted segments (Kaplan and Norton, 1996b and 2000; Sommerville and Robertson, 2000; Watson and Chileshe, 2001; Liebowitz and Suen, 2000; Baldwin et al., 2001; Redshaw, 2000; and McCabe, 2001).

Internal Business Improvement Perspective – To satisfy shareholders and customers what business processes must we excel at?

The emphasis in this perspective is to identify and measure the processes that organisations must excel at to meet organisational and customers’ objectives. This will lead to achieving their financial and customer strategic goals.
Through the use of the BSC, the key processes in an organisation are monitored to ensure that outcomes will be satisfactory and thus it serves as a mechanism through which performance expectations of both customers and the organisation are achieved. It is further argued that this perspective reveals two fundamental differences between the traditional and BSC approaches to performance measurement. The traditional approaches attempt to monitor and improve existing business processes whereas the BSC approach identifies entirely new processes at which the organisation must excel to meet customer and financial objectives. The second important difference is that BSC incorporates innovation processes, which often may result in the development of new products or services (Amaratunga et al., 2000).

The key objectives of an organization's internal processes are: understanding customer needs, shaping customer requirement, creating innovative products and increasing customer value, providing responsive service, tender effectiveness, risk management, quality service, safety/loss control, supplier chain management, joint ventures and partnerships, and good corporate citizenship. Therefore, performance measures used in the internal processes are: defect rates, non-conformance to specification/standards, rework/value of rework, productivity and cost reduction, adherence to schedule and budget, cost and time predictability, environmental and safety incidents, ethical incidents, corporate quality performance, investment in technology, and research and development and IT expenses per employee (Kaplan and Norton, 1996b and 2000a; McCabe, 2001; Kaglioglou et al., 2001; Sommerville and Robertson, 2000; Enderle and Tavis, 1998; Cebon et al., 1999; Liebowitz and Suen, 2000).

**Innovation, Learning and Growth Perspective – To achieve our vision, how will we sustain our ability to change and improve?**

The learning and growth perspective of the BSC identifies the infrastructure that the organisation must build to create long-term growth and improvement. The predominant element within this perspective is whether the organisation possesses the required capabilities to improve and create future value for its stakeholders. This perspective looks at the ability of employees, the quality of information systems, infrastructure, and practices in supporting accomplishment of organisational goals (Amaratunga et al., 2000).
Chapter 2: Literature Review

This perspective constitutes the essential foundation for success (both current and future) of any knowledge-worker organisation (Balanced Scorecard Organisation, 2001).

According to Kaplan and Norton (1996b and 2001a) the following are the main objectives in this perspective:

- Objectives pertaining to employees: developing core competencies (reskilling employees, training, personnel development, etc.), employee satisfaction, retention and productivity, creating the appropriate climate for action (strategic awareness, alignment, teamwork for synergies, empowerment, rewarding, interaction with knowledge workers), and
- Objectives pertaining to systems and procedures: developing the company's technical infrastructure to enable continuous learning, and enhance knowledge management capabilities such as information systems, databases, tools and networks.

Prusak and Cohen (2001) also support the above suggestions by saying that investing in social capital (building stronger relationships among employees) by means of making connections (also stressed by Geus, 1997), enabling trust and fostering co-operation would greatly contribute to business success. This is because businesses run better when people within an organisation know and trust one another; deals move faster and more smoothly; teams are more productive; and people learn more quickly and perform with more creativity (Prusak and Cohen, 2001).

In the case of innovation, Kim and Mauborgne (1997) found that in high-growth companies (irrespective of the type of industry) the strategic emphasis was on value innovation, not on willful competition or retaining of customers. Their strategy was also to build on the powerful commonalities in the features that customers value and provide the total solution customers seek. They also found that value innovators go beyond traditional offerings.

Widely used performance measures in this perspective include level of awareness of existing knowledge, accessibility to existing knowledge and strategic information, infrastructure available to facilitate knowledge management processes, employee
satisfaction rating, employee flexibility, level of trust, employee empowerment index, number of employee suggestions, employee absenteeism and turnover, number of innovations made and under way, time taken to adopt to a new system, investment in innovation and learning, number of quality and effective partnerships and research leadership (Kaplan and Norton, 2000a; Ahmad and Montagno, 1998; McCabe, 2001; Cebon et al., 1999; Neely et al., 2001a; Liebowitz and Suen, 2000; Low and Siesfeld, 1998; Prusak and Cohen, 2001)

The next section addresses role of the BSC in strategic management of an organisation.

2.1.2.3 Creating a Strategy-Focused organisation using Balanced Scorecard (BSC) as an appropriate tool

A close look at the effective strategy formulation process that was proposed by Roos et al. (2001) as shown in the Figure 2.7 reveals that establishment of an appropriate performance measurement (PM) system is essential right from the initial strategy formulation stage.

![Figure 2.7: The strategy formulation process (Source: adopted from Roos et al., 2001)](image)

According to Langford and Male (2001), for successful strategic management the indication of how strategic objectives are to be achieved and also identification of the major components of the strategy are crucial. A review of literature on the BSC and strategy-focused organisation proves that the Balanced Scorecard sufficiently fulfils the main principles of a strategy focused organisation such as translating the mission and strategy into operational terms (tangible objectives and measures), aligning the organisation to strategy, making strategy everyone’s everyday job and a continual process, and mobilising change through executive leadership (Kaplan and Norton, 2000a)
and 1996b). This is because measures on the Balanced Scorecard are usually derived from current organisational objectives and strategies and thus performance measurement results imply the effectiveness of strategies and their implementation, and update this information quite frequently.

A study carried out by Low and Siesfeld (1998) has underscored the importance of corporate communications of the leading indicators of financial performance especially in public companies as major investors’ decisions are in fact significantly influenced by non-financial performance information. The indicators identified through the study include: the company’s strategic vision and ability to execute against it, the credibility of management, the innovativeness, the ability to attract people, customer satisfaction level, and market share.

Hence, the implementation of the Balanced Scorecard can bring many strategic advantages to that organisation as it explores the strategy and its objectives in detail, and also measures performance of the existing strategy. It can also play a crucial role in the implementation of new strategies in organisations by providing regular strategic feedback and updating strategic measures to suit new strategies. Kaplan and Norton (2000a) also point out the importance of updating strategic measures to suit prevailing strategies. They state that even some organisations with well-formulated strategies have difficulties in their implementation because, though those organisations change their strategies, the tool for measuring strategies have not kept pace.

Letza (1996) provides some valuable guidelines for the design and implementation of a Balanced Scorecard through a few case studies and identifies certain critical elements of the long-term strategy for growth. Those fundamental elements are customers, people, innovation, processes, performance, suppliers, community, and benchmarking (against world class companies). He also views innovation and competencies as the corner stones in the success of a company and, thus, critical determinants of future success.
Chapter 2: Literature Review

The strategic model developed by Kaplan and Norton (1993) explains how to link a Balanced Scorecard performance measurement system to the company strategy as follows:

**Exploring the vision of the future**
(What is the company’s vision of the future? Mission statement, vision statement and strategies)

**Determining preferable strategic outcomes of the key performance parameters such as financial, customer, internal processes, and innovation and learning**
(If the company’s vision succeeds, how will it differ?)

**Establishing critical success factors to achieve the vision**
(What are the critical success factors?)

**Balanced Scorecard**
(What are the critical measurements? Measures (leading and lagging) of progress in achievement of the critical success factors)

**Strategic initiatives**
(What we need to do?)

**Strategic Outcomes**
(Satisfied stakeholders, effective processes, motivated and prepared workforce)

**Figure 2.8**: Linking Measurement to Strategy (adapted from Kaplan and Norton, 1993 and 2000a and Letza, 1996)

According to Kaplan and Norton (1996b) the Balanced Scorecard is more than a tactical or an operational measurement system. Innovative companies are using the scorecard as a strategic management system to manage their strategy over the long run (see Figure 2.9).
The Balanced Scorecard as a Strategic Framework for Action (Source: Kaplan and Norton, 1996a)

It is worthwhile to note, as shown in Figure 2.9, that the Balanced Scorecard, while concentrating on strategic implementation, also enhances strategic feedback and learning, especially double-loop learning. Kaplan and Norton (1994) argue that most companies today operate in a turbulent environment with complex strategies that, though valid when they were launched, may lose their validity as business conditions change. In this kind of environment, continuous strategic learning is paramount and comprises gathering feedback, testing the hypotheses on which strategy was based, and making necessary adjustments. These functions were found to be lacking in the past despite their importance (Kaplan and Norton, 2000a). Strategic feedback clearly shows the present status of the organisation from many perspectives for the decision makers. According to the Balanced Scorecard Organisation (2001), the BSC provides diagnostic feedback into various processes to guide improvements on a continuous basis, and also
feedback around the measurement methods themselves and which metrics should be tracked.

In summary, strategic management is not a one-off occurrence that finishes once the strategy is implemented. It is a continuous process that requires an appropriate performance measurement system such as a BSC in order to translate strategies into performance measures and also to provide a continuous factual feedback to monitor and determine performance trends, predict future performance and understand cause and effect relationships. As part of this discussion, a new model of performance management using Balanced Scorecard as a main tool can be proposed as follows:

![Process Diagram](image)

**Figure 2.10**: New overall Performance Management model of a strategy-focused organisation (adapted from Kagioglou et al., 2001)

The feedback process as mentioned in the above model (see Figure 2.10) may help organisations to carry out routine strategic reviews and also may lead to the development of new strategies. There seems to be a process of constant strategic learning and adapting to the business environment that evolves over time, leading to new opportunities and threats to organisations. The main difference between the model proposed by Kagioglou et al. (2001) (refer to Figure 2.4) and the above model is that the latter is a continuous process whereas the earlier is not. Additionally, the latter model encourages the continuous upgrading of strategies and thus measures on the Balanced Scorecard.
Another advantage of the Balanced Scorecard application is that it paves the way for efficient strategy mapping in organisations based on scorecard perspectives. According to Kaplan and Norton (2000a) the strategy map clearly shows how an organisation plans to convert its various assets into desired outcomes. This is essential because the key to executing a strategy is to have people in the organisation who better understand it - including the critical but perplexing processes by which intangible assets will be converted into tangible outcomes. Strategy maps give employees a clear line of sight into how their jobs are linked to the overall objectives of the organisation, enabling them to work in a coordinated, collaborative fashion toward the company’s desired goals.

On the other hand, as the strategy implies the movement of an organisation to a desirable but uncertain future position where the organisation has never been before, usually it is based on certain hypotheses. Strategy maps help organisations to capture these hypotheses, which should be subject to subsequent testing. A sample strategy map is as follows:

**Financial Perspective:** Market share, prompt payments, profitability, utilization of assets, higher market value, predictable future financial performance / strong market position, lower risk, etc.

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**Customer Perspective:** Customer orientation and their satisfaction, long-term customer relations, operational excellence, product leadership, value for money, etc.

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**Internal Process Perspective:** Stakeholder relationship, understanding and meeting customer requirements, process efficiency, partnering and alliances, corporate citizenship, safety and health, supply chain inputs, quality performance, lead time performance, etc.

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**Innovation and Learning Perspective:** Employee knowledge, skills, competencies, training, employee moral and teamwork, co-ordination and communication, alignment of business and personal goals, reflection and learning, knowledge management (infrastructure, e.g. systems), corporate culture of innovation and learning, etc.

**Figure 2.11:** A sample strategy map (mapping of causes and consequences) (adapted from Kaplan and Norton, 1996b and 2000b; Walker, 2000a; Letza, 1996 and Sim and Koh, 2001)
From the strategy map in Figure 2.11, it can be appreciated that there is a sequence of activities throughout all perspectives, which have to be fulfilled in an organisation in order to achieve a better financial performance.

For example, employees need to develop their competencies and align their personnel goals with that of the organization for innovation and learning to occur. At the same time, in order to innovate and learn and build the right strategic capabilities (see under internal process perspective, e.g. process efficiency) the management must provide employees with the necessary technology and systems and also create an environment for reflection and learning (see under innovation and learning perspective). This will deliver specific value to the customers in the long-term (see under customer perspective) and ultimately lead to better bottom-line performance of the company (see under financial perspective).

Therefore, the strategy maps are effective in providing a visual representation of a company’s critical objectives and the crucial relationships among them. This also leads to capture and test of the hypotheses on which organisational strategies are based. The other benefits are better corporate communication of the organisational objectives as well as leading indicators of the company’s future financial performance to all stakeholders.

2.1.2.4 Strategic advantages of using Balanced Scorecard

The advantages of using a Balanced Scorecard in an organisation can be summarised as follows:

- It clarifies the organisational strategy and gains consensus among its managers,
- It communicates and educates the organisation and all its stakeholders about old and new strategies, objectives and directions,
- It allows the managers to look at the business from four important perspectives simultaneously and frequently managers can see whether one objective is being achieved at the expense of another and take necessary action,
- It forces top managers to focus only on the handful of measures that are most critical for a business and avoids overloading of information when making quick decisions,
- It aligns departmental and personnel goals to the strategy,
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- It helps identify and align strategic initiatives,
- It meets several other managerial needs in a business, such as organisation of resources and their allocation, planning and controlling of business activities, and human resource management,
- It provides strategic feedback (diagnostic feedback into various processes to guide improvement on a continuous basis via benchmarking, indicate performance trend, provides feedback around performance measurement methods themselves, and which metrics should be tracked),
- It tracks the performance of intangibles and intellectual capital in an organisation that has greater bearing on its long-term performance, and
- It also builds a good reputation among potential clients, shareholders and employees (adapted from Kaplan and Norton, 1996b and 2000a; BSC Organisation, 2001; Roos et al., 2001).

2.1.2.5 Shortfalls of the Balanced Scorecard

Despite the above-mentioned advantages, the Balanced Scorecard is not free from criticism. It has been criticized for over-simplicity and not providing a complete measurement system (Kagioglou et al., 2001). Letza (1996) also identified certain potential mistakes the organisations that he studied have made in designing and implementing a Balanced Scorecard. They are:

- Measuring the wrong things. Most of the times managers failed to relate their measures to the overall strategic goals of the organisation,
- Failure to measure critical strategic activities. This was usually due to the resistance from managers as they perceived that certain things are un-measurable or those who undertake the activities are ‘too professional’, and
- Yielding conflict between managers along the functional lines due to measurement of their performance. Conflict arose when certain divisions were performing at less than optimal level.

Neely et al. (2001b) argue that in BSC no mention is made in the Balanced Scorecard of employees. Likewise, no mention is made of suppliers, alliance partners, regulators, the
local communities or pressure groups. Yet all of these parties can have a substantial impact on the performance and success of an organisation.

According to Gautreau and Kleiner (2001), there are difficulties in using the BSC when an organisation is trying to automate the system. They claim BSC measures items which are often difficult to relate to and measures may be difficult to quantify, leading to too many performance measures. On the other hand, determining the performance measures is often more difficult than expected. Further, it takes a great amount of time and resources to update the scorecard and successfully implement it.

Finally, though the BSC worked well when it was first introduced nearly a decade ago it has now also been criticized for not providing guidance on how to improve performance to achieve desired strategic results (Gautreau and Kleiner, 2001). This is because the world has moved on and priorities are changing in the so-called “New Economy” (Neely et al., 2001b). However, it is important to note that most of the limitations mentioned above are manageable to a greater extent with proper planning and awareness (Gautreau and Kleiner, 2001). Most of the problems can be overcome by changing the Balanced Scorecard perspectives to suit the emerging management schools of thought.

2.1.3 Wider Performance Measurement in Construction Using a Balanced Scorecard

According to Walker and Johannes (2001) recent developments in performance measurement highlight a wider agenda emerging than the time, cost, and quality triangle. Traditionally, the construction industry has failed to recognize the role that a wider spectrum of stakeholders may play in the performance of the projects. He further states that two major trends gaining popularity that take into account the wider spectrum of the organisation in the manufacturing and services sectors are the concepts of Balanced Scorecard and the Triple Bottom Line.

The Balanced Scorecard approach has been found to be effective in measuring performance of the construction organisations as it fulfils most of the critical managerial requirements (see Strategic advantages of using a BSC on pages 35-36).

A need for such evolution in using a wider performance measurement has been widely accepted and acted on to a certain extent in the construction industry. The following are the summarized details of important research works done and guidance given with
regard to construction performance measurement and management. These works aim to bring about a revolution in those areas providing value for money in the procurement process and also prompt those involved in construction to reconsider the ways and means of assessing project performance. The following information will lead to the design of a preliminary BSC framework for construction contractors.

2.1.3.1 Balanced Scorecard Guide for Project Relationship Management

Walker (2000a) prepared a guide for managing project relationships based on construction performance measurement and piloted in the industry with those construction organisations involved in a project alliance contract. It is to be noted that in this research work the results of the project management process have been placed under two categories such as project outputs and outcomes as shown in the Figure 2.12. The former concerns traditional clients’ requirements that were found to have difficulties associated with their assessment (as explained by Ward et al., 1991) such as project deliverables (cost, time and functionality); social outputs that the project delivers like providing goods and services, help boost economic activities and providing infrastructure for the community development; and also new concerns that have evolved over the period and received the interest of enlightened clients and customers, such as environmental impact of projects. On the other hand, the latter concerns the other vital intangible results of project management that are also becoming more important in the present day business context.
**Figure 2.12**: The Project Delivery System (Source: Walker, 2000a)

These outcomes can be considered as essential derivers of better long-term project/business performance in construction organisations. The assessment of the outcomes has potential for use at higher levels in organisational planning for long-term success and is more reliable than entirely going for the assessment of outputs.

The main focus of Walker’s (2000a) research provides a guide to measure the four important outcomes of a project that are usually ignored but are of prime importance for the sustainable success construction businesses. The results of such measurement can be effectively used to understand the actual value generated by a project.

These four outcomes and relevant measures are as follows:

**Business success**: measurement focusing on accomplishment of certain drivers of the business success such as:

- delivery performance: financial returns, financial rewards, contribution to general business performance, and capitalising on and making use of knowledge and experienced gained,
- strategic growth/opportunities: opportunity of entering niche market, creating new markets, establishing wider customer base and close supply chain base,
• process improvement: facilitating supply chain process improvement, linking organisation’s business systems with others, and understanding supply chain’s business priorities, and
• commercial sustainability: improving organisation’s ability to improve resource use and waste minimization, improving long-term survivability, long-term profitability, and leadership in sustainable resource use and waste minimization.

**Experience:** measurement concentrating on utilization of knowledge and skills gained through the participation in the particular project aimed at improving future performance and encourage innovation and creativity while paying attention to supply chain management. Measures comprise the following:
• knowledge management: awareness and accessibility of existing knowledge, conversion of tacit knowledge to explicit knowledge and leverage of knowledge,
• discovery improvement and innovation: developing/improving new work methods and technical solutions, developing/improving new process or management solutions, encouragement of innovation and improvement (adaptation and adoption) and encouragement of breakthrough/invention (creation of new approach),
• reflection and internalization: evaluation of performance on projects, mapping of cause-and-effect to document ‘how’ and ‘why’ of performance observed and recorded, processing of reflected tacit knowledge into explicit knowledge, and simplifying and refining of knowledge and experience,
• supply-chain and inter/intra-team relationship: fostering trust to share experiences, facilitating open communication (personal and through IT) and coordination of action (personal, administrative and through IT), and simple and effective problem solving procedures.

**Image:** this measurement concentrates on image development amongst project stakeholders. Measures consist of the following:
• client/end-users: application of resources throughout the project to facilitate client/end-users’ confidence that project is superb, and application of resources to convince the client/end-users that the contractor’s involvement should be repeated,
• other participants (consultants, subcontractors, suppliers, government organisations, etc.): available systems to facilitate the team members’ (including
partners') confidence that the project is superb, and facilitating the construction team’s and partnered team's professional development and commitment to excellence on the project, and

- wider community (society - potential customers): facilitating public perception that the project is superbly well managed, linking the organisation’s image to a positive image of the project, establishing a link to delivering a public good or satisfying a valid public need, seeking ways of improving the organisation’s image as a good corporate citizen.

**Stakeholders' satisfaction**: this measurement in Walker’s (2000a) framework concentrates on exploring ways and means employed by the organisation to achieve stakeholders’ satisfaction about project outcomes. Measures include the following:

- paying customers: excellent service delivery, keeping customer informed of likely consequences of actions proposed for this project, project threats and opportunities, and facilitating customer's trust about project team’s capacity to deliver the expected results,

- end-users: assisting in end-users’ aspirations being considered for the project at briefing, design, delivery and commissioning stages, getting feedback on end-users’ aspirations at the post-occupancy stage, and having planned an information and education strategy for the project

- supply chain: sharing of information and knowledge with all supply chain teams to minimize waste, confusion and misunderstanding, consulting them about alternative design/production option and mutual goals and ambitions for the project, and exchanging key staff and facilitating training and education to improve understanding of business systems and processes,

- wider community: identifying shadow stakeholders that might be affected by the project and less vocal than other stakeholders, presenting the project as being of benefit to the wider community, showing the project’s contribution to improvement of facilities available to the wider community and facilitating opportunity for the wider community to comment and provide ideas for the project.

Walker’s (2000a) pilot study revealed that the organisations involved in the alliance active at the discovery aspects of innovation and process improvement did not perform
well at the reflection and internalisation that is essential for diffusion of ideas throughout the organisation. He stressed the importance of questioning the assumptions made during strategy formulation to raise performance, which can be achieved through strategic mapping. He also demonstrated how a gap analysis could be carried out between the desired outcomes and those actually observed, thus enabling appropriate solutions (by establishing a solution breakdown structure) in order to develop action plans to improve performance. Also in order to capitalise on previous experience and knowledge acquired over the period of time as well as to be innovative, organisations have to concentrate on the following:

- management of existing knowledge (including reflection and internalisation),
- generation of new innovation and knowledge through discovery,
- encouragement to experiment (may be with possible failures),
- maintaining better relationships with stakeholders - as trust, open communication and co-ordination also encourage reflection and internalisation.

Therefore, in a Balanced Scorecard with the learning and growth perspective we should have measures to track such important aspects that influence the organisational learning and growth that ultimately lead to better business performance. Additionally, from this research work the importance of stakeholder perspective measurement in a contractor’s BSC can be understood and its sub-elements can be taken into consideration.

2.1.3.2 Stakeholder Performance Measurement Framework

Love and Holt, (2000) propose an alternative to the traditional performance measurement system called 'stakeholder perspective measurement'. They claim that it can be used in combination with the traditional business performance measurement system that is currently being used in organisations to deliver superior results. Their model has taken into account four important perspectives of a firm (see Figure 2.13):

- as a stakeholder entity reflecting the interests of customers and shareholders (reflected in measures of product/service performance) - customer perspective,
- as a goal-oriented, profit centre (reflected by measures of financial performance) - financial perspective, and
• as a system that engages in resource acquisition, conversion, and exchange with the environment (reflected in measures of competitive ability such as corporate ability and individuals’ ability; productivity; quality; and environmental concerns) - learning and growth, environmental sustainability and corporate citizenship.

This approach would adequately consider the relations that an organisation has with all its stakeholders and that are critical for the business’s short-term and long-term viability.
Figure 2.13: Stakeholder Performance Measurement Framework showing its relationship with traditional BPM (Source: Love and Holt, 2000).

There were claims that the balanced performance measurement systems in construction as explained so far, would inevitably:

- ensure that customer requirements have been met (and if not, why not). This will lead to higher customer orientation and satisfaction,
- help establish achievable business objectives and monitor compliance thereto. This will provide a basis for strategic management of the organization,
- provide standards for business comparisons (both inter-departmental/divisions /individuals and inter-company/industries). This will help the organisation to decide on further actions to be taken in order to be effective and also form and maintain a competitive edge in the market,
• pave the way for rewarding employees on the basis of their group performance. This will also encourage teamwork among employees,
• identify quality problems and those requiring priority attention. This will lead to solving proactively the critical problems before they arise,
• keep a track on the functions of the business and strategies,
• give an indication of the costs of poor quality while giving directions for future best quality performance and inducing a culture of prevention rather than cure,
• justify the use of resources and also provide a basis for sustainable development,
• provides a mechanism for project participants to measure their contribution to the level of the performance attained on projects,
• provide feedback for continuous business improvement, and
• help organisations track important intellectual capital and intangible assets performance (Love and Holt, 2000; Walker, 2000a).

2.1.3.3 Other Performance Measurement Frameworks and Research Findings

Kagioglou et al. (2001) have developed a conceptual framework to measure and manage construction performance using the Balanced Scorecard approach. But they have added project and supplier perspectives to the perspectives of financial, customer, internal business and innovation as devised by Kaplan and Norton (1994) in order to make it more appropriate for use in construction. On the other hand, they stressed the need for having certain common measures that track the company's performance in every perspective (e.g., client satisfaction).

According to Baldwin et al. (2001) the approach used by ‘Arab Contractors Ltd’ provides valuable guidelines for other contractors who intend to implement such a system in their organisations. Initially, selected project managers were asked to give their opinions about the measures that they think could be used to measure organisational performance. The measures identified with the consensus opinion (measured using relative importance index) of the project managers were forwarded to senior mangers for their opinions/comments. Subsequently top management reviewed the list of measures as agreed on by project managers and senior managers, and a final list of performance
measures was established. The responsibilities for performance measurement were allocated to relevant divisions of the company.

Seven elements were identified to evaluate project performance together with the relative importance of each of the following elements: profitability, achievement of time schedule, quality, liquidity, customer satisfaction, continuous improvement, and commitment to health, safety and environmental regulations. Each of the above elements was measured using appropriate metrics. The 'quality' was measured using metrics like quality of execution, efficiency of quality system, quality of supplies and incoming materials, continuous quality improvement, etc. To evaluate the performance of each of these metrics, submetrics were developed. For example, in order to evaluate the quality of execution, submetrics were used, such as value of penalties incurred for defaults, non-conformance to specifications, and incomplete tests together with other failures to meet quality procedures.

Recent initiatives by the Australian Procurement and Construction Council (APCC) and Department of Industry, Science and Resources (DISR) reveal that construction industry regulators in Australia are more concerned about macro-level wider performance indicators. However, the development of such indicators by individual organisations is paramount in order to eventually get a precise macro view.

The scorecard developed by APCC comprises performance indicators to measure each of the industry attributes such as seamless project delivery (use of alliances and partnerships), efficiency and profitability, innovation and environmental responsiveness. These indicators were arrived through a perception survey of construction industry chief executives in 2001 across all States in Australia.

The main aim was to provide an insight into aspects of business management and development that are being pursued by construction industry leaders to facilitate best strategic decision making within the industry. Over half of the respondents reported a revenue downturn, against one-third who had revenue increases. Despite the recorded downturn in profit, the respondents have invested in training and new businesses or pay shareholders or stakeholders. The majority of companies surveyed (79%) had adopted innovative practices, especially companies operating in both building and engineering sectors. The extent of innovation also appeared to be closely related to company size.
However, this finding was contrast to the findings of DISR (2001, pg. 19) that found that there was no evidence relating to innovativeness to organisational size.

Marketing and business development, and cost planning and budgeting were the major areas of innovative practices across all States. Innovation occurred in other areas such as information management, planning, risk management, design, Occupational Health, Safety and Rehabilitation Management (OHS & R), and environmental management too. While environmental concerns are on the increase in the industry only 48 percent of the respondent companies (predominantly larger ones) had indicated that they have environmental objectives and targets in their strategic or business plans. Only 29 percent of NSW respondents and 13 percent of others apply environmental criteria to more than 25 percent of their procurement expenditure. Some organisations with higher turnover have the highest current use of environmental criteria in selecting their suppliers of materials and services. When respondents were asked about the degree of using formal agreements or alliances with others to achieve seamless project delivery, only 17 percent of NSW respondents and 27 percent of others indicated that they were used on projects representing more than 25 percent of annual turnover. But they had a clear understanding of the importance of such arrangements on the project delivery and consequently on their business performance (APCC, 2001).

Research sponsored by DISR in 2001 on innovation disclosed several issues, that also support the importance of being innovative. The research urged organisations to create an appropriate environment for innovation by revealing important drivers and inhibitors of innovation.

An ‘Innovation Index’ was used to interpret and compare the responses and findings from the survey of all industry participants. The index was based on the results of the survey. It reflects the following variables:

- income generated and cost saving resulted from innovations,
- number of examples of innovations,
- number of successful commercialisations of innovations, and
- subjective rating by the respondents of how innovative they believe their organisation to be and how fast their organisation can embrace new and relevant innovations by others.
Therefore, it can be said that the higher the innovation index the greater the innovative activities in the particular organisation. Based on the index scores developed through the research the responding organisations were classified into two groups: high innovators and low innovators. Then, the following observations were made in respect of their performance.
Compared to low innovators, high innovators:

- recorded 3 to 4 times the proportion of turnover from products and services developed in the last three years,
- recorded 3 to 4 times the cost savings as a result of process and organisational innovations in the last three years,
- created more jobs and capitalized on more new markets,
- were 50 percent less likely to miss their project delivery deadlines, and
- were 50 percent less likely to fail in meeting stakeholders objectives on projects

Engineering construction, residential building, and building material sectors were found to be more innovative in the industry.

Innovation improves employee satisfaction, protects the environment and helps companies improve their outcomes and enhance conditions in the community across a wide-ranging scorecard. Most innovations were driven externally by competitors, clients, and suppliers and internally by senior management attitudes, marketing, information technology departments, and staff and employees. Joint ventures and collaborative efforts supported and facilitated the innovation process. The high innovators had the distinguished capability to turn information and creative ideas into commercial reality. Their senior managers devoted time to investigating the future scenarios and understanding the needs of the market place (clients and suppliers) and were able to position themselves and prepare their organisation accordingly. High innovators also created a working environment that encourages creative solutions (they provided employees with freedom to decide how to carry out projects and employees were challenged by their work, their business unit structure encouraged idea development and competitive forces), and entered into client relationships, joint ventures and alliances to develop and commercialise innovations and reduce risk.

High innovators also focused on increasing market penetration, entering previously untouched markets, and improving existing strategies and management techniques.

It was made clear that alliance contracting had a positive impact on the innovation index, and the vast majority of respondents described their engagement in joint-venture or collaborative arrangements as 'successful' to 'very successful'. In exploring the respondents' perceptions with regard to innovation, the research found that innovation
was viewed by the majority of respondents as developing previously unseen technology, processes, products and services in the industry. The research also revealed that in the construction industry innovation was highly focused on technology and processes. More than 60 percent of the respondents perceived that employees’ participation in training beyond that required to fulfill the job requirements was highly conductive to innovation. It was also found that the risk and lack of sustainable demand for innovative solutions appear to affect the likely returns or profits that the innovations otherwise could create. Importantly the research pinpointed that 48 percent of organisations surveyed had no measure of innovation, either qualitative or quantitative and identified it as a major limitation.

Recommendations were provided to organisations in order to develop an innovation measurement scale to enable innovation management, monitoring and improvement, and, for the government sector clients as regulators, it was stated that they should demand the tendering organisations for government projects to detail their innovation program as part of the selection criteria (DISR, 2001). Therefore, it is worthwhile to incorporate the perspective of innovation into the wider performance measurement system in construction organisations.

2.1.3.4 Lessons from benchmarking and ongoing efforts to become world class organisations

Another DISR (2000) report on benchmarking in construction identifies that leading international competitors moved to a new business model with different value adding metrics. The new model incorporates measures reflecting the growing importance of intangible assets creation through customers and suppliers. Important elements in the new model are: reputation, leadership, culture, knowledge, systems and processes. Earlier research by AEGIS (1999) indicates that, in Australian construction industry, networking (specially informal) is the highest ranked factor followed by innovation that highly contribute to participating organisations’ entering into new markets and achieving market growth. Nearly half of the 28 respondents stated that more than 60 percent of their revenue derived from their largest three customers. Intangibles and intellectual capital seems to matter in the long-term business success of construction organisations.
The ongoing efforts of construction organisations to become world class also stimulate long-term thinking about performance improvement.

A recent article by Dulaimi and Hwa (2001), dealt with developing world-class construction companies and was based on the perceptions of contractors in Singapore, raised certain issues that influence better performance of construction companies. Companies who claimed themselves as world class, indicated that they were world class in the following ways: management quality, technology supremacy, global operations, product quality, large market share, significant contributors to growth of the industry, etc. Responses of other contractors revealed that to become world class a contractor has to emphasise the following: long-term strategic development, joint venture and strategic alliances, improve management quality, overseas ventures, improve production efficiency, research and development, etc. These research findings reinforce the need for long-term strategic development including innovation, partnerships, continuous learning, and knowledge management.

2.1.4 Selection of Critical Success Factors and Business/Project Performance Indicators for Construction Organisations

The literature reveals that there are several important factors that influence the success of a construction company. Identification of these performance parameters is essential along with appropriate measures in order to apply a Balanced Scorecard.

2.1.4.1 Construction Business Performance Measures in Use

According to Sommerville and Robertson (2000) the Morrison Group’s operational scorecards comprised the following perspectives with a range of measures and sub-measures on each area as follows:

1. Customer/external view:
   - Quality of service/work: Results from customer satisfaction survey,
   - Achievement of time scales: Results from customer satisfaction survey,
   - Standard of communication: Results from customer satisfaction survey, and
   - Impact on society, and good practice: Results from quarterly environment audit (site appearance, energy efficiency and nuisance control, material storage, control of
2. People view:
   • **Employee satisfaction**: Results from quarterly employee attitude survey,
   • **Employee involvement**: Percentage positive response to communication and involvement section of quarterly employee attitude survey,
   • **Training and development**: Average number of training days per employee, and
   • **Safety**: Accident frequency rate.

3. Processes/resource view:
   • **Target zero time delays**: Latest monthly measurement in weeks,
   • **Work won on value**: Percentage of contracts quarterly won on a non-traditional basis, i.e. not simply lowest price tender, and
   • **Criteria and waste efficiency**: Quarterly savings from divisional monitoring of operating unit’s submissions.

4. Financial perspective:
   • **Risk management**: Number of loss-making contracts in the year per $100 million turnover,
   • **Return on capital employed**: Interim and year end from published accounts,
   • **Profitability**: Interim and year end pre-tax profit margin from published account.

5. Business results:
   • **Shareholder funds/market value**: Market value of the group as percentage of shareholders’ funds
   • **Earning per share growth**: Annual percentage increase in earnings per share at year end
   • **Project (site) contribution**: Gross profit margin from interim and year end account.

McCabe (2001) has mentioned that as the Morrison Group’s mission is to ‘deliver world-class customer service and value through innovative, quality driven approach’, their ‘balanced business scorecard’ also comprised other critical areas of success in construction, such as innovation, partnering, supply chain management, and teamwork.
and leadership, which would lead them to becoming a world-class construction organisation.

According to McCabe (2001), Miller Civil Engineering (UK) used performance indicators such as cost predictability, time predictability, defects, accidents, number of employee suggestions implemented, number of continuous improvement projects completed, number of ISO 9001 non-conformities, plant breakdown, number of customer complaints, energy consumption rate, number of environmental reportable incidents, etc. in benchmarking the company’s performance.

The report by Construction Task Force (CTF) in London introduced five fundamentals to the construction process, namely committed leadership, focus on customers, integration of the process and the team around the product, quality-driven agenda and commitment to people. The authors also recommended that the industry should put in place a means of measuring progress towards its objectives and targets. They also indicated the potential performance improvement that is possible in the industry by providing evidence and used that to set achievable targets for performance improvement. Subsequently, ten key performance indicators (KPI) are currently being used in the UK construction industry as disclosed by Department of Transport and Regions (DETR). The information that these KPI generate can be effectively used by clients and supply chain organisations for benchmarking against best practices within or outside the construction industry. The aim of such practice is to convey the existing delivery of value as against potential delivery.

The proposed key performance indicators that underpin the five fundamentals of the CTF are as follows: client satisfaction - product, client satisfaction - service, defects, safety, predictability - cost, predictability - time, construction time, construction cost, productivity and profitability (McCabe, 2001).

It is evident that these performance indicators make sense through their capture of narrowly defined aspects of value.
2.1.4.2 Performance Measures Used in International Key Quality Awards

In recognition of substantial improvements in business performance that many organisations have achieved, a number of national and international awards have been established. The criteria used in qualifying organisations for such prestigious awards provide better guidance for performance improvement initiatives in construction organisations by identifying key performance parameters and also performance measures.

2.1.4.2.1 MBNQA Model

Critical success factors that have been incorporated into the criteria for the Malcolm Baldrige National Quality Award (MBNQA) as indicated by McCabe (2001) are as follows:

- **Leadership**: Senior executive leadership, leadership system and organisation, and public responsibility and corporate citizenship;
- **Information and analysis**: Management of information and data, competitive comparison and benchmarking, and analysis and uses of company-level data;
- **Strategic planning**: Strategic development and strategic deployment;
- **Human resources development and management**: Human resources planning and evaluation, high-performance work system, employee evaluation, training and development, and employee wellbeing and satisfaction;
- **Process management**: Design and introduction of quality products and services, process management regarding product and service production and delivery, process management regarding supportive services, and management of supplier information;
- **Business results**: Product and service quality results, company operational and financial results, human resources results, and supplier information results;
- **Customer focus and satisfaction**: Customer and market knowledge, customer relationship management, customer satisfaction determination, and customer satisfaction results.

However, higher weighting is given to the customer, business results, human resource development and management, and process management factors (see Appendix A).
According to McCabe (2001) these criteria were based on the core values and concepts identified by Porter and Tanner (1996), which provide the foundation for integrating overall customer and (organisational) operational performance requirements. In addition to the above critical success factors, Porter and Tanner (1996) originally included the following critical success factors: continuous improvement and learning, fast response (environmental changes and customer requirements), long-range view of the future, management by fact (based on the objective data), partnership development, and results orientation.

2.1.4.2.2 EFQM Excellence Model

Selection criteria for another high profile award called ‘European Foundation for Quality Management Award’ (EFQM) comprised the following critical success factors (Neely, 1999) in addition to the above:

- **Policies**: Quality and quality control policies and their place in overall business management, clarity of policies (targets and priority measures), methods and processes for establishing policies, relationship of policies to long-term and short-term plans, communication (deployment) of policies, and grasp and management of achieving policies, and executives’ and managers’ leadership;

- **Organisation**: Appropriateness of organisational structure for quality control and status of employee involvement, clarity of authority and responsibility, status of inter-departmental co-ordination, status of community and project team activities, status of staff activities, relationships with associated companies (group companies, vendors, contractors and sales companies); and

- **Future plans**: Status of grasping current situations, future plans for improving problems, projection of changes in social environment and customer requirements and future plans based on these projected changes, relationship among management philosophy, vision and long-term plans, concreteness of future plans.
The EFQM aimed to create awareness of Total Quality Management (TQM) and convince that the implementation of TQM programs can lead to significant benefits such as increased efficiency, reduced costs and greater satisfaction, which together contribute to improved business results (Wang and Ahmed, 2001). Another significant feature of the EFQM is the learning and innovation element that seemingly was not properly addressed in the MBNQA model.

EFQM recognises that processes are the means by which an organisation harnesses and releases the talents of people to produce performance results, and also performance improvement can be achieved only by improving processes by improving the people (McCabe, 2001). Better leadership by senior mangers is essential to manage the changes, which are more likely to occur when an organisation begins striving for excellence.

Managers must be prepared to do the following (McCabe, 2001):

1. Ensure that the philosophy of giving the customer the best possible is articulated at every opportunity – convincing the customers,
2. Introduce better methods of communication that enable people to provide their opinions about what needs to be done. Get feedback and suggestions from employees – also it helps make employees aware that they are the true assets in organisations,
3. Ensure employees are aware of the need to address customer-supplier relationships – in that they will understand why it is vital to enhance relationships and then the organisation can capitalise on that intangible asset,
4. Support training and education of employees to ensure that every person can perform their part in the process of improvement – involves developing necessary skills and competence of employees,
5. Ensure that management systems that exits are optimal for facilitating continuous improvement – such as establishing performance measurement mechanisms and new targets,
6. Create an environment where people are encouraged to co-operate – where trust flourishes and teamwork increases,
7. Encourage effort, and never blame if failure occurs – this enables learning from mistakes and leadership in innovative practices, and
8. Implement strategies that support and integrate all of the above.

The EFQM Excellence Model with the relative worth (shown in brackets) of each main criterion enables organisations to assess their ability to achieve excellence as shown in Figure 2.14.

![EFQM Excellence Model Diagram](image)

**Figure 2.14**: The EFQM Excellence Model (Source: McCabe, 2001)

It is evident from the literature that differences exist in point allocations placed on each criterion, as business results have the greatest weight for the MBNQA and customer satisfaction for the EFQM award (see Appendix A). However, organizations striving to achieve excellence in performance can have their own weighting based on their past experience or valid perception of success.

### 2.1.4.3 Feedback from the implementation of the Excellence Models

The literature reveals that four winners of the 2000 excellence awards are proven to be outstanding compared to other organisations in the following ways (Wang and Ahmed, 2001):
Chapter-2: Literature Review

- **Satisfying customer needs:** Customer satisfaction is the focus of all four companies. They listen to and learn from existing, former and potential customers and apply performance indicators to measure customer satisfaction. Customer satisfaction is incorporated into key company objectives and strong commitment is made to achieve the goal,

- **Surprising customer value:** Companies realise that customer satisfaction has become an essential ingredient to achieve success against competition and have incorporated a higher level of organisational philosophy to surprise and delight customers,

- **Superposing organisational competence:** Companies use different strategies to strengthen organisation competence. Their emphasis is on planning, learning and continuous improvement, technology, corporate culture, employee empowerment and innovation, creating mutual trust and strategic partnership, and flexibility,

- **Surpassing competitors’ products:** One company relies on looking to the external environment for new technology in order to distinguish itself from competition, hoping to surpass competitive offerings. Another company fosters individual and team initiatives and undertakes continuous improvement through brainstorming and identification of opportunities for improvement, and

- **Simulating market demand:** The winners to a certain extent stimulate market demand.

Identified drawbacks in those companies that should be addressed for further excellence are as follows:

- Their ambition to exceed stakeholders’ expectations needs to be transformed into reality, and anticipation of customer needs are as important as satisfying customers needs,

- There is little evidence of any company’s superposing its existing organisational competency and building up new layers. Closing the gap of lack of creative input must be emphasised in these organisations,

- Surpassing tradition with innovation is another ambition which needs to be transformed into reality. In general the four companies emphasise innovation
through continuous improvement, rather than surpassing existing products and services in the market, and

- Companies are required to achieve a leadership position by taking more pioneering steps towards becoming the first-mover in the market and creating new market demand.

These findings provide insights into how to become more customer focused, which is an important management imperative in construction (CIDA, 1993) and where construction organisations involved in the building and engineering sectors are becoming more concerned about determining clients’ needs (APCC, 2001).

According to Garvare and Isaksson (2001) over the years customer focus has evolved into the broader concepts of interested parties, human stakeholders, environmental stakeholders and societal stakeholders. But there is an argument that today’s business excellence models including MBNQA and EFQM are primarily focusing on the paying customer and a single bottom line of economic prosperity. These models are built around the values of total quality management. They are not focusing on the concept of the Triple Bottom Line but have their derivers and enablers in the traditional context of the market economy. To a small extent the existing components of public responsibility and citizenship, as well as focus on the human resources, promote personal and societal excellence, society equity and environmental protection (Garvare and Isaksson, 2001).

Enderle and Tavis (1998) in their article on the balanced concept of the firm emphasised the importance of social and environmental aspects in the success of long-term performance of the firm.

Further, Walker (2000b) maintains the same emphasis required construction companies to report their accountability beyond the financial matters to encompass social and environmental accounting. He also pointed out the need for developing quality measures for environmental aspects of at least major stakeholders beyond paying client/customer and communicating the impact in adding value to society. He argues also that obtaining ISO 14000 is not merely sufficient for construction organisations to show their environmental performance, but a clear commitment to continual improvement by setting and reviewing environmental objectives and targets is paramount as originally required by the ISO 14000.
Evidently, this indicates the need for public responsibility and corporate citizenship in order to reap better performance results in construction businesses, especially by capitalising on corporate governance, image and reputation.

2.1.5 Evaluation and selection of Construction Contractors based on Wider Performance – towards a Best Practice of using a Balanced Scorecard (BSC)

Suitable selection method for choosing construction participants themselves constitute an important subsystem of an appropriate procurement system that could contribute to desired performance levels (Kumaraswamy and Walker, 1999). It is interesting to note that the BSC criteria can be efficiently used in contractor selection. On the other hand, the criteria currently used by construction clients and their representatives can be considered in developing a BSC framework for construction contractors.

A review of literature on contractor selection revealed that the most frequently used criteria for selecting construction contractors are as follows:

**Tender price:** initial capital cost, annual life cycle cost (running and maintenance costs) (quoted in Hatush and Skitmore, 1997a).

**Financial capability:** annual turnover, net assets, credit ratings, liquidity, bank arrangements, bonding capacity, value of work-in-progress, etc. (Hatush and Skitmore, 1997a&b; Palaneeswaran, 2000).

**Technical ability:** experience, plant and equipment, personnel, construction methods and systems, etc. (Hatush and Skitmore, 1997a).

**Management capability:** past performance, planning, controlling, organisation, organisational arrangements, management of human resources, quality management, quality of work, and existence and application of quality control programs, etc. (Hatush and Skitmore, 1997a; Palaneeswaran, 2000).

**Relationships:** prior business relationships with clients/their representatives, subcontractors, suppliers, local authorities, dispute and claim history, negotiation skill etc. (Hatush and Skitmore, 1997a & 1997b; Jennings and Holt, 1998; Fong and Choi, 2000; Wong et al., 2000).
**Resources:** physical resources, quality and quantity of human resources, training or skill level of craftsmen, quality and quantity of managerial staff, work load etc. (Wong et al., 2000; Fong and Choi, 2000).

**Health and safety performance:** safety policy, safety system, frequency of safety audits, safety history, health and rehabilitation management, etc. (Palaneeswaran, 2000).

It is important to note that the degree of emphasis and weight assigned to each criterion are different and are largely dependent on the circumstances and specifics of the project as well as the preferences of the decision makers and their different experiences (Hatush and Skitmore, 1997a; Wong et al., 2000). On the other hand, there is no consensus as yet on a common set of criteria for contractor selection. It is said that the strategy used for bid evaluation should reflect the clients' objectives usually in terms of cost, time, quality and security. As the clients' requirements vary from project to project the strategy (thus criteria) should be adjusted accordingly.

This also requires decision makers to make some subjective assessment, but it has been found that subjective approaches in these areas do not necessarily serve the best interests of the client (Hatush and Skitmore, 1997a).

The potential role of appropriate tender selection criteria in the overall development of the industry is substantially high. It is evident that the criteria used to select a particular contractor to award a project not only influence the project outcomes but also lead to change the way the industry operates at large. For example, if the criterion of safety and health performance carries more weighting in the tender evaluation criteria, it will ultimately lead to increasing contractor concern about their health and safety performance in their day-to-day operations. Kashiwagi (1997) also support the above argument by indicating that the use of performance information in a performance-based procurement system would bring other advantages to the industry. The construction industry would change from current "low-bid", "all the same" industry to a "value added" performance-based industry where the performance information is utilised at maximum level by all participants. The contractors can use the performance information to: design company structure and operations, formulate strategic plans, cause continuous improvement, identify markets of opportunity, select partners etc. On the other hand, clients or facility managers can utilise the information to procure the best option,
eliminate non-value added design activities and functions, reduce facility management requirements, and reward performing contractors.

Owing to its importance in bringing about the most required change in the industry and most sophisticated clients’ needs together with an increase in alternative forms of project delivery system, the contractor evaluation continues to receive close attention by construction researchers. Despite this, evaluation criteria themselves largely remain unchanged. This can be seen from the consensus towards contractors’ financial, managerial, technical, health and safety, quality and past performance aspects (Wong et al., 2000).

It has been emphasised by Kumaraswamy and Walker (1999) that contractors should be assessed not only at the registration and pre-qualification stages but also at the final tender evaluation stage. This is contrary to some previously held views in the industry, that pre-qualification provides a list of capable tenderers who should thereafter be judged merely against price criteria (Kumaraswamy and Walker, 1999). Such practice to a certain extent is currently in existence in government sectors in countries like Hong Kong, Singapore and Australia. The Hong Kong Housing Authority adopts a 20:80 split between performance and price for evaluating the tenders for all building contracts under Preferential Tender Award System (PTAS) (Construction Industry Review Committee, 2001). The NSW Department of Public Works and Services gives a 2 percent tender price preference for accredited contractors over non-accredited contractors under Contractor Best Practice Scheme (CBPS) (see CBPS Accreditation Requirements, 1998-2001). In Singapore contractors tendering for public sector works receive a tendering advantage of up to 5 percent or 5 million Singapore dollars for their quality of work under the Construction Quality Assessment Scheme (CONQUAS) (Tam et al., 2000b).

According to Palaneeswaran (2000) the selection of low-bid contractors in the public sector derives from certain reasons. Public sector clients perceive that if the lowest bidder is selected that would lead to the following advantages on their part: a simple and straightforward decision-making process can be facilitated, no complex evaluation is involved and hence there is quick decision making, public accountability can be maintained by avoiding public criticism as taxpayers’ money is spent, and it is the best
way to prevent favouritism and collusion. The other factors such as rules and regulations, probity, reluctance to change and lack of knowledge may also contribute to accept the lowest bid. Public sector clients also believe that quality and other performance could be achieved by other means (e.g. close supervision). However, the effect of ‘the lowest bid wins’ policy on quality has been recognised. This apparently encourages contractors to risk bidding below normal profit margins with the prospect of recovering cost by cutting quality (Tam et al., 2000a) or through variation claims later.

Kumaraswamy and Walker (1999) strongly support non-lowest tender price contractor selection. They also urge that the multiple criteria that can be used to assess the potential performance of the contractor must express both the general and the particular needs of the client and the project in the context of the given scenario, including market and environmental conditions as well as industry and community concerns. Such an evaluation system, while satisfying the direct and indirect needs of the client and contractor, would consider the needs of the general community and industry. Their view is that performance measures should also be designed to evaluate the contractors in terms of transparency, accountability, sound corporate governance, ethics and social and environmental concerns. This would definitely lead to the development of domestic contractors and bring longer-term industry benefits. This is based on the premise that an organisation’s wider business performance would affect its stability and enhance its capacity to complete a project, meeting or exceeding stipulated project goals. Therefore the selection should concentrate on determining contractors’ all round performance potential for achieving this endeavour. They also indicate that general best practice guidelines (such as provided by CIDA, 1993) could be effectively used to develop comprehensive contractor selection criteria.

The Construction Industry Development Agent (CIDA) provided a best practice guide for Australian construction industry practitioners in 1993. This best practice guide was based on the seven management imperatives considered essential for effective strategic management in organisations. Those management imperatives are client focus, planning, process improvement, supplier relationships, people involvement, information use and leadership. A mechanism was also provided for organisations to figure out their actual status of development in respect of these imperatives.
The Constructor Best Practice Scheme used by the NSW Department of Public Works and Services recently identified the following issues as important for continuous improvement: client focus, workplace practice, management practice, cooperative relationships, quality management, occupational health, safety and rehabilitation management, and environmental management (www.cpsc.nsw.gov.au/ethics). Under the Queensland Government's Prequalification (PQC) System, contractors undertaking government building projects valued at more than $250,000 are required to complete performance reports on the service they provide in relation to a range of activities, such as time management, standard of work, quality systems, management and suitability of site personnel, management of subcontractors, contract administration, OHS&R, management of industrial relations, environmental management, workforce or skills development. The performance reports are used for evaluating contractors for pre-qualification and selective tender list as well as tender evaluation purposes (www.build.qld.gov.au). Again the Performance Information Procurement System, which is in use at the Hawaii Department of Accounting and General Services, Public Works Division, considers the following main aspects of wider performance: client satisfaction, internal performance management and improvement and corporate citizenship.

Any standard criteria established for evaluation purposes should be reconsidered according to the circumstances and specifics of the project as well as the requirements of the clients. Further, such standard criteria can assist clients and their advisors by being useful basic templates. But, in the case of public clients, having standard criteria for each of the work categories that they usually procure (such as buildings and infrastructure facilities) would be highly beneficial.

As several researchers and industry auditors have emphasised the need for objectivity and transparency in the evaluation and selection of contractors (Hatush and Skitmore, 1997a & b; Kumaraswamy and Walker, 1999; Wong et al., 2000; Construction Industry Review Committee, 2001), using standard criteria would ultimately fulfill this requirement at both pre-qualification and bid evaluation stages. This is needed for clients (specially public clients) to be accountable to project stakeholders including the wider community (Kumaraswamy and Walker, 1999). To make this process more effective, an invitation to tender should spell out the criteria for selection (and if necessary weighted
according to the order of importance to the client), enabling contractors to produce their submissions accordingly.

Palandeeswaran (2000), while indicating the utmost importance of value-based selection, stated that in value-based contractor selection frameworks an appropriate balance between ‘most economically advantageous’ perspectives and the ‘value based’ prospects should be structured. Thus, in any value-based contractor selection approaches, the primary focus for clients lies in establishing a structured framework of what ‘value’ they wish to achieve, where and how those value contributors exist, and how those value contributors could be evaluated in terms of both objective and subjective indicators.

This reinforces the need for identification of the critical success factors in construction, which determine the wider performance of contractors along with the relevant performance measures. Consideration of such wider performance is essential to sufficiently determine the contractor’s future performance.

Though furnishing such sensitive information to clients for securing construction projects is posing a danger, it can be overcome by not disclosing all the information and also by ensuring greater confidentiality of the information. A main hidden advantage of using a Balanced Scorecard performance measurement system in the construction organisation is that it helps management prepare documents on the factual performance of the company.

The selection of successful alliance members for the National Museum of Australia project is an example of the best-value contractor selection. The assumption governing the selection process was simply that, by having the best-qualified people involved working together with the best interests of the project uppermost in their minds, the best and most effective and appropriate solutions would emerge (Walker and Johannes, 2001). In addition to traditional requirements (cost, time and functionality), the criteria comprised ability to undertake full scope of works, ability to add value and innovation to the project, outstanding safety performance, better workplace relations, successful public relations and industry recognition, and adherence to environmental management and ecological sustainability practices. This further urged the contractors to uplift their wider
performance and maintain records of achievements to successfully secure projects. The potential alliance members who competed for the project were required to demonstrate their ability to carryout the project, meeting the above requirements by providing examples (number of examples varied for each criterion) of successful past projects. This required contenders to put considerable effort in preparing proposals to meet the selection criteria. They used existing presentation and management information resources to demonstrate their capacity. However, the research team engaged on the project observed that the contenders had not been accustomed to maintaining records that were necessary for many of the selection criteria (Walker and Johannes, 2001).

The following Figure 2.15 summarises the aspects of wider performance that are taken into account in various tender evaluation models used in the procurement of public works. It also indicates the extent of the actual consideration of the performance aspects in those models. Further, exploration of the sub-elements of the main performance aspects identified in those models reveal that the models still need to incorporate new performance measures (or indicators) to be highly effective in assessing contractors’ true performance.
### Figure 2.15: Tender Evaluation or Pre-qualification Models and the extent of wider performance considerations

<table>
<thead>
<tr>
<th>Key Determinants of Wider Performance</th>
<th>PQC (QLD Government)</th>
<th>CBPS (NSW – DPWS)</th>
<th>PASS (HK-HA)</th>
<th>CPIS (HK-HA)</th>
<th>NMA Template</th>
<th>PIPS(SHFG-DAGS/PWD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Innovation &amp; Learning</td>
<td>√ M</td>
<td>√ H</td>
<td>X</td>
<td>√ L</td>
<td>√ H</td>
<td>√ VL</td>
</tr>
<tr>
<td>2. Client Satisfaction</td>
<td>√ M</td>
<td>√ H</td>
<td>√</td>
<td>√ L</td>
<td>√ H</td>
<td>√</td>
</tr>
<tr>
<td>3. Internal Process Improvement</td>
<td>√</td>
<td>√ H</td>
<td>√</td>
<td>√</td>
<td>√ H</td>
<td>√</td>
</tr>
<tr>
<td>4. Social Responsibility &amp; Corporate Citizenship</td>
<td>√</td>
<td>√ H</td>
<td>√ L</td>
<td>√ M</td>
<td>√ H</td>
<td>√ L</td>
</tr>
<tr>
<td>5. Business Development</td>
<td>√ M</td>
<td>√ H</td>
<td>X</td>
<td>X</td>
<td>√ H</td>
<td>x</td>
</tr>
<tr>
<td>6. Financial Performance</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>X</td>
<td>√ H</td>
<td>x</td>
</tr>
</tbody>
</table>

**Abbreviations:**
- CBPS – Contractor Best Practice Scheme
- L – Low level, H – High level, M – Medium level, VL - Very low level
- CPIS – Contractor Performance Index System
- DAGS – Department of Accounting and General Services
- DPWS – Department of Public Works and Services
- HA – Housing Authority
- HK - Hong Kong
- PASS – Performance Assessment Scoring System
- PIPS – Performance Information Procurement System
- PWD – Public Works Division
- SHFG – State of Hawai Facilitites Group
- NMA - National Museum of Australia
2.1.6 Analysis of Wider Performance of Major Construction Contractors in Australia – Perceptions about Business Success

The previous sections dealt with wider performance issues of construction contractors based on literature. That literature review led to the establishment of a preliminary BSC framework, which needs to be tailored to suit the Australian construction industry. To achieve this, the perceptions of Australian contractors in regard to their business success were examined and based on their consensus opinions. A BSC framework was developed for use in the industry survey for further validation.

The following section summarises the information obtained from the review of publications of the major construction contractors in Australia. Most of the publications are from publicly listed construction companies. It is evident that these sources of information while trying to attract investment capital also give some genuine information about organisational performance. However, analysis between the publications of private and publicly listed companies reveals that publications of the private contractors also share same opinions as the publicly listed companies with regard to the level of importance of different aspects of wider performance.

Information contained in the publications of both private and publicly listed companies can be categorised under four main perspectives of long-term performance such as business development, stakeholder management, process management and innovation and learning.

2.1.6.1 Business Development Perspective

The analysis of the information revealed that majority of contractors (> 50%) do not perceive innovation, community relations, reputation and image to be much more important for their success, or pay less attention to those aspects. Not all contractors perceive factors like learning and growth, environmental sustainability, better human resource management and future plans as significantly important to achieve success.

Further, it seems to be that the majority of those contractors realise the importance of the following strategic capabilities for their sustainable future success: client and stakeholders relationships, safety and health, technology supremacy, better financial strength, learning from partners via alliance and partnering type contracts and also via acquisitions of businesses, ability to manage the risk exposure (through providing a wide
range of services, having overseas projects to off-set the recession in Australia, diversification into related businesses, getting involved in BOOT (Build, Own, Operate and Transfer) type projects to ensure a continuous stream of income), ability and willingness to provide a complete service to clients, corporate citizenship and reputation (Leighton Holdings Limited (LHL), 2000; LHL, 2001; LHL, 2001b; Clough, 2001; Transfield Services Limited (TSL), 2001).

The contractors perceive that the increasing involvement in relationship contracting (partnering and strategic alliance) is paramount, because this provides opportunities for collaborative learning for partners in terms of technology and management expertise, leading to an increase the company’s valuable knowledge base. The relationship type contracts also bring other benefits like sharing scarce resources and market knowledge, broadening competitive edge, enhancing reliability, better pricing, capitalizing on partners’ ideas, creating a culture of win-win relationships and two different groups jointly working as one entity towards their mutual goals that go beyond the traditional and often confrontational agreements (Clough, 2001; Boulderstone Hornibrook (BH), 2000; BH, 1999; TSL, 2001; Thiess, 2000).

Therefore their strategies and objectives are focused on performance improvements in these critical areas which determine the company’s business development (LHL, 2001b; Clough, 2001; BH, 2000, TSL, 2001).

Only a few contractors have stated that they have already introduced performance measures to monitor only certain performance parameters of their company (for example, safety performance) other than financial while expressing their willingness to further expanding this practice and using a BSC system to measure total business performance (Clough, 2001; TSL, 2001).

Some contractors appear to undertake project evaluations (project reviews) on their projects (especially major projects) and report the benefits of such exercise are enormous (LHL, 2001b; LHL, 2000). Contractors also perceive that providing value for money for the client by adding maximum possible value to project deliverables is crucial for success as this usually leads to repetitive business opportunities from the existing client base and also attracts new clients. According to them the generic organisational value chain comprises the following elements: innovation (in respect of procurement, technology and
construction methods), customer management processes (through service quality, understanding of clients' needs, client involvement, skilled professional services, flexibility, responsiveness, effective problem solving, better communication, complete and integrated service and adopting best practices), operational processes (IT, quality control, risk management, knowledge and skill sharing, safety and health, training, continuous improvement, cost control, greater integration of supply chain partners, environmental sustainability and industrial relations) (United Group Ltd (UGL), 2001; Thiess, 2000; LLC, 2001; TSL, 2001b; BH, 2000).

Industry leadership is perceived to be contributing to the long-term success of construction organisations through a better image among stakeholders leading to project acquisitions. According to contractors, the main aspects related to industry leaderships are: contributing to the development of the industry, introducing new technology, innovation, better environmental and safety performance and corporate governance (BH, 2000; Thiess, 2000; LHL, 1998; Clough, 2001; UGL, 2001).

Networking was not properly emphasised though there is growing evidence that networking matters a lot when it comes to business growth of contractors. Some contractors acquire comparatively larger proportion of their total workload through negotiation for which networking may contribute positively (for example, in the case of Leighton Holdings Ltd at present, around 35.96 percent of the total value of work. See LHL, 2002). However, relationship management efforts of the contractors with project stakeholders will automatically lead to networking and therefore it is an invisible part of stakeholder relationship management.

2.1.6.2 Stakeholder Relationship Management Perspective

Contractors recognise the increasing role that a wider array of stakeholders usually plays in the success of their organisation (Thiess, 2001a; LHL, 1998). According to contractors, key stakeholders include: customers, shareholders, strategic partners, subcontractors, suppliers, employees and their families, communities, government organisations, professional bodies, unions, financial institutions, media and universities. But seemingly not all contractors proactively undertake a stakeholder analysis before commencing.
construction on site in order to identify stakeholders and any potential issues that may have a greater bearing on their project outcomes.

Factors like customer acquisition and retention (repetitive business) were emphasised as being uppermost leading to business success. To acquire and retain customers contractors are required to become highly customer focused to better realise clients' needs, preferences, and their businesses.

Further, collaboration with customers to achieve the most valued results is also perceived to be important (UGL, 2001; Thiess, 2000; TSL, 2001; WCG, 2000; LLC, 2001). Continuously developing relationships and team working with project partners such as consultants, subcontractors, suppliers, specialists and alliance partners are considered fundamental to the acquisition and successful project delivery (LHL, 1998; JHL, 2000).

A majority of the contractors recognise the superior value of people assets to succeed in the construction market and therefore better people management is perceived to be an important feature in their organisation. Career development and training opportunities are available to employees (Clough, 2001; BH, 2000; Thiess, 2001a). Some contractors provide performance based incentives to their employees (LHL, 1998) and try to align their objectives with that of the employees' aspirations (Thiess, 2001a). Increased OHS&R and environmental performance of the contractors together with the community services that they provide may also have a positive impact on employees' motivation.

Most contractors are concerned about communities in which they operate because maintaining a supportive and well-informed community is crucial for successful project acquisition and delivery. The main aspects of community relations that are considered to be essential by the contractors are: providing sponsorships and donations for community programs (mostly educational and social), consulting the communities, having honest and open communication with them, and focusing on environmental performance and OHS&R (Thiess, 2001a; LHL, 2001; Clough, 2001; LHL, 2000).

These activities usually lead to the following benefits: improved management control through relationships, staying well ahead of legislation, cost savings, demonstrating environmental responsibility and building a good reputation in the community.
Contractors value their reputation and image in the industry (LHL, 2001b). The reputation and image of the contractors is likely to be governed by several factors such as: awarding of major landmark projects, customer satisfaction, compositions of their value chains, industry leadership and corporate citizenship.

To sum up, the literature review suggests that effective management of key stakeholders of a construction project is crucial for both short-term and long-term performance in the industry. In the present day context not only those who are directly involved in procurement of a project but also others (such as the wider community) have an increasing stake in a successful project acquisition and delivery. Therefore, key stakeholders should be managed proactively in order to reap enormous potential benefits. These critical issues should be considered under the stakeholder relationship management perspective in the BSC (see Figure 2.16).

2.1.6.3 Process Management Perspective

Managing the whole process of a typical project cycle is important and from a contractor’s point of view their involvement in a project usually starts from tendering and then spans throughout the construction processes until the end of the defect liability period. The literature reveals that tendering, supply chain management, risk management (cost, time, quality, workplace relations), and management of OHS&R, EMS, and IMS (Information Management Systems) are important elements in the process management endeavour of a contracting organisation. Systematic tendering and project acquisition are receiving greater attention by contractors. This is important to balance and overcome the financial pressures of competitive tendering as contractors win most of their projects by competitive bidding (Clough, 2001). Successful techniques used by contractors are: focusing on certain market types and clients (building and property, engineering and infrastructure, mining and resources, environmental and telecommunication) and geographical areas (within Australia and international), and providing alternative proposals to add value (LHL, 2002; JHL, 2000; LHL, 2000; BH, 2000).

The contractors consider management and coordination of subcontractors and suppliers and successful team work to be important for their success (JHL, 2000). Having
agreements with important suppliers and subcontractors is considered to be essential for delivering complete services with a higher level of reliability (BH, 2000). Expansion of IT networks to include online applications enabling direct and interactive dialog with those partners is also being emphasised (BH, 2000). This is very important in the business environment where creative and intelligent inputs of the partners are essentially required in a timely manner by the main contractor even in the initial bidding, planning and design stages. The need for on-line applications has become mandatory with the increase of relationship based-contracts, such as partnering, joint-ventures etc.

Effective risk management is being considered integral to the success of the contractor who is increasingly exposed to risk occurrences relating to cost, time and workplace relations. Approaches adopted by contractors to better manage risks are: pre-project planning and documentation, deploying experienced management teams, having strong financial management systems and integrated IT capabilities, conducting project audits, integrating risk prevention plans with project scheduling and internal controls, understanding OHS&R, environmental and community concerns, enhancing relationships with union and ethical conducts (LHL, 1998; BH, 2000).

There are instances where successful environmental management and community consultation undertaken on past projects led to the subsequent award of major projects (LHL, 2000).

Contractors understand the ever-increasing need to achieve better performance in OHS&R, EMS and TQM systems at present and look forward to further improving their performance in those areas (Thiess, 2001a; Clough, 2001). Contractors should see accreditations (like ISO 14000, ISO 9000) as only the first step, which should be followed by benchmarking, review and improvement (LHL, 1998).

Another important aspect of the process management is information and communication technology. Contractors believe that understanding, adapting and implementing leading edge information and communication technologies is important for the efficient and effective business operation (LHL, 1998; LHL, 2000a). Contractors understand that having integrated management systems is highly beneficial (JHL, 2000; LHL, 2001a). At present at least one contractor has succeeded in the integration of quality, safety and
environmental practices into a simplified process-based system (JHL, 2000). Such integration should be further expanded to include other systems such as management reporting and decision-making, project reviews and knowledge management and performance measurement to achieve potential results, which must be a current focus of the contractors (LHL, 2001; LHL, 2001b).

2.1.6.4 Innovation and Learning Perspective

Issues that are related to innovation and learning are seen as crucial for determining the long-term performance of a contracting company. Innovation has been a critical deliverable feature in major projects (LHL, 2001a; JHL, 2001). Contractors usually capitalise greatly on their innovativeness and organisational learning (JHL, 2000; BH, 2000). Thus, knowledge management is receiving continuous attention of the contractors and it is on the new management agenda (LLC, 2001; LHL, 2000). Contractors believe that information systems play a major role in tapping the expertise and experience of people in their organisations and thus depend more on technological infrastructure to transfer tacit into explicit knowledge (LHL, 2000b; JHL, 2000).

Top management leadership is considered to be essential for innovation and learning because there are critical top management issues that influence the knowledge management initiatives in an organisation. These issues include: investments in software and hardware infrastructure, experiments, systems, tools, human resources, education, training, knowledge acquisition and sharing, communication and integration (LHL, 2000b).

Success of innovation and learning activities is a product of a supportive culture, not merely the technological infrastructure, systems and procedures adopted by contractors (BH, 2000). However, only slight emphasis is made on encouraging people to share their knowledge with others by making their knowledge explicit, and enhancing planned social interactions and gathering (such as arranging seminars and meetings and stimulating discussions). Structured project review initiatives already taken by contractors (LHL, 2001b) are a good starting point for embarking on further knowledge management activities within organisations. These reviews should be necessarily
followed by effective analysis, documentation, and communication and sharing of information and knowledge.

At a glance when analysing published information of contractors it is evident that at present the construction industry gives greater weight to technological aspects of innovation and learning. Thus back-up support of other industries, especially information technology and manufacturing industries, is essential to drive innovation and learning in construction organisations. All these issues are addressed under innovation and learning perspective in the BSC (see Figure 2.16).
2.2 The amended Balanced Scorecard framework for Contractors

The above discussion indicates that several critical factors govern the long-term performance of construction contractors and therefore the incorporation of the above perspectives will inevitably give a wider and more comprehensive picture of contractors' performance. In order to build up a simple but comprehensive framework for the performance measurement of the contractors, critical measures/factors under each perspective can be summarised as follows:

- **Business development perspective**: Developing strategic capabilities, strategic management, performance management, industry leadership, and networking ability,

- **Stakeholder management perspective**: Client service, relationships with partners, managing employees, wider community concerns, and image and reputation building,

- **Process management**: Tendering and project acquisition, supply-chain management, risk management (cost, time and workplace relations), occupational health, safety and rehabilitation management, environmental management systems, quality assurance and quality management, and information technology and communication, and

- **Innovation and Learning perspectives**: Top management leadership, culture and environment, knowledge management initiatives (project reviews, experiments, etc.), utilising and implementing shared ideas, and lateral supports by other industries.

Kaplan and Norton (1996b) also support this kind of amendment and state that their Balanced Scorecard framework (see Figure 2.6) is only a template. Different perspectives can emerge depending on industry circumstances, organisational strategies, performance drivers, factors that create competitive advantage and breakthroughs for an organisation. Having explored the available literature with regard to new performance measurement models and critical success factors in other industries as well as specifically in construction, the following Figure 2.16 illustrates key perspectives of a wider construction performance measurement/management system (an amended BSC framework for construction).
Figure 2.16: Amended Balanced Scorecard framework for construction contractors

2.3 Conclusion

The literature review discussed new directions in the management of organisations (irrespective of the economic sectors) that encompass new management blueprints. The issues addressed in the blueprints determine the sustainable business success of an organisation.

The intellectual performance of a company is increasingly interpreted as an early warning signal of subsequent financial performance and it is rapidly becoming a very important measure of the company’s future performance. The need for having metrics to measure intellectual capital assets of a company is being highly emphasised (Liebowitz and Suen, 2000; Roos and Roos, 1997).

It has been widely accepted that measurement is the foundation of a good management practice (Love et al., 1999; Neely, 1999 and Neely et al., 1997; Thompson, 1998). Measuring the wider performance in a construction company is inevitable for effective management. Recent research conducted by DISR (2001) has found that not all contracting organisations have measures, either qualitative or quantitative, in order to monitor and improve emerging performance parameters such as innovation, despite its importance.
The publications of the contractors clearly indicate that the contractors understand there is a need for measuring their wider performance. The present measurement systems only focus on easily measurable aspects of performance (e.g. lost free working hours, number of defects, etc.) and neglect the rest that have greater impact on their long-term performance, especially most of the aspects falling under stakeholder management, and innovation and learning perspectives.

The available tender evaluation and/or pre-qualification models of contractors help identifying essential performance measures. But they do not adequately cover all essential performance measures. On the other hand, evolving value-based tender selection criteria (non-lowest-tender price selection criteria) also appear to demand a wider performance measurement and management system to be adopted in contracting organisations to successfully secure construction projects. Hence, having a wider performance measurement framework is necessary more than ever before to help contracting organisations sustain long-term performance in the industry. This performance measurement framework can be utilised to successfully assess contractors' performance at both pre-qualification and tender evaluation stages.

The Balanced Scorecard (BSC) system is found to be effective in fulfilling the requirements of the new management era while at the same time it has higher potential for becoming an overall management system in the construction industry.

To make it appropriate to use in construction, the perspectives of the Balanced Scorecard should be tailored considering the most important critical success factors specifically to the construction industry. The analysis of the available literature revealed that due to the nature of the construction business the incorporation of four major performance parameters, namely business development, process management, stakeholder management, and innovation and learning (see Figure 2.16), would be appropriate to measure long-term performance in the construction industry. After validation, the amended BSC model will be appropriate to measure the progress of contractors in pursuit of their objectives or the best practices and to create a framework for continuous improvement in their organisations.
Having introduced a preliminary Balanced Scorecard framework for contracting organisations based on a focused literature review and which was subsequently supported by the perceptions of the Australian contractors, it is now possible to report on the design of the relevant industrial survey. The industrial survey was aimed at achieving the research objectives as mentioned in Chapter 1. Chapter 3 initially deals with the research methodology and moves on to analyse the responses obtained through the industry survey.
CHAPTER 3

RESEARCH METHOD AND ANALYSIS OF INDUSTRY RESPONSES

3.1 Research Methods and Rationale for the Selection

3.1.1 Introduction to Research Methods

A review of the literature revealed that there is an array of quantitative and qualitative research methods that can be used in construction related research. The selection of an appropriate method to be used depends on the objectives of the research as well as the research design. Selection of each method will have an impact on the manner in which the data are collected, analysed, interpreted and presented.

Quantitative research methods involve consideration of the size and magnitude of the survey group and are perceived as being more analytical and having scientific features compared to qualitative methods. Structured interviews, structured surveys, experiments, empirical studies and statistical analyses, are all synonymous with quantitative research methods (adapted from Holt, 1997). In contrast, a qualitative research method utilises subjective methods very often based on personal opinion, perception, or feeling. Process observation, opinion or expression, unstructured interviews and open question surveys are common qualitative research methods. There are arguments both objecting and also supporting the qualitative approach.

Hall (1998) citing Seymour and Rooke (1995) argues that traditionally in construction management research the scientific approach has dominated but with the shortfall of not taking the human element into account.

All problems that are faced by the construction industry are social in nature, thereby making scientific approaches totally inappropriate in their application to construction related research. Hall (1998) calls for a balanced approach in the selection of research method. In this research a balanced approach was adopted as the best way to achieve research objectives.
3.1.2 Design of Research Instrument and Data Collection

This research primarily deals with the measurement of the wider performance of construction contractors. The research method used for the data collection was a mixture of literature review (see Road Map of the Literature Review on page 10 for details) and face-to-face meetings with respondents to undertake a survey using a standard questionnaire (see Appendix C). The former was essential for the purpose of establishing the research background and developing a research instrument in the form of a questionnaire and the latter was to enable collection of valid data for further analysis.

3.1.2.1 Questionnaire Design and Survey

3.1.2.1.1 The Design of the Survey Instrument

The survey instrument was based on the Construction Industry Development Agency practitioner’s guide for best practice (CIDA, 1993). A survey employing a structured questionnaire was carried out among construction managers and client representatives who were considered to be knowledgeable and experienced from the industry participants’ point of view to achieve the research objectives.

The contractors’ questionnaire commenced with requesting the respondents to provide their contact information (see Appendix C1). An illustrative model of the proposed performance measurement system was provided, indicating the main Balanced Scorecard perspectives based on the preliminary BSC framework derived through the literature review.

For each of the four main perspectives, a brief description was provided. Under each perspective, five main issues relating to the wider performance parameters were identified. At the start a simple explanation was given about each of the five issues. Then the respondents were asked (Question 1) to rate their personal opinions of how desirable that they thought the issue in question should be used as value-based selection criteria for construction contractors.

The scale was in a range from 1 = very undesirable to 5 = very desirable. In other words, they were asked to indicate their perceptions about the relative importance of each of the performance issues.
The respondents were also asked (Question 2) to indicate the degree of difficulty that they would expect when obtaining evidence to substantiate their response (to the current way in which their organisation responded to issues described in each question). The scale ranged from 1 = very difficult to 5 = very easy.

Next, the respondents were provided with four descriptions (Levels A to D where, A was a traditional practice in respect of the particular subelement and D was the industry best practice) each question describing how their organisation might be currently performing and then asked (Question 3) to indicate only the description that most suited their current organisational performance (C). At the same time, they were also asked to indicate how they would prefer to see their organisation perform in the future (within two to three years) by selecting a preferred scenario (P) out of the same four descriptions (Levels A to D).

An example was illustrated to assist the respondents in answering each of the above questions.

In contrast, the questionnaire for clients (See Appendix C2) was similar to that of the contractors’, except it sought only the client representatives’ desirability of the issues being adopted for value-based selection criteria for construction tendering (Question 1 in the contractors’ questionnaire). They were also asked to select a best-suited performance split between contractors’ tender price and their wider performance to be used in a best-value contractor selection model in Australia.

3.1.2.1.2 Data Analysis Methods

Relative Importance Index (RII)

For the quantitative analysis of responses for Questions 1 and 2, the relative important index (RII) method previously used by Kumaraswamy and Chan (1998) was used.

The main reasons for selecting the RII were that:

1. It is frequently used in construction related research for analysis of data of similar nature (especially data type and size) and hence easy to interpret and understand the research results.
2. Secondly, the calculation of RII was a prerequisite in facilitating the ranking of critical
wider performance issues in the value-based contractor selection criteria and also necessary
in the development of a template to use in the value-based contractor selection as set out in
the research objectives.

The RII was computed using the following formula:

\[
\text{RII} = \frac{\Sigma W}{A \times N}
\]

Where \( W \) = weighting or rating as assigned by each respondent in a range from 1 to 5, \( A \) = the
highest weight (in this case = 5), and \( N \) = the total number in the sample.

Gap Analysis

Guidance given in CIDA (1993) on carrying out a gap analysis was followed for the combined
analysis (slightly to be on the side of a qualitative approach) of the responses for Questions 1 and 3
in the contractors’ questionnaire. The reason for selecting the gap analysis method was to
accommodate more interpretation of the research results (as set out below) by following a well
guided approach to performance measurement.

The responses to Questions 1 and 3 can be used to infer two key factors that, while indicating the
existence of any performance gap, would also lead to the changes in the methods of current
performance evaluations. Those factors are:

1. The level of significance of each wider performance measurement when evaluating
contractors or awarding projects, and
2. The participants’ dissatisfaction with the way the construction contractors’ performance is
assessed or their tenders are currently evaluated.
Chapter 3: Research Method and Research Results

The level of understanding of the significance of the particular issue of the wider performance can be inferred from a combination of the future score (P) and the relative importance score (RII) for the wider performance issue given by the respondents (by multiplying the RII of each issue by its P score). A relatively high score for each would indicate that there is a high perceived need for the consideration of that particular issue in contractors' evaluation and need for considering the issue in construction business activities by a contracting organisation. On the other hand, a combination of low scores for P and RII would tend to indicate a relatively low level of need for the incorporation of the particular performance issue in the performance measurement or evaluation of the contractors.

The level of dissatisfaction about their own performance can also be inferred from the difference between the future score (P) and current score (C).

The responses of the contractors for Question 3 would also indicate the actual status of their wider performance as against the industry best practice. When cumulated, this would lead to a health check (in a macro view) through the better appreciation of the true wider performance of the contractors. A gap analysis can also be done to identify the areas that need immediate attention to enable the development of action plan recommendations.

3.1.3 Rationale for the Research Design

3.1.3.1 Rationale for the Selection of the one-to-one Questionnaire Survey

The rationale behind the selection of the one-to-one questionnaire survey is that it has the following advantages:

1. It would enhance the communication between the researcher and the respondents, and also facilitate the further clarification of issues raised in the questionnaire to ensure the validity of the data;
2. It would increase the response rate and also the reliability of getting data within the specified time frame; and
3. It would provide the opportunity to further discuss the matters in relation to performance measurement and management and the value-based criteria for selection of construction tendering.
3.1.3.2 Rationale for changing the format of CIDA's Research Instrument

The design of the research instrument used in this research slightly differs from the original design as proposed by CIDA (1993) to guide effective strategic management activities towards achieving best practice in construction enterprises.

The main differences between the data collection and analysis methods and reasons for such changes are as follows:

CIDA (1993) provides two methods to derive strategic management of performance in construction enterprises. The first method deals with identifying the necessary scope of change and provides an indication to managers of the possible sequence (five levels were identified) of progress towards the best practice of each management imperative to assist managers in those enterprises. The second method helps managers to diagnose the current situation by measuring two aspects such as the level of management readiness and the extent of the progress of the enterprise towards strategic management best practices.

However, in this particular research those two methods employed in the CIDA research and explained in the CIDA guide (CIDA, 1993), were combined to make it easy for respondents to answer the questions while trying to achieve the same research output.

The five levels of progress identified in the CIDA guide range from the initial ‘awareness’ (of the need) level to the ‘robustness’ level. At the awareness level the enterprises accepts the need for change and implements initiatives whereas at the robustness level the enterprise looks to continuously question its current way of doing things to arrive at fundamentally better ways (sustaining best practice and forming a leading edge). In this particular research instrument only four levels (A-D) with a description of each level were used. It was based on the following valid perceptions:

All mid-size construction companies are above the moderate level in respect of the awareness of the best practices. This assumption can be substantiated by the content analysis of the contractors' publications (and can also be substantiated on the basis of the argument put forth by CIDA (1993))
after deletion of the uninformed level). The reduction of five levels in CIDA’s guide to four levels in this research instrument is necessary because of the problems associated with classifying the relevant milestones (descriptions under each level) under the respective sequence of progress identified in the CIDA guide.

As a result, the sequence of progress in five levels identified in the CIDA guide was ignored and four levels (A-D) were introduced in the new model. It is to be noted that, in the design of this particular research instrument, the directions given in the CIDA guide about the sequence of progress of an enterprise in its journey towards best practice have to be considered merely as guidelines. The purposes of the two researches are totally different. The guidelines given in the CIDA guide are not hard and fast rules to carry out the same sort of research instrument design, data collection or analysis.

In addition, CIDA (1993) used a nine (9) point scoring scale with only two extreme statements to diagnose the current situation whereas in this research design the four levels (A-D) are more like a four point scale with a description for each level.

In this research the four levels (thus four point scale) was used to pinpoint exactly where the contractors are at present and where they want to be in the future in respect of their wider performance. This also makes it possible to clearly understand what the respondents actually thought of when proving their ratings on any levels, which was not possible with the CIDA approach.

The following section reports on the results of the face-to-face industry survey conducted with 34 respondents in Victoria, Australia. The survey commenced in January 2002 and ended in February 2003 (14 months duration). Though the respondents were based in Victoria, their professional practices in the industry not confined only to Victoria. Both the consultants and contractors undertake projects all over Australia. The respondents have a minimum of 10 years industry experience and are employed in senior managerial positions in consultant and contracting organizations. The managers (27 numbers) from consulting organizations have different professional background, such as project management, architecture, quantity surveying, engineering etc. They are engaged in both public and private sector projects in Victoria. They were
selected through referral from leading practitioners. On the other hand, the contractors whose senior representatives participated in the research have similar attributes as discussed in the section 2.1.6 in Chapter 2. Of the seven (7) contractors, three of them have international projects. All of them are engaged in different types of procurement methods, ranging from traditional measure and pay to new relationship-based contracts. A majority of the contracts are for the procurement of building and civil engineering projects.

3.2 Research Findings

3.2.1 Analysis of the Overall Research Findings and Discussion

Initially the analysis of responses regarding the BSC performance measures as the best-value contractor selection criteria has been completed (see Table 3.1) using the relative important index system. For this purpose, the data collected from both clients’ representatives and contractors have been used. This analysis indicates which performance measures are significantly important for the benefit of clients as well as the contractors. Thus those critical performance issues should be incorporated into a Balanced Scorecard framework for a contracting organization and can be used in the best-value contractor selection method in order to boost wider performance in the construction industry.

All respondents accepted the Balanced Scorecard framework used in the questionnaire as appropriate and commented positively about its coverage of essential performance measures in construction organisations. Respondents also pointed out that it is important to incorporate the financial performance measures into the Balanced Scorecard. During discussion they accepted that this financial information is readily available in construction organizations through accounting functions already in place. They realise that what is lacking is the availability of other performance information that this particular research is set to explore and analyse. A complete Balanced Scorecard framework of a construction organization should comprise appropriate financial measures widely used in company accounting, as indicated in the earlier literature review, in order to use it as a comprehensive overall management framework. The following section reports on the analysis of overall research findings on the Balanced Scorecard performance measurement framework.
<table>
<thead>
<tr>
<th>Balanced Scorecard Perspectives and Relevant Sub-Elements</th>
<th>RII</th>
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<tbody>
<tr>
<td><strong>1.0 Business Development Perspective</strong></td>
<td></td>
</tr>
<tr>
<td>1.1 Ability to develop strategic capabilities</td>
<td>0.66</td>
</tr>
<tr>
<td>1.2 Ability to manage strategies</td>
<td>0.74</td>
</tr>
<tr>
<td>1.3 Use of performance measurement systems</td>
<td>0.79</td>
</tr>
<tr>
<td>1.4 Industry leadership in providing value</td>
<td>0.88</td>
</tr>
<tr>
<td>1.5 Level of networking with stakeholders</td>
<td>0.68</td>
</tr>
<tr>
<td><strong>2.0 Stakeholder Management Perspective</strong></td>
<td>0.78</td>
</tr>
<tr>
<td>2.1 Client focus when attempting to deliver a project</td>
<td>0.90</td>
</tr>
<tr>
<td>2.2 Being a preferred team partner</td>
<td>0.86</td>
</tr>
<tr>
<td>2.3 Ability to manage own employees</td>
<td>0.76</td>
</tr>
<tr>
<td>2.4 Ability to address wider community concerns</td>
<td>0.68</td>
</tr>
<tr>
<td>2.5 Ability to build image and reputation</td>
<td>0.69</td>
</tr>
<tr>
<td><strong>3.0 Process Management Perspective</strong></td>
<td>0.79</td>
</tr>
<tr>
<td>3.1 Responsive tendering practices</td>
<td>0.87</td>
</tr>
<tr>
<td>3.2 Management of and integration with supply chain partners</td>
<td>0.78</td>
</tr>
<tr>
<td>3.3 Adoption of proactive and continuous risk management practices</td>
<td>0.85</td>
</tr>
<tr>
<td>3.4 Ability to provide supportive working environment (OHS&amp;R, EMS, QA and QM practices)</td>
<td>0.74</td>
</tr>
<tr>
<td>3.5 Level of information technology infrastructure</td>
<td>0.71</td>
</tr>
<tr>
<td><strong>4.0 Innovation and Learning Perspective</strong></td>
<td>0.70</td>
</tr>
<tr>
<td>4.1 Top management support for innovation and learning</td>
<td>0.67</td>
</tr>
<tr>
<td>4.2 Availability of appropriate culture and environment (social infrastructure) for innovation and learning to occur</td>
<td>0.72</td>
</tr>
<tr>
<td>4.3 Knowledge management initiatives under way</td>
<td>0.69</td>
</tr>
<tr>
<td>4.4 Level of utilisation and implementation of shared ideas</td>
<td>0.72</td>
</tr>
<tr>
<td>4.5 Availability of lateral support from other industries</td>
<td>0.68</td>
</tr>
</tbody>
</table>

Table 3.1: Balanced Scorecard performance measures as best-value contractor selection criteria (see Appendix D for more elaborated information)
In Table 3.1 the relative importance indices of each sub-element reveals the importance of measuring the particular performance issue. The average relative importance index of all five sub-elements of the main perspective has been considered as the relative importance index of the particular main perspective. This information obtained through the survey is important to undertake an exercise on ranking of construction contractors based on their wider performance. Table 3.1 facilitates a quick and thoughtful decision making process in contractor selection based on their wider performance known as ‘value-based contractor selection’.

In the absence of such information it will be very difficult to decide on the priority level of each performance issue against another as it was reported in the case of contractor selection on the National Museum of Australia project (Walker, 2001). This is primarily because there are several important performance issues to be considered. Every contractor has a different set of capabilities, which makes it impossible to give a performance score to a contractor without knowing the importance of each performance issue compared to others and arrive at a final decision.

On the other hand, when a contractor has to make a decision on investing in one of the available development programs for performance improvement, the above information can be effectively used to make a reasonable and thoughtful decision as it helps understand the level of importance of each performance issue and thus development programs in relation to one another.

3.2.1.1 Discussion on Balanced Scorecard Performance Measurement Results and Value-based Contractor Selection

For the purpose of defining the level of importance of each of the four perspective measurements and the relevant sub-elements the following scale is used. The RII below 0.50 is below median level of importance, the RII between 0.50 and 0.75 is moderate level of importance, RII between 0.75 and 0.90 is high level of importance and RII above 0.90 is considered to be extreme level of importance. It has been revealed from Table 3.1 that the respondents believe that the performance measures under Process Management Perspective of the contractors are relatively more important than the others (the average RII is 0.79). Relatively, high ratings are given to the elements such as responsive tender (RII is 0.87), proactive and continuous risk management practices (RII is 0.85), and effective management and integration of supply chain partners (RII is 0.78).
The elements such as the ability of the contractors to provide a supportive working environment (RII is 0.74) and level of the Information and Communication Technology (ICT) use (RII is 0.71) in the company is considered to be not important compared to the other three elements mentioned above.

One client’s representative pointed out that, in the value-based contractor selection model, if consultants are to give a weighting against a contractor’s performance with regard to risk management, they can give only a lesser rating, because consultants would measure (or take into account) that performance again when giving a weighting for the contractors’ tender prices. As the tender price is supposed to include a margin for the risks involved in the project’s execution, the risk management ability of the contractors will be automatically taken in to account by the consultants when considering their tender prices. Although this is a valid point, the capability of the contractors in managing unexpected risks (which are difficult to predict) should be taken into account and thus the risk management element should be included under the contractors’ Balanced Scorecard performance measurement framework and also in the value-based contractor selection model. Another respondent mentioned that ‘if other processes like supply chain management, OHS&R, EMS, QM, etc. are managed effectively the risk exposure to construction projects or organisations can be minimized dramatically’. Therefore, relative weighting for risk management can be brought down in the contractors’ Balanced Scorecard framework or value-based contractor selection model.

Again in tender evaluation, if the performance of a contractor with regard to OHS&R, EMS, QA and QM aspects are measured and considered, then the risk management performance can be given less weighting. But the need for scenario planning was emphasized. In one case, a contractor mentioned that scenario planning is done at site level, not at the head-office level in his organisation.

Secondly, the Stakeholder Management Perspective measurement was considered to be next most important by the majority of the respondents (the average RII is 0.78). Among the measures of effective stakeholder management practices of the contractor, the following three are considered to be more important: better client focus in providing services (RII is 0.90), being a preferred project team partner (RII is 0.86), and ability to manage own employees (RII is 0.76). The issues such as
ability to address wider community concerns (RII is 0.68) and the level of image and reputation building (RII is 0.69) have received moderate importance ratings.

The majority of the respondents had the opinion that better client service and managing project team partners were very important for smooth flow of work. Thus, the client’s decision on the selection of the contractor is influenced by the contractor’s past performance in this regard. One respondent stated that he selects people who are easy to work with based on his past experience with the organization. That ensures that other parties such as clients and other consultants also would find it easy to work with that particular contractor.

When providing responses in relation to measuring a contractor’s performance with regard to management of employees, one respondent noted that it is very difficult to give a rating for this aspect at the tender evaluation stage unless the consultants have a long-term relationship with the particular contractor. However, several respondents highlighted this performance aspect as essential in the building industry in Victoria.

When it comes to wider community concerns, one respondent mentioned that at the tender evaluation stage he takes into account the relationship of the contractor with whom they deal frequently in their day-to-day business (close neighbors such as authorities, community groups in close proximity, labourers, etc.) rather than the community at large.

Thirdly, contractor’s Business Development Perspective measurement was considered to be highly important (the average RII is 0.75) by the representatives of both client and contractors. It was evident that this response was given by the surveyed contractors in order to make the value-based tender evaluation model work in practice rather than to indicate the critical measures of their company’s performance. The reason is that the majority of the contractors commented positively on the importance of the measures under this perspective measurement. The measures relating to best practices such as providing value management services as part of the service delivery (RII is 0.88) and performance measurement and management of the company (RII is 0.79) are considered to be highly important and strategic management (RII is 0.74) is considered to be moderately important. It can be stated that the aspects under these perspectives such as strategic capability development, strategic management and networking are highly beneficial to the contractor’s development.
According to the client’s representatives these aspects of performance, while contributing to business development of the contractors, also add value to the projects that those contractors undertake. Clients with a continuous stream of work get high benefits through improvement in the contractor’s performance under this perspective measurement compared to one-off clients, because the enormous benefits of this performance improvement on project performance are not immediate.

Respondents pointed out that by emphasizing more on performance aspects under business development perspective, a contracting organization could ensure the strategic direction of their organization. Then attention should be given to maintaining better performance at project level. But better performance under this perspective is not wholly enough for long-term success. Performance under other main perspectives should be simultaneously improved in order to achieve sustainable performance improvement and business success.

Two respondents noted that if a contractor is good at managing their business strategies they would be able to implement and manage better procurement strategies on individual projects and also help clients achieve their objectives.

The majority of the respondents had the opinion that performance measurement is a must as it measures the effectiveness or performance of the strategies already in place and it should be carried out regularly in every organization. They also mentioned that it is rarely done in practice. Each construction organization has a set of strategic objectives to be achieved, but progress towards the achievement is very rarely measured. If the measurement is not properly done, there is no point having an effective business strategy or direction for any organization, one respondent asserted.

The research has revealed that the industry values the contractors’ performance in respect of value management and it expects the contractors to come up with their own suggestions to improve the value in constructed facilities. This performance also differentiates a contractor from other rivals leading to project acquisitions. Thus value management is one of the very important performance aspects and the ability of a contractor in providing value outcomes in project procurement should be measured. As this performance is project specific, that should be given a higher weighting at the tender evaluation stage.
Finally, respondents have highly emphasized networking as a means to win projects repeatedly from an existing client base. It brings other benefits to contractors’ organizations such as access to updated market knowledge and market opportunities and name recognition.

Finally, the *Innovation and Learning Perspective* (the average RII is 0.70) measurement was considered to be the lowest priority among the main four perspective measurements. Clients’ representatives perceive that innovation and learning performance is difficult to measure and accurately quantify when compared to other perspectives. Higher performance in respect of innovation and learning is expected of the contractors specifically for large projects and thus innovation and learning performance do not need to carry more weighting in the tender selection criteria under all circumstances. The responses obtained in relation to the measures and also follow-up discussions revealed that the industry realises the present need for measuring the actual performance with regard to innovation and learning aspects in contractors’ organisations. Appropriate culture and environment (RII is 0.72), and the utilisation of shared ideas (RII is 0.72) are considered to be moderately important for innovation and learning to flourish in contractors’ organisations. It is interesting to note from the above responses that innovation and learning in construction is perceived to be more socially oriented than something that is technologically driven (for example, using communities of practice as an appropriate initiative rather than using knowledge management (KM) hardware to transfer knowledge within a construction organisation).

All respondents agreed that innovation and learning initiatives could add enormous value to the contractors if there is a proper mechanism to manage knowledge in their organisations. They strongly believe in a social system as a firm base for effective knowledge management functions as most construction knowledge resides in the employees’ minds rather than in company systems.

It can be stated that KM requires an atmosphere that makes it easy for the workers to capture, analyse, transfer and share knowledge with other workers. This is possible with strong social networking among employees conducive to knowledge management functions. This will be further discussed in the following chapter.
Overall responses revealed that the survey participants gave more weighting to not only contractor process management capabilities but also to stakeholder management ability and innovation and earning performance. Innovation and continuous learning have become more important in the present day business context.

The clients’ representatives with the vision of future development (long-term view) of the industry as implied during the discussion responded more positively to the measures under the business development perspective and innovation and learning than short-term oriented ones (for example, those who were highly concerned about cost of the initiatives such as image and reputation building, developing and piloting KM hardware and their effect on contractors’ bid price). When it comes to the Balanced Scorecard framework for contractors, all industry participants responded positively about these measures and highly supported the need for having appropriate sub-measures in order to capture a comprehensive picture about the progress of an organization in relation to stakeholder management and innovation and learning performance. In response to that need and also to make the above Balanced Scorecard model operational, it is necessary to design an appropriate database that can be used to collect data relevant to each sub-element of the model. The next chapter will deal with the proposal of designing and maintaining a database comprising critical performance metrics that would track a company’s wider performance in relation to all five main Balanced Scorecard perspectives (including financial performance).

According to the research objectives, at this stage, a Balanced Scorecard (BSC) performance measurement framework has been designed and validated and also relative importance indices of the main BSC perspectives and their sub-elements have been found (see Table 3.1). One of the main objectives of the research is to measure actual performance of contractors to understand the actual status of their wider performance using the developed Balanced Scorecard measurement framework. The measurement carried out and reported in the subsequent section will help contractors to understand how to approach performance measurement, how to practically measure wider performance and also how to use the information obtained through measurement to enhance company performance. The following section reports on the analysis of responses obtained from seven contractors (denoted as C1 to C7 in the analysis) with regard to their own performance.
### 3.2.2 Analysis of Contractors’ Responses

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C= Current performance level, P= Preferred performance level, DS= Dissatisfaction level (DS = P – C), I = Importance level (equal to the level of desirability expressed by the respondents) and PS = Perceived significance level (PS = P x I). Avg. = Average

**Table 3.2:** Summary of Contractors’ Responses

To coincide with the A-D levels identified in the questionnaire for measuring the wider performance of contractors, in the above table a 1 to 4 measurement scale is used to explain the contractors’ current and preferred levels of performance.
And where the contractor’s current performance was in between two levels as shown in the illustrative example in filling the questionnaire, the contractor was given full-points only when he fulfilled all the requirements under the particular level. For an example, where a contractor indicates C (where C indicates Current performance Level) under performance level D, he was given only 3 points on the 1-4 scale and thus considered only fulfilling the requirements under performance level C.

According to CIDA (1993), the level of contractors’ dissatisfaction in regard to performance issues under the above sub-elements can be inferred from current level (C) and preferred level (P) of performance. That is, dissatisfaction = preferred performance - current performance (\(DS = P - C\)). A 1 to 5 scale is used to indicate the level of importance (I) of each sub-element of the main perspective measurement for best-value contractor selection.

Table 3.2 provides some useful indication about the wider performance in the construction industry. The current level of contractors’ wider performance can be illustrated using the average responses provided under C (current performance level).

![Figure 3.1: Contractors’ Current Performance Level](image)

*Managing Construction Business Performance – Effective Use of a Balanced Scorecard Approach*
From the above Figure 3.1 it can be stated that, while the business development and process management perspectives are quite strong (both received rating of approximately 3 out of 4), stakeholder management and innovation and learning perspectives clearly have more room for improvement.

The following section further analyses each of the above perspectives and also responses of the seven surveyed contractors separately. The Current performance levels indicated in the Figures 3.2, 3.3, 3.4 and 3.5 directly reflect the respective contractors’ responses given in the questionnaire.

### 3.2.2.1 Business Development Perspective

#### 1.1 Performance Issue: Strategic Capability Development

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#### 1.2 Performance Issue: Proactive Strategic Management

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1.3 Performance Issue: Performance Measurement and Management

1.4 Performance Issue: Delivering Value for Money

1.5 Performance Issue: Networking

Figure 3.2: Contractors’ responses regarding business development perspective

Current level of contractors’ performance (C)

The respondents expressed that their current level of performance in regard to the business development perspective is moderate (receiving an average of 3 points out of 4). Under this perspective their performance is high in respect of value for money, strategic management and performance measurement and management, and comparatively low in respect of strategic capability development and networking with the industry partners.
Preference for future focus (P)

Business development is identified as the most important performance area for future focus. According to the respondents, all performance issues under this perspective need to be the focus in the future, with specifically more attention given to the issues such as value for money, strategic management and performance measurement and management in the future.

Dissatisfaction with present performance (DS = P-C)

The respondents are slightly satisfied with the performance of their organization with regard to business development, compared to other perspectives. However, it is revealed from the analysis that to a certain extent contractors are not satisfied with the performance of their organisation in relation to strategic capability development and also proactive strategic management.

Perceived significance (PS = P x I)

The business development is ranked third in the perceived significance rating. The sub-elements, such as delivering value for money and performance measurement and management are perceived to be more important than other issues.

Availability of evidence to substantiate the current level of performance

As there were only 7 contractors, analysis under this heading (also under the next three perspectives) is of qualitative nature and data was obtained directly from the questionnaire survey and follow up interviews. Representatives of companies C1, C3 and C5 stated they had evidence to substantiate their current level of performance with regard to all issues, whereas representatives of C2, C4, C6 and C7 indicated that it is quite difficult for them to provide evidence in respect of strategic management and strategic capability development practices. However, this performance can be revealed through available management information such as strategic management reports and program reports.

Other results

In addition, company C5 revealed that it has a set of key performance indicators (KPIs) to measure the performance of their estimating division and a reward system also in place to encourage the top performers.
This system could be extended to measure the company’s performance in all core business processes.

The representative of the company mentioned that more than 25 percent of the projects that C5 undertakes usually come through the company’s networking partners.

Not all surveyed contractors perceive networking as the most important factor for their business development. Hence it is clear that a critical Balanced Scorecard framework will differ from one organisation to another depending on their business strategy and perceptions about business success.

3.2.2.2 Stakeholder Management Perspective

2.1 Performance Issue: Client Service

![Graph showing performance levels for client service across different companies.]

2.2 Performance Issue: Delivering Value for Money

![Graph showing performance levels for delivering value for money across different companies.]

Managing Construction Business Performance – Effective Use of a Balanced Scorecard Approach
2.3 Performance Issue: Managing Employees

2.4 Performance Issue: Wider Community Concerns

2.5 Performance Issue: Image and Reputation Building

Figure 3.3: Contractors’ responses regarding stakeholder management perspective

Current level of contractors’ performance (C)

According to respondents their current level of performance in regard to stakeholder management is average (receiving an average of 2.5 points out of 4). Under this perspective their performance is slightly high in respect of client service and wider community concerns, and comparatively low in respect of managing project team partners, employees, and image and reputation building.
Preference for future focus \((P)\)

Stakeholder management is identified as the second important perspective for future focus. According to the respondents, sub-elements under this perspective need to be the future focus, with specifically more attention given to client service and wider community concerns in the future. The present level of emphasis is likely to continue in the future (refer to current level of contractors’ performance).

Dissatisfaction with present performance \((DS= P-C)\)

The respondents are highly dissatisfied with the performance of their organization with regard to stakeholder management, compared to other perspectives. It is revealed from the analysis that they are not satisfied with employee management issues as well as issues that are related to management of partners and image and reputation building. Though these issues received low \(P\) (preference for future focus) rating, they are critical for both short-term and long-term success of contracting organizations.

Perceived significance \((PS= P \times I)\)

Stakeholder management is ranked second in the perceived significance rating. The performance issue of client service (along with responsive tendering) received the highest rating in the overall Balanced Scorecard framework. The issue of managing project team partners is also perceived to be more important than the rest of the issues.

Availability of evidence to substantiate the current level of performance

Representatives of C1, C2, C3, C5 and C7 stated they had evidence to substantiate their current level of performance with regard to all issues whereas representatives of C4 and C6 indicated that it is difficult for them to provide evidence in respect of client focus, management of project team partners, and image and reputation building. However, this evidence can be obtained from testimonials or references from the past clients, project team partners and community groups with first hand knowledge of the contractors.
Other results

Company C5 pointed out that it usually deploys a team to undertake a defect survey on buildings before handing over of the constructed facilities to its clients. This process ensures that the defects are fixed in advance before even the clients become aware of those defects.

Company C5 also pointed out that it tries to listen to its project team partners well and this enables it to incorporate their valuable ideas into its methods of project execution.

It was stated that the acquisition of main subcontractors works well when they have a long-term relationship (say, over 10 years) with those subcontractors before acquisition.

They face problems after acquisition of sub-contractors, especially pertaining to time and cost, where they had only a short-term relationship.

The representative of C5 indicated that the company could make enormous savings by working on the creative ideas that its supply chain put forward and in some cases such savings are shared among the contractor, client and the supply chain partner who has put forth that idea. It is very difficult for C5 to introduce and run an integrated system with sub-contractors and suppliers without their co-operation. Though it had the idea of transmitting drawings electronically and all other details for pricing to some subcontractors, it had to give up that initiative as the subcontractors are not equipped to receive those documents electronically and carry out pricing.

The estimators at those organizations are not familiar with the computer applications and they are reluctant to use a new system. They prefer to work with traditional systems because they think that they can reduce the emergence of any new problems arising out of new systems of working and also feel more comfortable when using an old system.

According to its representative, C5 is about to introduce an intranet system to enhance internal communication and integration. It was indicated that it places more emphasis on wider community aspects, because not only does it contribute to the smooth flow of work, but also it develops the company’s image and reputation. It was interesting to note that in some contracts undertaken by C5, the defect liability period was 7 years and the contract also required the contractor to do post-project evaluations. According to the respondent, that has a greater impact on their reputation in the industry.
3.2.2.3 Process Management Perspective

3.1 Performance Issue: Responsive Tendering

3.2 Performance Issue: Supply Chain Management

3.3 Performance Issue: Risk Management
3.4 Performance Issue: OHS&R, EMS, QA, QM, etc.

3.5 Performance Issue: Information and Communication Technology

Figure 3.4: Contractors’ responses regarding process management perspective

Current level of contractors’ performance (C)

The respondents stated that their current level of performance in regard to this perspective is moderate (receiving an average of 2.9 points out of 4). Under this perspective their performance is slightly high in respect of responsive tendering, supply chain management and OHS&R, EMS, QA and QM, and comparatively low in respect of risk management and information and communication technology.

Preference for future focus (P)

Process management is identified as the most important sub-element, along with business development, for future focus. According to the respondents, a focused attention should be given to all sub-elements under this perspective in the future.
Dissatisfaction with present performance (DS= P - C)

The respondents were slightly dissatisfied with the performance of their organization in regard to process management, compared to other perspectives. It is revealed from the analysis that they are not satisfied with the issues that are related to risk management and information and communication technology.

Perceived significance (PS= P x I)

Process management is ranked first in perceived significance rating with responsive tendering and client service having the highest rating in the overall Balanced Scorecard framework.

Availability of evidence to substantiate the current level of performance

Most of the contractors' representatives stated they had evidence to substantiate their current level of performance with regard to all issues, except for representative of C6 who indicated that it is slightly difficult for the company to provide evidence with respect to supply chain management and risk management. However, this evidence can be obtained from references from supply chain partners and by looking at the past track record of the contractor.

Other results

Company C5 revealed that it gets its site managers, sub-contractors and suppliers involved in the estimating process where higher input from those who have been involved in similar types of projects and/or who are also most likely to be involved in the execution of the project in question is required. In addition, the estimating division frequently updates knowledge through formal and regular contacts with site staff. This interaction is very high, especially when the contractor is developing the detailed designs from the preliminary sketches.

Company C5's representative accepted that its tendering policy changes from time to time depending on the availability of projects. At a point in time they meet the profile under level D whereas they may or may not meet the scenario under level B in the questionnaire (see Issue 3.1 in Appendix C1).
Company C7’s representative managing engineering works pointed out that there is an increasing awareness among clients in OH&S issues with some projects being assessed on their lost time injury rates. In addition, environmental and community related issues are playing an increasingly important role in any major project acquisition and delivery strategy.

3.2.2.4 Innovation and Learning

4.1 Performance Issue: Top Management Leadership

![Bar chart showing performance levels for different companies.]

4.2 Performance Issue: KM Culture and Environment

![Bar chart showing performance levels for different companies.]

4.3 Performance Issue: KM Initiatives

![Bar chart showing performance levels for different companies.]
4.4 Performance Issue: Implementing Shared Ideas

Figure 3.5: Contractors’ responses regarding innovation and learning perspective

Current level of contractors’ performance (C)

The respondents stated that their current level of performance under this perspective is average (receiving an average of 2.5 points out of 4). Under this perspective their performance is relatively high in respect of top management leadership and implementing shared ideas, moderate for lateral support and culture and environment, and comparatively low in respect of knowledge management initiatives.

Preference for future focus (P)

Innovation and learning was identified as the second most important performance area, along with stakeholder management, for future focus. According to the respondents, under this perspective future focus would be directed towards issues such as top management leadership, implementing shared ideas and appropriate culture and environment.
Dissatisfaction with present performance (DS = P-C)

The respondents are highly dissatisfied with the performance of their organizations with regard to innovation and learning, compared to other perspectives. Specifically, they are highly dissatisfied with the performance of their organisations in relation to launching knowledge management initiatives (the lowest rating given in the whole BSC framework) and implementing shared ideas.

Perceived significance (PS = P x I)

Innovation and learning is ranked fourth in the perceived significance rating, with performance issues such as top management leadership and implementing shared ideas perceived to be more important.

Availability of evidence to substantiate the current level of performance

All contractors' representatives stated that they have evidence to substantiate their current level of performance with regard to all issues whereas representatives of C2, C4, C5 and C7 indicated that it is difficult for them to provide evidence in respect of implementing shared ideas. However, this evidence can be obtained from references from supply chain partners and from the past track record of the contractor.

Other results

Further, the majority of surveyed contractors highly recommended that knowledge management initiatives should be in place in all organizations for their success in the long term. At the least, a well-structured project review should be carried out on all projects to capitalize on the knowledge gained in the execution of the project. This is highly important due to the high turnover of employees in the industry. According to one respondent, the main factor which makes it impossible for construction professionals to do such an effective analysis and transfer of the knowledge to other employees is 'a lack of availability of time', which should be overcome in order to reap enormous benefits.
The representative of the company C1 mentioned that working closely with the supply chain partners and implementing shared ideas is a common occurrence in the organization as it used to select the same partners to work with them on repeated projects. This contributes to their business success. Therefore superior KM performance is of strategic advantage for contractors.

It has been observed from the research that senior managers believe that construction organizations should implement human resource strategies focused on intellectual capital management as one of the effective KM strategies. The knowledge management functions, which lead to innovation and learning, have close positive links with the HRM of the construction organization. This research has found that these two areas have more room for improvement in the Australian construction industry. Still, the BSC performance measurement can play a major role in the implementation of such strategies by providing factual information regarding the HRM performance of the company such as employee recruitment, retention, learning and development as mentioned in Appendix B.

3.3 Conclusion

Chapter 3 reported on the research method used in this particular research. As part of this research approach, a literature review was conducted with regard to performance measurement and management including a focused review on the Balanced Scorecard system. Additionally, published information of construction contractors, especially publicly listed companies was explored. Based on that information a content analysis was carried out to map the essential performance parameters as perceived by Australian construction contractors.

Further, a review of current construction procurement procedures of the public construction clients within and outside Australia was carried out to determine the extent of best-value contractor selection criteria used by consultants in construction. This was done in order to effectively capture the useful background knowledge of the major construction participants regarding the measurement of contractors' performance.

Subsequently, a research instrument was designed in the form of a questionnaire to collect data among construction managers and clients' representatives to further validate the BSC performance measurement framework. The guidelines provided by the CIDA (1993) best practice guide have been followed with necessary changes to arrive at that research instrument.
Both qualitative and quantitative approaches have been used to collect and analyse data. A one-to-one questionnaire survey was a major part of the data collection, which facilitated useful qualitative data collection to further scrutinize the responses. For analysis of data, relative importance index and gap analysis methods were utilised. Among the respondents, 25 of them are senior consultants and seven are contractors.

Analysis of responses revealed that on average all respondents who are senior practitioners agreed on the suitability of the BSC framework used in the survey. Among the four BSC perspectives, process management (RII 0.79) and stakeholder management (RII 0.78) received higher RII ratings with negligible difference (0.01) while the business development and innovation and learning perspectives were also perceived to be important by the respondents and received 0.75 and 0.70 RII ratings, respectively.

The analysis of responses obtained through the questionnaire survey of contractors reveals the perceptions of contractors in regard to their wider performance. Contractors' current performance levels in regard to process management and business development are moderately high while stakeholder management and innovation and learning performance are perceived to be average. The contractors also perceive that performance in regard to stakeholder management is of higher significance for their business success. Though innovation and learning perspective receives relatively lower perceived significance rating, two major contractors claimed it to be more important for their business success. This is because of the complexity and large scale of the projects that they frequently undertake, which makes innovation and learning in their organization uppermost important for their sustainable success. Innovation and learning is considered to be an essential component in their project acquisition and delivery strategy. Thus, it can be concluded that all BSC perspectives are perceived to be important at present, with varying importance levels, and are currently receiving the attention of senior management of the construction companies, depending on the company's strategic objectives. According to the respondents, this emphasis is likely to be continued in the future. The representatives of C1, C2 and C6 had the opinion that the existence of the right culture and environment conducive to innovation and learning is difficult to prove. This requires appropriate qualitative measures to be put in place to capture actual performance status of the intangibles.
In addition, the use of value-based contractor selection criteria is possible, with the contractors’ claim that they can provide evidence to substantiate their performance with regard to most of the criteria.

According to the research objectives, at this stage, the proposed Balanced Scorecard framework has been validated through an industry survey and found to be appropriate to use in contracting organisations. Relative importance indices of each of the sub-elements of the main BSC perspectives have been calculated. Wider performance of seven contractors has been investigated in accordance with the performance issues identified in the BSC framework. The availability of information with the contractors to demonstrate their actual wider performance has been examined.

The following chapter explains the potential benefits of a BSC performance measurement and how BSC can be constructively used as a comprehensive management tool in a construction organization. As part of the research objectives, a performance gap analysis will be carried out. A PDCA (Plan – Do – Check – Act) cycle for construction will be developed. An online system for an assessment of contractors’ wider performance will be introduced and can be used as a template for value-based contractor selection.
CHAPTER 4

MANAGING WIDER PERFORMANCE OF CONTRACTORS USING A BALANCED SCORECARD APPROACH

This chapter deals with initiatives that a contracting organization can take to continuously improve its performance for long-term success. In addition, it demonstrates the potential benefits of a BSC performance measurement system in a contracting company while providing recommendations to boost current levels of performance in contracting organisations. As part of research objectives, a PDCA framework has been proposed and an online computer aided system has been developed to evaluate contractors’ (wider) business performance based on the research results.

4.1 Creating and putting Balanced Scorecard into action to gain Strategic Advantages

The Balanced Scorecard performance measurement system sharpens the strategic focus in contracting organizations by aligning current activities with long-term goals. It is practically done through identification of critical measures, effective reporting and subsequent meetings to continually focus and address issues that are critical to continued strategic and operational success. Figure 4.1 shows important steps involved in a performance measurement process that provides factual information to management.

![Diagram of Performance Measurement Cycle]

*Figure 4.1: Performance Measurement Cycle*
4.1.1 Setting Business Objectives

Setting or reviewing existing business objectives should be initially carried out to focus on the strategic performance. For example, based on the proposed Balanced Scorecard model, the business objectives of a contracting organisation could be summarized under the following headings:

1. Continuous business development
2. Effective stakeholder management to achieve mutual goals
3. Effective management of business processes to add value for project outputs and outcomes and
4. Maximizing the level of innovation and learning for sustainable success.

After establishing the business objectives, it is essential for organisations to select critical performance measures.

4.1.2 Selecting and Establishing Performance Measures

Identification of critical performance measures should be carried out with the consent of the managers in the organization. The better approaches are to ask the managers to propose a list of performance measures or shortlist the performance measures from available performance models (for example, the proposed BSC model). It is recommended that for each measure the information source should be identified, give performance interpretation, indicate importance level and map its link to sustainable success. This would enable everyone to gain a common understanding about the performance measures, which is a prerequisite for proper implementation.

4.1.3 Measuring Performance and Refinement of Measures

As the collection of performance information is an important task for the success of any performance measurement system, it is advisable to make managers in the respective divisions of the company responsible for that information. Once the system has been put in place and running for some time, the measures should be updated based on the opinion of the users.
This refinement process can result in the elimination of less actionable ones and the selection of performance measures that highly matters to the company. Establishing cause-and-effect linkages can help identify the important measures. The cause-and-effect linkage maps allow managers to consider the way in which wider performance issues influence and are influenced by other elements in the BSC framework.

The current challenge in performance measurement is not necessarily identifying what we could measure; it is identifying what needs to be measured so as to concentrate on what is absolutely vital. It is crucial that contractors select only a handful of numbers of vital performance measures to use in the BSC framework that have greater bearing on the company’s long-term success. It would take time for an organization to sort out appropriate performance measures, because a revolution in performance measurement can only be achieved through the continuous use of the system and revision of the theory about how the business is running.

The determination of the most appropriate performance measures is important and can be effectively done using a cause-and-effect linkage map with an analysis of correlation between the key performance measures.

![Diagram](image)

**Figure 4.2:** A sample map indicating positive correlation between HRM and KM

### 4.1.4 Performance Reporting

The team measuring the performance should produce a performance update report that must summarise the company strategies, key performance parameters, associated measures and a written performance summary. Producing performance reports has proven to shift the management focus from day-to-day aspects of business towards a systematic approach to long-term sustainable success.
The report must give a snapshot of performance for managers, highlighting the areas most pertinent to them. Following the performance reporting, senior managers can meet to review the report and approve performance summaries for all perspectives. They should also identify issues requiring further commentary from managers. Consequently, a final report with the approval of executives can be prepared and circulated among managers who must prepare themselves to discuss the issues in the second meeting. The follow-up meeting should be centered on discussing performance and brainstorming implications for action. This process is expected to bring a lot of key advantages such as better strategy focus, cross-functional communication, collaboration and learning.

4.1.5 Performance Benchmarking

The potential benefit of BSC performance measurement is that it paves the way for establishing a performance benchmarking system internally and also with external partners to further enhance the company’s performance measurement system and its performance on a continuous basis.

4.2 Improving Current Performance Level

The research has demonstrated that performance of the contractors with regard to knowledge management and employee management could be improved as they are critical for long-term success and, evidently, at present there is much room for improvement. The following section discusses these two issues while providing suggestions for performance improvement.

4.2.1 Knowledge Management Initiatives

It is surprising to note that though the industry understands the benefits of managing knowledge on execution of construction projects and running of the business over a period of time, it is not effectively done at present in any of the surveyed contracting companies. Construction knowledge has increased at all levels in the industry, but what is lacking is the subsequent use of that knowledge in an effective manner to obtain the optimal use of it. In this light, it is recommended that those contractors are required to do the following in order to increase the reflection and
internalization of knowledge throughout their companies and maximize the use of knowledge gained during the course of the business:

1. On completion of every project contractors should conduct a post-project review across key performance aspects with the participation of all key stakeholders who were involved in the project, and document the facts of the project, lessons learned, problems encountered and solutions arrived, innovations and mistakes occurred. Then a knowledge management team must scrutinize the information to create explicit knowledge that can be used by all workers in the organisation.

2. Organise quarterly management meetings to discuss the company-wide performance on projects.

3. Create an environment conducive to KM activities in the organisation with the greater focus on KM activities such as knowledge acquisition, scrutiny, sharing, usage, and

4. Continuous updating of organizational and individual knowledge with higher emphasis on soft KM issues. The following are the important issues to be addressed in each of the above KM activities:
   - Essential environment for knowledge acquisition: learning opportunity (partnering, and staff exchange), time, support from co-workers, willingness to learn, and rewards.
   - Analysis and understanding of knowledge: expert reviews, brainstorming sessions, discussions, reporting and communication methods, revisions, mapping cause-and-effect linkages, tools and other infrastructure etc.
   - Sharing, transforming and use of knowledge: proper modes of communication and venues (newsletters, notice boards, internet and intranet, seminars and presentations, meetings and conferences), networking, collaboration and co-ordination, self-organised teams, communities of practice and social interactions.
   - Continuous updating: surveys, project reviews and site visits, research and development (R&D), benchmarking of performance including KM, networking, effective human resource intellectual capital management, databases and knowledge based systems (such as AI, ES and DSS).
4.2.2 Managing Employees

The research has demonstrated that the performance of the surveyed contractors with regard to people management is not up to the level of relevant best practice. This seems to have more impact on the knowledge management ability of the surveyed contractors. It is vital that contractors continuously review their performance in terms of people management in order to uplift their current performance (including knowledge management performance). The potential role that a BSC performance measurement can play in managing employees is significant. Contractors can collect information on each essential performance issue related to people management of and analyse it in order get an understanding of the current performance level. Examples of such quantitative and qualitative analyses are provided in Appendix B.

4.2.3 Action Plan for Performance Improvement

An action plan should be developed to improve the performance of contractors in terms of knowledge management and human resources management. The recommended action plan should address the following issues:

<table>
<thead>
<tr>
<th>Performance Parameter</th>
<th>Initiatives to boost current performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Management (KM)</td>
<td>- Post-project reviews to record project information such as cost, time, production methods and techniques, lessons learned, problems encountered and solutions arrived, innovations and mistakes occurred</td>
</tr>
<tr>
<td></td>
<td>- BSC performance measurement to track KM performance</td>
</tr>
<tr>
<td></td>
<td>- Management meetings to discuss company-wide KM performance</td>
</tr>
<tr>
<td></td>
<td>- More emphasis on KM activities such as knowledge acquisition, analysis and understanding, sharing, transforming, use and continuous updating</td>
</tr>
<tr>
<td>Human Resource Management (HRM)</td>
<td>- BSC performance measurement to track HRM performance</td>
</tr>
<tr>
<td></td>
<td>- Better HRM strategies, for example, recruitment and training and development should focus on creativity, leadership, multi-skills, ability to work in teams, smartness, health, willingness to learn and develop, and mentoring ability</td>
</tr>
</tbody>
</table>

Table 4.1: Action plan for performance improvement
The following section deals with suggestions for performance improvement by adhering to the “Deming PDCA cycle” for standard continuous improvement.
4.3 Business Excellence in Australian Construction Industry and the Role of PDCA Cycle

It can be recommended that in order to strive for excellence in business performance it is paramount that organizations are required to adhere to the Deming (Lee, 2002) cycle of plan, do, check and act (also known as ‘PDCA’ cycle). PDCA is a standard continuous improvement method that is highly suitable for construction organisations. A review of the major quality awards such as Baldrige, EQA and SQA also indicated that key requirements in most of the criteria are formulated and organized to adhere to the PDCA cycle. Thus for construction organizations also it will be highly beneficial if there is a best practice framework for continuous performance improvement following the same PDCA cycle. This will be a good practical guide in the journey towards industry best practices. Such a framework can be developed based on the amended balanced scorecard framework used in this research.

In the PDCA cycle for excellence in construction performance the Planning (P) phase involves setting up of performance goals, Do (D) phase involves implementation of initiatives to achieve those performance goals, Check (C) phase involves monitoring the effectiveness of the initiatives and finally, Act (A) phase involves carrying out the activities that would ensure continuous performance improvement. It is recommended that contractors get a clear picture of the BSC performance measurement and management system before implementing the system in their organization. This would enable them to adopt a systematic approach in implementation. It seems that the Deming PDCA cycle is effective in providing a complete picture of the BSC implementation.
Figure 4.3 provides a snapshot of the design of the PDCA framework for construction organizations, which is presented in the Appendix E. The proposal helps contractors manage their long-term performance and it is based on this particular research outcome.

**Figure 4.3:** Design of PDCA cycle for construction contractors
4.4 Performance Benchmarking

In order to further develop the BSC performance measurement system for easy implementation and provide in-depth performance information, it is recommended that construction organisations should use relevant sub-measures under each critical performance parameter. Benchmarking would help track performance trends over time. This would also enable organisations to establish a benchmark of current performance against which future improvement can be targeted and tracked as part of the drive for continuous performance improvement.

Through the research it was possible to find out the relative importance of each performance parameter, but this may slightly vary from one company to another according to their strategy and perceptions of the managers. Therefore the selection of the most suitable set of performance metrics to be used in company benchmarking should be done with the participation and consent of managers (at all levels) of the particular company. External facilitators with the expertise on performance benchmarking can be used to help establish the initial system, if necessary. However, Table 4.2 provides selected metrics based on the literature survey and the research outcomes, which can be used in benchmarking. It is possible for construction contractors to collect data regarding a selected number of performance measures out of the list (provided below) and quantify the performance at appropriate intervals (monthly, quarterly and annually). Then it can be linked to the BSC performance reporting system.
### Business Development:
- Shareholder funds/Market value
- Earnings per share growth
- Number of awards won / reputation /relative market position
- Capital growth
- Market value of project / construction cost
- Programs for strategic capability development (successfully completed/under way, etc)

### Innovation and Learning:
- Number of employee suggestions obtained (or implemented)
- Number of innovations made and under way
- Time taken to adopt new system
- Investment in innovation and learning
- Number of quality/effective partnerships
- Problem solved / benefits obtained by sharing best practices
- Importance / repeat usage / updating of the codified repository items
- Number of joint-venture / partnering contracts

### Stakeholder Management:

#### Customers:
- Customer retention / repeated and new businesses
- Market share
- Customer satisfaction / customer rating
- Number of customer claims / complaints
- Average customer duration
- Annual income per customer
- Average duration of customer relationship
- Customers lost
- Customers per employees

#### Supply Chain Partners:
- Supply chain performance (product and service) / management
- Level of trust
- Communication of customers' future needs
- Compatible information system
- Use of informal information sharing

### Internal Process Improvement:
- Cost and time predictability
- Number of defects / time for remedial action / completion of defects
- Employee satisfaction
- Employee absenteeism and turnover
- Non-conformance to specification / standards
- Rework value
- Productivity growth / efficiency
- Adherence to schedule and budget

### Financial Performance:
- Profitability
- Annual turnover growth
- Total assets / total assets per employee
- Revenue per employee

### Number of customer bases captured
- Goal achievement
- Strategic review meetings / reviews / reports per year
- Number of performance reviews of projects per month
- Availability / accessibility of performance benchmarking information
- Number of regular networking partners / projects from networking partners

### Public at large:
- Number of accidents / accident frequency rate / lost time injury
- Impact on society
- Waste reduction
- Number of complaints made by commuters / prosecutions
- Environmental reportable incidents
- Ethical practices and unethical incidents
- Responsiveness to society

---

### Table 4.2: Performance Metrics

1Sommerville and Robertson (2000); 2Watson & Chileshe (2001); 3Baldwin et al. (2001);
4Kagioglou et al. (2001); 5Cebon, et al.(1999); 6Kaplan & Norton (2000a); 7Redshaw (2000);
8Soetanto et al.(2001); 9Neely et al.(2001b); 10McCabe(2001); 11Kaplan & Norton (1994); 12Robson and prabhu (2001); 13Liebowitz & Suen (2000); 14Enderle & Tavis (1998); 15Korac-Kakabadse et al. (2001); 16Low & Siesfeld (1998); 17Ahmed, et al. (1998); 18Arora, R (2002); 19Tan, et al. (2002);
4.5 Assessment of Business (wider) Performance using an Online Computer-aided System

An online performance assessment system is being developed through this research result, which can be used by contractors as well as consultants. The primary data for this development was obtained from the questionnaire survey results (i.e. relative importance indices provided in Table 3.1).

Through the survey, it has been found that the majority of client representatives had the opinion that the appropriate performance split between contractor’s price and their wider performance to be used in the contractor selection in Victoria is 70:30. Therefore, in a best-value contractor selection exercise the lowest tenderer will be getting a score of 70 on the basis of the price quoted by him for that project. This exercise should be carried out for every contractor and in deciding a score for the price quoted by other contractors the deviation between the lowest tender price and the price quoted by the particular contractor can be taken into account.

The contractor’s wider performance should be assessed and a performance score should be assigned accordingly (for every contractor, a maximum of 30 will be given for wider performance).

Initially, in order to assess wider performance of contractors it is recommended to use the questionnaire that was originally used to collect data in this research (see Appendix C1) and then the consultant carrying out the contractor selection exercise has to feed that data manually into an online computer system (located at www12.brinkster.com/concem/) in order to find out the actual performance score of the contractors. Because the weighting to be assigned for each performance aspect will differ from one to another depending on their importance, the primary function of the computer model is to calculate the performance score for each contractor by utilizing the analysed data fed into the system based on the relative importance indices of each of the performance aspects found through the research. Thus this computer-based system utilises the relative importance indices developed through this research to calculate a performance score for each tenderer (Refer to Appendix – F for more information regarding the concept behind the on-line performance measurement tool).

It should be noted that this computer aided program can also be used at the pre-qualification stage to short list the prospective tenderers based on their performance score and, in turn, the performance score can be used (with necessary updates) at the tender selection stage to decide on the final performance score for the tendering contractors as mentioned above.
The following are the overall performance scores obtained by each of the surveyed contractors when the performance assessment was carried out through the on-line system (read the following Table 4.3 in conjunction with Figures 3.2, 3.3, 3.4 and 3.5 in Chapter 3).

<table>
<thead>
<tr>
<th>Contractor</th>
<th>Performance score (out of 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>64.81</td>
</tr>
<tr>
<td>C2</td>
<td>68.82</td>
</tr>
<tr>
<td>C3</td>
<td>61.66</td>
</tr>
<tr>
<td>C4</td>
<td>65.53</td>
</tr>
<tr>
<td>C5</td>
<td>78.76</td>
</tr>
<tr>
<td>C6</td>
<td>80.28</td>
</tr>
<tr>
<td>C7</td>
<td>59.19</td>
</tr>
</tbody>
</table>

Table 4.3: Performance score calculated using the online performance assessment system

4.6 Conclusion

Chapter 4 demonstrates how to use the Balanced Scorecard approach in construction organisations to achieve competitive advantages through sustained performance improvement. A typical performance measurement cycle has been explained. The importance of mapping cause-and-effect linkages vis-à-vis company performance, which leads to updating of performance measures, has been emphasized. Performance issues in regard to human resources management and knowledge management have been identified as areas where there is much room for improvement. Further, an action plan has been developed indicating the possible actions that can be taken to boost current performance levels with regard to those issues. A plan-do-check-act cycle has been developed based on the proposed Balanced Scorecard (BSC) model clearly indicating the steps involved in a performance management process when using a BSC method for performance measurement. Performance benchmarking has been suggested as a means of providing in-depth supporting information for BSC performance measurement by using company-wide databases while encouraging continuous performance improvement. A set of performance measures has been identified that are appropriate to use in performance benchmarking in a contracting organization. An online computer aided performance measurement system has also been developed based on the proposed BSC model, which can be used by contractors and consultants to assess contractors' wider performance. Only two of the seven surveyed contractors obtained a performance score above 75.
At this stage all research objectives have been successfully achieved and explained. Chapter 5 concludes the research and provides recommendations for further research.
CHAPTER 5

CONCLUSION AND FUTURE RESEARCH DIRECTIONS

5.1 Introduction

Organisations depend on the measurement and analysis of performance for controlling and taking actions to ensure sustainable success in the respective market place. Such measurements should derive from business needs and company strategies and objectives, and they should essentially provide factual data and information about key processes, outputs, and results. Analysis of performance information can be used to determine trends, projections, and causes and effects, and all are critical for continuous improvement. Performance measurement system in a construction company should include measures to track its performance in all critical perspectives, not only financial but also stakeholder management, business development, process management, and innovation and learning. The Balanced Scorecard performance measurement has been found to be appropriate in fulfilling the requirements.

Balanced Scorecard (BSC) as a performance measurement system broadens the focus of management from relatively short-term financial goals to incorporate issues that affect sustainable long-term performance in the construction industry. BSC improves communication about the true performance within and outside the organization. By measuring performance over time using the BSC performance measurement an organization can track how well or badly it is performing and the measures can also be evaluated or changed to better support organizational goals. In essence, the BSC performance measurement is all about understanding what is happening inside the organization and working out how to introduce improvement. The implementation of BSC performance measurement and the appropriate performance reporting system allows senior management to review and discuss the strategic management performance of their company. With the availability of performance reports, senior managers of the company can meet to discuss the company performance regularly and identify issues of prime importance. This can be followed by a session to seek and record further commentary from managers and may take the form of a brainstorming session.
This would facilitate formulation of plans and enable corrective actions to be taken to boost performance of the company in identified areas. Thus BSC effectively provides actionable performance insights on strategic objectives which are important for construction businesses.

However, there is a criticism that though much has been written about the BSC performance measurement system, little has been written about how to create a Balanced Scorecard framework.

This research involved development of a BSC performance measurement framework for construction contractors and measurement of contractors’ performance to demonstrate the potential use of the BSC performance measurement. The respondents were carefully selected through referral from leading construction practitioners and academics. A face-to-face questionnaire survey was carried out and follow-up interviews were conducted among 34 senior managers in the Melbourne metropolitan area. Of those seven were contractors’ representatives and the others were clients’ representatives such as project managers, architects, quantity surveyors, and engineers.

**Research Objectives**

The main objectives of the research were threefold:

1. to identify critical performance parameters to put on a BSC framework together with relative importance of each parameter,

2. to measure actual wider performance of contractors to demonstrate how a BSC framework can be used constructively to manage wider performance in contracting organizations and also to identify the areas that need immediate attention, and

3. to develop a template for performance assessment and provide recommendations to uplift current wider performance of contractors in the construction industry.
Research Results

Relative importance index (RII) and gap analysis method (previously used by CIDA, 1993) were employed to analyse the research data. Research revealed that on average all senior practitioners agreed on the suitability of the BSC framework used in the survey. Among the four BSC perspectives, process management (RII 0.79) and stakeholder management (RII 0.78) received higher RII ratings while the business development and innovation and learning perspectives were also perceived to be important by the respondents and received 0.75 and 0.70 RII ratings, respectively. These results show a dramatic change in the perceptions of senior construction practitioners regarding sustainable business success. Traditionally, higher emphasis has been placed on process management and business development but now industry realizes the importance of stakeholder management and innovation and learning too for a sustainable success.

The analysis of the contractors' responses revealed their perceptions in regard to wider performance. The surveyed contractors' current levels of performance in regard to process management and business development are moderately high. The stakeholder management and innovation and learning performance are perceived to be average. The contractors also perceive that performance in regard to stakeholder management is of higher significance for their business success. Though innovation and learning perspective was perceived to be less important, it is considered to be an essential component in the major project acquisition and delivery strategies. The level of emphasis given by a contractor to the innovation and learning perspective varied with the scale and complexities of the projects that the particular contractor undertakes. Thus a BSC framework for a contracting organization must be based on the particular organizational circumstances and the perceptions of senior managers about the organizational success. The research results indicated that contractors' current performance in regard to employee management and also launching knowledge management initiatives are apparently low, allowing much more room for improvement.

It should be noted that the use of value-based contractor selection criteria is possible with the contractors' claim that they can provide evidence to substantiate their performance with regard to most of the criteria. A template for performance assessment is being developed in the form of an on-line system which is of benefit to the broader industrial base.
Recommendations for Wider Performance Improvement

The following recommendations are provided for contractors to enhance and continuously improve their wider performance in the industry:

1. Map cause-and-effect linkages based on the performance measurement results, calculate correlations among measures, select the critical measures and update the critical measures on the BSC framework accordingly,

2. Prepare an action plan and implement it for performance improvement based on the BSC performance measurement results. As the research results revealed that two performance areas, namely employee management and launching knowledge management initiatives, should be improved, the following further recommendations are set out:
   2.1 BSC performance measurement to track HRM performance,
   2.2 Better HRM strategies, for example, recruitment and training and development should focus on creativity, leadership, multi-skills, ability to work in teams, smartness, health, willingness to learn and develop, mentoring ability etc.,
   2.3 As a knowledge management initiative, project reviews should be conducted on completion of every project and in addition to information on cost, time, construction techniques, etc. Contractors should also record other information, such as lessons learned, innovation that occurred, problems faced and solutions arrived, mistakes, etc.,
   2.4 BSC to track knowledge management performance,
   2.5 Management meetings should be held to discuss company-wide knowledge management performance, and
   2.6 It is essential to create an environment in the company which encourages and supports knowledge management functions.

3. Adhere to a PDCA (Plan – Do - Check - Act) cycle to systematically approach performance measurement and management practices,

4. Carry out performance benchmarking and link the system with the Balanced Scorecard performance measurement system in the company, and

5. Development of an-online performance measurement tool and publish the results at least quarterly basis.
Chapter - 5 : Conclusion and Future Research Directions

Based on the research findings, a PDCA cycle has been developed. The PDCA cycle is based on the developed BSC framework, which in turn was modeled on the basis of major business excellence models and best practices in other industries. Thus adherence to the construction PDCA cycle would lead to business excellence in the contractors’ organizations for which BSC performance measurement is a must as it provides feedback about true performance (in the “Checking” process). The developed online performance assessment tool can be used by contractors as well as consultants to assess contractors’ wider performance. This online system can be used to decide where a contractor stands when compared to industry best practices as the system allocates a performance score against each contractor.

5.2 Future research directions

The following recommendations are provided for future research:

1. The developed Balanced Scorecard model can be implemented in contracting organizations and further research can be carried out to see the correlations among measures over 3-5 years leading to short-listing of critical measures and to document implementation issues,

2. Further research can be carried out to validate the critical measures on the proposed Balanced Scorecard framework by increasing the sample size and to identify important sub-measures under each critical measure for performance benchmarking purposes, and

3. It is interesting to note that the contractors involved in the research do not appear to use performance benchmarking information in the strategic management processes /activities. It is evident that these processes are carried out “intuitively” rather than with the aid of a detailed routine performance reporting system in place. Thus, future research can be carried out to investigate the prevailing strategic management practices in contractors’ organisations and see whether a BSC performance measurement system can help boost the strategic management activities/processes. The said research can focus on the following:
   • How do they develop and deploy strategic plans to achieve key strategic objectives?
   • How do they allocate resources to accomplish key strategic objectives?
   • How do they develop action plans in their journey towards their goals?
   • How do they ensure the changes resulting from those plans can be sustained?
   • What are their short-term and longer-term plans?
• What are the key human resource plans that derive from their short-term and longer-term plans?

• What are the key performance measures or indicators available to track the progress of the strategic performance?
## Illustration

<table>
<thead>
<tr>
<th>Issue</th>
<th>RII</th>
<th>Maximum Score</th>
<th>Index</th>
<th>Example, C1</th>
<th>Score</th>
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Total RII 1-20 = 15.08
Performance score of C1 = 64

Total score = 100.00
## Appendix A

### The Malcolm Baldrige National Quality Award criteria (source: McCabe, 2001, p.139)

<table>
<thead>
<tr>
<th>Criteria / sub-criteria</th>
<th>Sub-criteria score</th>
<th>Criteria score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Leadership</strong></td>
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<td></td>
</tr>
<tr>
<td>1.1 Senior executive leadership</td>
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<td></td>
</tr>
<tr>
<td>1.2 Leadership system and organisation</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>1.3 Public responsibility and corporate citizenship</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td><strong>2. Information and analysis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Management of information and data</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>2.2 Competitive comparisons and benchmarking</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>2.3 Analysis and uses of company-level data</td>
<td>40</td>
<td>75</td>
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<td><strong>3. Strategic planning</strong></td>
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<td></td>
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<tr>
<td>3.1 Strategy development</td>
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<tr>
<td>3.2 Strategy deployment</td>
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<td><strong>4. Human resource development and management</strong></td>
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<td></td>
</tr>
<tr>
<td>4.1 Human resources planning and evaluation</td>
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<tr>
<td>4.2 High-performance work systems</td>
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<td></td>
</tr>
<tr>
<td>4.3 Employee education, training and development</td>
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<td>4.4 Employee wellbeing and satisfaction</td>
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<td><strong>5. Process management</strong></td>
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</tr>
<tr>
<td>5.1 Design and introduction of quality products and services</td>
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</tr>
<tr>
<td>5.2 Process management: product and service production and delivery</td>
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</tr>
<tr>
<td>5.3 Process management: support services</td>
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</tr>
<tr>
<td>5.4 Management of supplier performance</td>
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<td>140</td>
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<tr>
<td><strong>6. Business Results</strong></td>
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<td></td>
</tr>
<tr>
<td>6.1 Product and service quality results</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>6.2 Company operational and financial results</td>
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</tr>
<tr>
<td>6.3 Human resource results</td>
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<tr>
<td>6.4 Supplier performance results</td>
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<td><strong>7. Customer focus and satisfaction</strong></td>
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<tr>
<td>7.1 Customer and market knowledge</td>
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</tr>
<tr>
<td>7.2 Customer relationship management</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>7.3 Customer satisfaction determination</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>7.4 Customer satisfaction results</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td><strong>Total points</strong></td>
<td></td>
<td>1000</td>
</tr>
</tbody>
</table>
Percentage weighting of MBNQA and EFQM criteria (source: McDonald, et al., 2002, p.22)

<table>
<thead>
<tr>
<th>EFQM Criteria</th>
<th>EFQM percentage weighting</th>
<th>MBNQA percentage weighting</th>
<th>MBNQA criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership</td>
<td>10</td>
<td>11</td>
<td>Leadership</td>
</tr>
<tr>
<td>People management</td>
<td>9</td>
<td>10</td>
<td>Human resources</td>
</tr>
<tr>
<td>Policy and strategy</td>
<td>8</td>
<td>8</td>
<td>Policy and strategy</td>
</tr>
<tr>
<td>Resources</td>
<td>9</td>
<td>8</td>
<td>Information and analysis</td>
</tr>
<tr>
<td>Processes</td>
<td>14</td>
<td>10</td>
<td>Process management</td>
</tr>
<tr>
<td>People satisfaction</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer satisfaction</td>
<td>20</td>
<td>8</td>
<td>Customer focus</td>
</tr>
<tr>
<td>Impact on society</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business results</td>
<td>15</td>
<td>45</td>
<td>Business results</td>
</tr>
<tr>
<td>Total percentage</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
Appendix B

The following example illustrates how a contractor can undertake an analysis to review employee recruitment and retention patterns in the company, which can be ultimately linked to the company’s overall BSC performance measurement system.

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of employees at January of each year</th>
<th>No. of employees recruits</th>
<th>No. of employees over one year service left the company</th>
<th>No. of employees under one year service left company</th>
<th>Overall average percentage of employees leaving company</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.2: Recruitment and Retention Patterns

Table 4.2 would give managers a snapshot of the recruitment and retention patterns in their company leading to actionable insights into the people management performance. The results of the analysis on people management performance of a company can be either quantitative or qualitative. An example of the qualitative analysis is as follows:

<table>
<thead>
<tr>
<th>People Management Results</th>
<th>Often Yes</th>
<th>Sometime Yes</th>
<th>Never No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Give employees more time to learn new skills</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offer alternative training (job rotation etc)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create a learning environment by undertaking past project performance reviews, analysing and communicating results to all employees</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Support industry recognition (professional etc)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Give opportunity to employees to interact with clients and key business partners</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.3: Effective People Management Practices

Table 4.3 analyses the level of the existing effective people management practices in the organisation. Though it is a qualitative analysis, managers can clearly see how their organisation is currently performing in the competitive market in respect of the best practices and can strive to align the organisational current practices with those best practices.
Appendix C1: Contractors’ Questionnaire

Identification - Please Let Us Know How You Can Be Contacted

Name
Title/Position
Company
Address
Phone # Fax #
E-mail

Why do we carry out this research?
As we all know, the tender price is usually the most significant criterion in contractor selection though it has been increasingly recognised that the lowest bid is not necessarily the most economical solution in the procurement of construction projects. As a result of higher emphasis on lowest tender price, less attention has only been traditionally placed on the quantitative evaluation of contractors’ quality attributes. However, in Australia public sector clients have expressed the urgent need for having a comprehensive framework for measuring contractors’ wider performance (e.g., balanced scorecard framework). Australian contractors are also interested in using a balanced scorecard measurement system to manage their own performance. Thus, this questionnaire is intended to incorporate the views of the contractors’ representatives pertaining to the measurement/assessment of the contractors’ wider performance.

The structure of this Questionnaire:

- Business Development: Strategic capabilities, Strategic Management, Performance Management, Industry leadership, and Networking
- Stakeholder Management: Client, Project team partners, Employees, Wider community, and Image and reputation
- Process Management: Tendering, Supply chain management, Risk management, OHS&R, EMS, QA &QM, and ITC
- Innovation and Learning: Top management leadership, Culture and environment, KM initiatives, Utilising and implementing shared ideas, and lateral support
Note: The above model is intended to measure the wider performance of the contractors based on the four major performance parameters such as business development, stakeholder management, process management, and innovation and learning. Each performance parameter consists of five important performance measures. In the end, you are also kindly requested to add your comments regarding any performance measures that, in your opinion, are important but have not been identified in this model.

How to answer this questionnaire?

At the start of each question we ask you to rate your personal opinion of how desirable YOU think the issue in question should be for use as a non-lowest-price selection criteria for construction tendering. The scale ranges from 1 = very Undesirable to 5 = very desirable. In the example below the response 4 is provided as being a desirable criterion for being part of selection criteria for awarding contracts for projects.

We also ask you to indicate your opinion of the degree of difficulty that you would anticipate when obtaining evidence to substantiate your response (to the current way in which your organisation is responding to issues described in each question). The scale ranges from 1 = very difficult to 5 = very easy. In the example below the response 3 is provided as being neutral about the level of difficulty.

You are also provided with four descriptions for each question describing how your organization is currently performing. We would like you to indicate ONLY the description that most suited to your current organizational performance. We also would like you to indicate how you would prefer to see your organisation perform, so please also indicate for ONLY one of these descriptions under columns Level A, B, C or D. Therefore please enter a C only in one shaded box and P also in only one shaded box.

In the example illustrated below you might feel that your organization almost meets one level but slightly between two levels. In such situations you can respond with a C- (for being less than Level C in the example illustrated below). Note that P in Level D indicates the preferred scenario.
Developing strategic capabilities—The way in which you can demonstrate how you develop your strategic capabilities

The desirability of this issue being adopted for non-lowest-price selection criteria for construction tendering is
where: 1 = very UNdesirable to 5 = very desirable

The degree of difficulty obtaining evidence to substantiate your response (indicated below in either A, B, C, or D) is
where: 1 = very difficult to 5 = very easy

<table>
<thead>
<tr>
<th>Level A</th>
<th>Level B</th>
<th>Level C</th>
<th>Level D</th>
</tr>
</thead>
<tbody>
<tr>
<td>We understand the importance of developing our strategic capabilities to be on par with other contractors. However, our financial position does not appropriately support this to be carried out. We seek the assistance from the government to achieve our goal.</td>
<td>We are in the process of planning for identifying our own capabilities as well as new capabilities with higher potential for the future success. We are still unconfident in going ahead with the development programs due to uncertainties in our business environment.</td>
<td>We have already implemented well-structured programs aimed at developing both our own and new strategic capabilities. As a result we have started to reap enormous benefits.</td>
<td>As for Level C but we have also analysed the feedback that we have obtained so far from the implementation and monitoring of such programs. We are now in the process of continuously improving the existing programs and also introducing new programs.</td>
</tr>
</tbody>
</table>

Current = C: Preferred = P

Current = C: Preferred = P

Current = C: Preferred = P

C -
C -
C -

Current = C: Preferred = P

Current = C: Preferred = P

P
1 Business Development Perspective – Issues 1-1 to 1-5

Rationale behind this perspective measurement is that for a contractor to succeed in the business the continuous development of the essential strategic capabilities is paramount. This differentiates the company from other rivals leading to business success. Building strategic capabilities necessarily requires contractors to have a strategic intention. Thus, effective strategies are to be in place at the correct time and then these strategies should be updated with the latest feedback from continuous strategic learning process. Importantly, having a performance measurement system with leading indicators of business success would be highly helpful in providing such a timely strategic feedback to them. Additionally, industry leadership and better networking with business stakeholders also have greater bearing on the business development of the contractors.

<table>
<thead>
<tr>
<th>Issue 1-1</th>
<th>Developing strategic capabilities—The way in which you can demonstrate how you develop your strategic capabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The desirability</strong> of this issue being adopted for non-lowest-price selection criteria for construction tendering is</td>
<td></td>
</tr>
<tr>
<td><strong>The degree of difficulty</strong> obtaining evidence to substantiate your response (indicated below in either A, B, C, or D) is</td>
<td></td>
</tr>
<tr>
<td><strong>Level A</strong></td>
<td><strong>Level B</strong></td>
</tr>
<tr>
<td>We understand the importance of developing our strategic capabilities to be on par with other contractors. However, our financial position does not appropriately support this to be carried out. We seek the assistance from the government to achieve our goal.</td>
<td>We are in the process of planning for identifying our own capabilities as well as new capabilities with higher potential for the future success. We are still unconfident in going ahead with the development programs due to uncertainties in our business environment.</td>
</tr>
<tr>
<td>Current = C: Preferred = P</td>
<td>Current = C: Preferred = P</td>
</tr>
</tbody>
</table>
### Issue 1-2 Strategic Management—The way in which you can demonstrate how you manage your strategies

**The desirability** of this issue being adopted for non-lowest-price selection criteria for construction tendering is

<table>
<thead>
<tr>
<th>Level</th>
<th>Current</th>
<th>Preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>C</td>
<td>P</td>
</tr>
<tr>
<td>B</td>
<td>C</td>
<td>P</td>
</tr>
<tr>
<td>C</td>
<td>C</td>
<td>P</td>
</tr>
<tr>
<td>D</td>
<td>C</td>
<td>P</td>
</tr>
</tbody>
</table>

**The degree of difficulty** obtaining evidence to substantiate your response (indicated below in either A, B, C, or D) is

<table>
<thead>
<tr>
<th>Level</th>
<th>Current</th>
<th>Preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>C</td>
<td>P</td>
</tr>
<tr>
<td>B</td>
<td>C</td>
<td>P</td>
</tr>
<tr>
<td>C</td>
<td>C</td>
<td>P</td>
</tr>
<tr>
<td>D</td>
<td>C</td>
<td>P</td>
</tr>
</tbody>
</table>

---

**where:** 1 = very UNdesirable to 5 = very desirable

---

We understand the importance of getting feedback about the performance of our strategies. However, such endeavour consumes more organisational resources and outputs of such an exercise immediately become obsolete in the more turbulent construction business environment.

We occasionally get feedback of our strategic implementation programs. We usually do so when encountered with bad performance failures and/or recession in the industry.

This information is often lost or difficult to use after a while.

Performance of our strategies is reviewed at regular management meetings and responsibilities of managers are assigned for timely corrective actions, if necessary.

We generally use such information for decision-making processes and quarterly / annual performance reviews.

Our business plans are developed alone with a set of appropriate performance measures and thus, information relating to performance measures are captured, analysed and discussed at management meetings.

We use detailed business development and project performance information to fine-tune our business strategy.

### Issue 1-3 Performance Measurement / Management—The way in which you can demonstrate the approach you adopt to collect information about your strategic performance and also the optimum use of it

**The desirability** of this issue being adopted for non-lowest-price selection criteria for construction tendering is

<table>
<thead>
<tr>
<th>Level</th>
<th>Current</th>
<th>Preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>C</td>
<td>P</td>
</tr>
<tr>
<td>B</td>
<td>C</td>
<td>P</td>
</tr>
<tr>
<td>C</td>
<td>C</td>
<td>P</td>
</tr>
<tr>
<td>D</td>
<td>C</td>
<td>P</td>
</tr>
</tbody>
</table>

**The degree of difficulty** obtaining evidence to substantiate your response (indicated below in either A, B, C, or D) is

<table>
<thead>
<tr>
<th>Level</th>
<th>Current</th>
<th>Preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>C</td>
<td>P</td>
</tr>
<tr>
<td>B</td>
<td>C</td>
<td>P</td>
</tr>
<tr>
<td>C</td>
<td>C</td>
<td>P</td>
</tr>
<tr>
<td>D</td>
<td>C</td>
<td>P</td>
</tr>
</tbody>
</table>

**where:** 1 = very difficult to 5 = very easy

---

We understand the importance of measuring performance of projects on completion.

We don’t bother too much in this regard because we have reasonable workload at present.

We randomly measure performance of our major projects relating to client objectives of cost, time and quality.

We verbally ask the managers who were in charge of those projects from head office to provide such information.

We systematically and regularly collect project performance information through our staff at site while project in progress and also on completion.

We analyse them in detail and record all contextual issues, which governed such project outcomes.

As for level C. We also involve all major project stakeholders in our project reviews. We have a team responsible for carrying out wider performance reviews and reporting upon the company wide performance. We always benchmark our performance against industry best practices and strive to maintain our leadership.
## Issue 1-4  Industry leadership in providing value —The way in which you can demonstrate the way you mobilise necessary techniques and processes to enhance your value to the paying client

*The desirability* of this issue being adopted for non-lowest-price selection criteria for construction tendering is  

where: 1 = very UNdesirable  to 5 = very desirable

*The degree of difficulty* obtaining evidence to substantiate your response (indicated below in either A, B, C, or D) is  

where: 1 = very difficult to 5 = very easy

<table>
<thead>
<tr>
<th>Level A</th>
<th>Level B</th>
<th>Level C</th>
<th>Level D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most of our past clients have been satisfied with project outcomes that they have specified. We usually are not required to provide additional advice.</td>
<td>We usually suggest cost/time saving as well as functionality ideas only when requested—generally only when projects start to go wrong.</td>
<td>We systematically and regularly look for ways to improve value-for-money. We often provide buildability, value analysis (VA/VM), functional flexibility and/or other advice.</td>
<td>As for Level C. We also have a clear track record of instigating creative innovative solutions to problems and winning major projects through our value adding alternative proposals.</td>
</tr>
<tr>
<td>Current = C: Preferred = P</td>
<td>Current = C: Preferred = P</td>
<td>Current = C: Preferred = P</td>
<td>Current = C: Preferred = P</td>
</tr>
</tbody>
</table>

## Issue 1-5  Networking ability —The way in which you can demonstrate how do you handle networking with key industry stakeholders

*The desirability* of this issue being adopted for non-lowest-price selection criteria for construction tendering is  

where: 1 = very UNdesirable  to 5 = very desirable

*The degree of difficulty* obtaining evidence to substantiate your response (indicated below in either A, B, C, or D) is  

where: 1 = very difficult to 5 = very easy

<table>
<thead>
<tr>
<th>Level A</th>
<th>Level B</th>
<th>Level C</th>
<th>Level D</th>
</tr>
</thead>
<tbody>
<tr>
<td>We understand the importance of networking in the growth of our company. Though we don’t emphasise currently on networking, we are too sure that we have other means to grow.</td>
<td>We usually do networking with clients when there is a need for more jobs and when the industry trend is heading towards recession. We do networking occasionally.</td>
<td>We do networking with current clients, consultants, and other company stakeholders. We also usually send out our newsletters, leaflets, etc. containing our recent remarkable achievements and improvements for our past clients and industry partners.</td>
<td>As for Level C. We also do regular presentations to our industry stakeholders aimed at communicating and transferring the new knowledge that we acquire time to time. Thus, we induce our stakeholders to value our networking and try to get optimum use out of it.</td>
</tr>
<tr>
<td>Current = C: Preferred = P</td>
<td>Current = C: Preferred = P</td>
<td>Current = C: Preferred = P</td>
<td>Current = C: Preferred = P</td>
</tr>
</tbody>
</table>
2 Stakeholder Management Perspective – Issues 2-1 to 2-5

The project stakeholders such as client, the supply chain partners, contractors’ project teams managing the project and also the wider community each have an impact upon project success. In addition, image and reputation of the contractors among project stakeholders ‘do matter a lot’ when it comes to successful project delivery.

<table>
<thead>
<tr>
<th>Issue 2-1</th>
<th>Client Service —How you treat your paying clients when attempting to deliver added value and profitable and successful projects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The desirability</strong> of this issue being adopted for non-lowest-price selection criteria for construction tendering is</td>
<td><strong>where</strong>: 1 = very UNdesirable to 5 = very desirable</td>
</tr>
<tr>
<td><strong>The degree of difficulty</strong> obtaining evidence to substantiate your response (indicated below in either A, B, C, or D) is</td>
<td><strong>where</strong>: 1 = very difficult to 5 = very easy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level A</th>
<th>Level B</th>
<th>Level C</th>
<th>Level D</th>
</tr>
</thead>
<tbody>
<tr>
<td>We try to keep the client satisfied and fix defects with the hope of being able to ask for a testimonial or good references when needed. On the other hand we also acknowledge the difficulties involve in satisfying our clients.</td>
<td>Site management generally makes a concerted effort to keep the client satisfied. We focus on maintaining or building our reputation with project award decision makers.</td>
<td>We seek informal feedback from the client/client representatives on how well the project went and we also have performance indicators to measure customer satisfaction. We keep records of testimonials and use these in PR activities. We focus on our reputation and attempt to broaden our client base through reputation.</td>
<td>We have developed company-wide systems for maintaining specific and validated feedback. We use this to improve our relationship with clients. We focus on relationship building to generate repeat business and/or alliances. While satisfying specified client needs we anticipate client needs and also stimulate new market needs.</td>
</tr>
</tbody>
</table>

Current = C: Preferred = P | Current = C: Preferred = P | Current = C: Preferred = P | Current = C: Preferred = P |
### Issue 2-2  Project Team Partners — How you treat your project team partners (including consultants) and supply-chain members when attempting to deliver added value and profitable and successful projects

The desirability of this issue being adopted for non-lowest-price selection criteria for construction tendering is

<table>
<thead>
<tr>
<th>Level A</th>
<th>Level B</th>
<th>Level C</th>
<th>Level D</th>
</tr>
</thead>
<tbody>
<tr>
<td>We try to keep project team partners as happy as possible. For example we hold periodical BBQs—we often sent cards/small gifts at the festive season.</td>
<td>We usually help suppliers or subcontractors in distress to keep them solvent till the end of the job. We informally monitor their staff morale and respond if needed. We also more concern about our ethical behaviour when we deal with all project team partners.</td>
<td>We have implemented a policy to gather feedback/improvement suggestions from project team partners. We use this information for wider company activities (such as resource procurement, recruitment, training, etc.).</td>
<td>We have a systemic approach to gathering 360° feedback from project team partners. We also frequently carry out brainstorming sessions to identify continuous improvement opportunities and take actions. Our strategy is focussed on being a preferred team partner.</td>
</tr>
</tbody>
</table>

Current = C: Preferred = P  

### Issue 2-3  Managing Employees — How you manage your own employees when attempting to deliver added value and profitable and successful projects

The desirability of this issue being adopted for non-lowest-price selection criteria for construction tendering is

<table>
<thead>
<tr>
<th>Level A</th>
<th>Level B</th>
<th>Level C</th>
<th>Level D</th>
</tr>
</thead>
<tbody>
<tr>
<td>We understand that the people are the most important asset in our company. We often allow employees to take time off for family emergencies when necessary and expect them to eventually make up the time. We have no specific reward systems.</td>
<td>We respond to and support our staff in times of family or health crisis and we always attempt to be family friendly. We also have a more responsive management style to motivate teams and people. Rewards dominate individual performance. We avoid losing key people by paying whatever rewards are justifiably necessary.</td>
<td>We provide a range welfare facilities and carrier development opportunities for our employees. Our management style is adapted to suit ability/circumstances of team members and focus on alignment of company objectives with employees’ aspirations. We substantially use team-based reward systems.</td>
<td>We promote family friendly policies. We systematically assess the impact our workplace has upon team members. We take action to improve this impact upon team members and also those that support them. We emphasise more on learning and we substantially use mentoring/helping rewards along with the rewards for individual and team performance.</td>
</tr>
</tbody>
</table>

Current = C: Preferred = P  

Page 8 of 16
### Issue 2-4  
**Wider Community Concerns**—How you make a positive influence on society at large when attempting to deliver added value and profitable and successful projects

*The desirability* of this issue being adopted for non-lowest-price selection criteria for construction tendering is

where: 1 = very UNdesirable to 5 = very desirable

*The degree of difficulty* obtaining evidence to substantiate your response (indicated below in either A, B, C, or D) is

where: 1 = very difficult to 5 = very easy

<table>
<thead>
<tr>
<th>Level A</th>
<th>Level B</th>
<th>Level C</th>
<th>Level D</th>
</tr>
</thead>
<tbody>
<tr>
<td>We abide by all OHS and EMS laws and requirements. We have no policy or particular expectation of our corporate citizenship image.</td>
<td>We have PR and legal advisors to help us respond to reasonable community expectations. Our main concern is to avoid bad publicity and capitalise on good PR.</td>
<td>We do all that is reasonably expected of us. We highly acknowledge contributions made by the community on successful project delivery. We respond to requests from charitable bodies or sponsorship requests. We actively support and sponsor various community groups.</td>
<td>As for Level C. We undertake a stakeholder analysis prior to commencing construction works and deploy community relation managers on our projects. We work with community groups affected by our projects. We take an active role in improving the image of our industry and our community supporters by actively supporting professional, industry and community groups.</td>
</tr>
</tbody>
</table>

Current = C: Preferred = P

### Issue 2-5  
**Image and Reputation Building**—How you make a positive influence on project stakeholders when attempting to deliver added value and profitable and successful projects

*The desirability* of this issue being adopted for non-lowest-price selection criteria for construction tendering is

where: 1 = very UNdesirable to 5 = very desirable

*The degree of difficulty* obtaining evidence to substantiate your response (indicated below in either A, B, C, or D) is

where: 1 = very difficult to 5 = very easy

<table>
<thead>
<tr>
<th>Level A</th>
<th>Level B</th>
<th>Level C</th>
<th>Level D</th>
</tr>
</thead>
<tbody>
<tr>
<td>We do our job and we think our projects meet client requirements and therefore, we highly believe that our image and reputation will be developed automatically.</td>
<td>We are anxious about developing our image and reputation among paying customers and we understand the importance of good reference and word of mouth in securing more projects form similar clients.</td>
<td>We use independent surveys of clients, consultants, supply-side partners, and community at large to improve our image and reputation. We also undertake a post-project evaluation to find out how our product performed against expectations and how our ‘brand’ image is perceived.</td>
<td>As for Level C. We also seek feedback and undertake R&amp;D to find new ways to improve both project outputs and outcomes for end-users. Our focus is on our role in the particular project, industry, and societal improvement, including advice on project functionality.</td>
</tr>
</tbody>
</table>

Current = C: Preferred = P
3 Process Management Perspective - Issues 3-1 to 3-5

The purpose of the following questions is to ascertain the level of competence that contractors can demonstrate to manage the whole project cycle compared to relevant best practices.

<table>
<thead>
<tr>
<th>Issue 3-1</th>
<th>Tendering — How you demonstrate your capacity to deliver profitable and successful projects at the tendering phase</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The desirability</strong> of this issue being adopted for non-lowest-price selection criteria for construction tendering is where: 1 = very UNdesirable to 5 = very desirable</td>
<td></td>
</tr>
<tr>
<td><strong>The degree of difficulty</strong> obtaining evidence to substantiate your response (indicated below in either A, B, C, or D) is where: 1 = very difficult to 5 = very easy</td>
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<th>Level A</th>
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<tbody>
<tr>
<td>We understand the importance of carrying out an analysis of our past tendering and commercial success to focus our concentration upon most successful market types, clients and geographical areas. However, we tender for most available projects and don’t lose tendering opportunities given by clients/their representatives.</td>
<td>We are planning to only tender on projects that have higher future prospects and always make planned $ return. We occasionally undertake analysis of tendering and commercial success. However, usually we don’t update this information and on the other hand, often this information is lost or difficult to use after a while.</td>
<td>We formulate our tendering policy on the basis of the results of our regular tender and commercial success analysis. Once we get the tendering opportunity we see whether the project in question meets our tendering policy. If so, we carefully analyse the project requirements and prepare our realistic project plans that can be easily adopted during the construction phase. Our tender is always responsive.</td>
<td>As for level C. We also get our project teams with the superior first hand experience in handing similar type of projects to provide insights in order to make the project more success. Our tender is always accompanied by alternative proposals with the clear identification of the pros and cons of each alternative. We also have also developed plans how to expand into new business areas or clients that we have identified for future business expansion.</td>
</tr>
</tbody>
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Current = C: Preferred = P  | Current = C: Preferred = P  | Current = C: Preferred = P  | Current = C: Preferred = P |
### Issue 3-2  Supply Chain Management—How you work with your project supply chain teams (subcontractors or suppliers) to deliver profitable and successful projects

**The desirability** of this issue being adopted for non-lowest-price selection criteria for construction tendering is

where: \(1 = \text{very UNdesirable} \) to \(5 = \text{very desirable}\)

**The degree of difficulty** obtaining evidence to substantiate your response (indicated below in either A, B, C, or D) is

where: \(1 = \text{very difficult} \) to \(5 = \text{very easy}\)

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<tbody>
<tr>
<td>We leave much of the decision-making of how work will proceed to our subcontractors and suppliers. We put pressure on them if it looks like a problem is developing. Site meetings only when needed.</td>
<td>We leave much of the decision-making of how work will proceed to our site management team. Site management staff inform our supply chain teams when we need things. Generally monthly site meetings.</td>
<td>We develop good relationships to work effectively and smoothly with our supply chain partners whom we have a very close and intimate relationship. We work closely with them to develop, coordinate and implement plans. Regular or real-time meetings.</td>
<td>As for level C. We work with them to build upon their ideas. Our logistics and production is closely integrated and we usually respond in real-time. We also usually try to acquire main sub-contractors and resource suppliers and strive to provide complete packages to our clients.</td>
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### Issue 3-3  Risk Management—How you effectively manage project risks to deliver profitable and successful projects

**The desirability** of this issue being adopted for non-lowest-price selection criteria for construction tendering is

where: \(1 = \text{very UNdesirable} \) to \(5 = \text{very desirable}\)

**The degree of difficulty** obtaining evidence to substantiate your response (indicated below in either A, B, C, or D) is

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<tbody>
<tr>
<td>We understand the importance of proactive risk management. We give most decision-making powers to our capable site managers – we place our trust in the site manager. We don’t have company standards for planning and management of cost, time and work place relations. We undertake no specific or formal risk analysis.</td>
<td>Once we win a project we prepare budgets, time and safety plans using our company wide standards. We scrutinise project performance (usually monthly) or more frequently if the project is ‘going wrong’. We specifically analyse risks only when the project in trouble.</td>
<td>Usually potential projects are assessed against risk and return methodology along with pricing and costs. Because we carefully analyse our project plans (such as budget, time, safety, industrial relations, community relations, environmental, etc.) during the tender process. Risk management is integral with our planning and control.</td>
<td>As for level C. We also integrate risk management plans with project scheduling and incorporate a range of scenarios to seek options for flexible decision making in reality. We also carryout extensive project audits while project in progress and build upon the pre-project plans. Highly proactive and continuous risk management.</td>
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</table>
### Issue 3-4  OHS&R, EMS, QA and QM — How you facilitate a supportive working environment for your project and supply chain teams to deliver added value and profitable and successful projects

**The desirability** of this issue being adopted for non-lowest-price selection criteria for construction tendering is

where: 1 = very UNdesirable to 5 = very desirable

**The degree of difficulty** obtaining evidence to substantiate your response (indicated below in either A, B, C, or D) is

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<tbody>
<tr>
<td>We understand the importance of maintaining good performance records in respect of OHS&amp;R, EMS, QA and QM systems. However, we give priority to cost and time requirements of our clients and find it slightly difficult to balance our interests with the requirements imposed by our business environment.</td>
<td>We have company-wide standard systems for OHS&amp;R, EMS, QA&amp;QM and we always focus on compliance. We believe that this is sufficient to respond to market demands. We either are or shortly will become an ISO accredited company.</td>
<td>We are moving towards integrated company-wide OHS&amp;R, EMS and QM systems. Team members are trained and encouraged to strive for a TQM outcome. We stress the importance of good systems.</td>
<td>As for Level C but also for decision-making, communication and management systems. From our point of view, the relevant accreditation is only the first step. Therefore, we always emphasise on benchmarking, review and continuous improvement.</td>
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### Issue 3-5  Information Technology and Communication — How you facilitate a supportive infrastructure for your project and supply chain teams to deliver added value and profitable and successful projects

**The desirability** of this issue being adopted for non-lowest-price selection criteria for construction tendering is

where: 1 = very UNdesirable to 5 = very desirable

**The degree of difficulty** obtaining evidence to substantiate your response (indicated below in either A, B, C, or D) is

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<tbody>
<tr>
<td>Much of our communication exchange is paper-based and verbal. Documents are boxed and filed upon project completion. Decision-making tends to be ad hoc and often not documented or confirmed for future reference. We leave training up to the individual concerned.</td>
<td>We maintain good records for making or defending claims using a variety of software on computers on-site. We tend to have some difficulty in transferring data/information for basing decisions upon. Training is provided only when justified and needed.</td>
<td>We mostly have networked information-processing facilities between sites and regional offices. We use email and electronic data transfer of files. We encourage and actively pursue IT system training when required. Our IT systems help facilitate quick decision-making.</td>
<td>We generally link our enterprise information systems with our supply chain partners. Most information is exchanged through networks and is compatible. We initiate training for IT systems for both our staff and our supply chain members. We use this to support joint decision-making between our supply chain and us.</td>
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4 Innovation and Learning Perspective – Issues 4-1 to 4-5
Clients, stakeholders and project participants often ignore this perspective and yet it represents a significant intangible benefit/asset that in some cases may be worth more than the physical assets produced as part of the project.

<table>
<thead>
<tr>
<th>Issue 4-1</th>
<th>Top Management Leadership — How your company value innovation and learning when attempting to deliver added value and profitable and successful projects</th>
</tr>
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<tbody>
<tr>
<td><strong>The desirability</strong> of this issue being adopted for non-lowest-price selection criteria for construction tendering is where: 1 = very UNdesirable to 5 = very desirable</td>
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<tbody>
<tr>
<td>We understand the value of <strong>successful</strong> innovation and learning. However, we are uncomfortable with failures, which prevent us from becoming leaders in innovation and learning due to our financial constraints.</td>
<td>We encourage employees to take only controlled risks when new situation calls for some experimentation. However, we are still uncomfortable with excessive failures.</td>
<td>We encourage, support and lead innovation and learning initiatives in the company. We recognise and reward innovation. We always treat failure as a learning experience and try to disseminate it throughout the company enabling employees to build upon the idea and make it a success later on.</td>
<td>As for Level C. We also have a comprehensive set of measures of innovation performance. We allocate sufficient funding for innovation and learning each year directly and also through R&amp;D. We keep an eye on other industries to transfer usable knowledge into construction innovation and we have entered into some joint venture / partnership type contracts purely aimed at innovation and learning objectives.</td>
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### Issue 4-2  
**Culture and environment — How your culture and environment support transfer of knowledge when attempting to deliver added value and profitable and successful projects**

The desirability of this issue being adopted for non-lowest-price selection criteria for construction tendering is:

where: 1 = very UNdesirable to 5 = very desirable

The degree of difficulty obtaining evidence to substantiate your response (indicated below in either A, B, C, or D) is:

where: 1 = very difficult to 5 = very easy

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<tr>
<td>We keep alert to good ideas. We have no formal or policy on how to exchange and share ideas/knowledge with others. Our reward systems do not recognise the value of knowledge sharing.</td>
<td>We realise that learning between employees and also from others is important. We have an informal system of noting good ideas for improvement. We use informal social gatherings to get our people connected, and exchange ideas and knowledge. We have no effective system to store this knowledge for later retrieval and use. Our focus is on individual learning.</td>
<td>We carefully store knowledge. We participate in meetings, seminars, conferences, etc. and actively support interactions with competitors and supply chain partners. We have formal programs aimed at making connections, enabling trust and enhancing co-operations among employees. We reward mentoring and focus on learning as an organisation.</td>
<td>We have a knowledge management approach and we systemise the exchange of ideas through hardware, software and people. We support our policy through R&amp;D and participating in cross-industry bodies involved in knowledge transfer. We seek out learning opportunities continuously. We have also deployed our key knowledge managers on major joint-venture/alliances type projects to gain valuable new knowledge.</td>
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### Issue 4-3  
**Knowledge Management Initiatives — How you create, store, transfer and re-use knowledge and continuously learn when attempting to deliver added value and profitable and successful projects**

The desirability of this issue being adopted for non-lowest-price selection criteria for construction tendering is:

where: 1 = very UNdesirable to 5 = very desirable

The degree of difficulty obtaining evidence to substantiate your response (indicated below in either A, B, C, or D) is:

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<tr>
<td>Any ideas or knowledge we have access to tend to be in people’s heads or their own filing systems.</td>
<td>We have files where we store information on lessons learned, good ideas etc. These are usually out of date, difficult to access or in incompatible forms. We mainly use information we have stored for estimating costs and in preparing time plans etc.</td>
<td>We undertake well-structured independent project reviews across wider perspectives, and analyse and store the knowledge gained for further exploration. We have invested in knowledge management hardware and allow access for only authorised people.</td>
<td>As for level C. We have been experimenting with KM hardware for over 5 years and have developed systems and approaches to convert as much tacit knowledge into explicit knowledge as possible. We are aware that we have a long way to go—we continue to experiment/improve our capacity.</td>
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## Issue 4-4  Utilising and Implementing Shared Ideas—How you implement shared innovation and learning when attempting to deliver added value and profitable and successful projects

**The desirability** of this issue being adopted for non-lowest-price selection criteria for construction tendering is

where: 1 = very undesirable to 5 = very desirable

**The degree of difficulty** obtaining evidence to substantiate your response (indicated below in either A, B, C, or D) is

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<tr>
<td>We often find it difficult to use our internally generated innovations and new knowledge. People move to other projects, either have difficult remembering critical details or have left the organisation. We do not focus on benefits derived from innovation.</td>
<td>We tend not to share ideas with others, as they can become our competitors at any time. People tend to only feel safe implementing their ideas in a small work groups. Our focus is on benefits to local work group through learning. We find little opportunity to use knowledge gained from shared ideas because we are always only minor players.</td>
<td>We routinely experiment with new innovations tested and proved elsewhere that we can adapt. We have a systematic approach to evaluating success/failure by experts. We openly discuss ideas and experiences to canvass reaction and learning from our staff both on site and our supply chain teams. Our focus is on organisational as well as individual learning.</td>
<td>We work jointly with our stakeholders to gain new market knowledge. Knowledge gained and transferred is an important value-adding activity that provides a competitive advantage for us in building our relationships with our stakeholders. Our alliances contracts highly support this initiative. We build in rewards for experimenting and implementing new ideas into our rewards and promotion policy.</td>
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<th>Level A</th>
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<th>Level C</th>
<th>Level D</th>
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<tbody>
<tr>
<td>We have limited or no access to new technological market information.</td>
<td>We have access to <strong>construction specific</strong> technological market information through industry contacts. Thus, we can respond quickly for the changes in the technological environment.</td>
<td>We have greater access to new technologies through our contacts in <strong>other industries</strong> and once we get the right signals we recruit high calibre professionals and train them to use new-sophisticated technologies prior to purchasing the technology. We are proactive in the adoption of the market technologies.</td>
<td>As for level C. We have our partners who are the leaders in the technological invention. We work together in order to tailor new technologies to suit construction best practices. We also try to identify the requirements for a new technology and work with them to create a best-suited technological solution.</td>
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Current = C: Preferred = P

Please Comment on any important non-lowest-price selection criteria issues that do not appear to have been included in the above questions
Appendix C2: Clients’ Questionnaire

Identification - Please Let Us Know How You Can Be Contacted

Name __________________________________________
Title/Position __________________________________
Company ________________________________________
Address _________________________________________
Phone # __________________ Fax # ___________________
E-mail ________________________________

Why do we carry out this research?
As we all know, the tender price is usually the most significant criterion in contractor selection though it has been increasingly recognised that the lowest bid is not necessarily the most economical solution in the procurement of construction projects. As a result of higher emphasis on lowest tender price, less attention has only been traditionally placed on the quantitative evaluation of contractors’ quality attributes. Research revealed that public and private clients assigned more than 60% importance on ‘lowest-price’ and a maximum of 30% importance on project specific criteria comprising contractors’ quality attributes. However, in Australia public sector clients have expressed the urgent need for having an effective and transparent tender evaluation model, which incorporates both tender price as well as the contractor’s wider performance. This questionnaire is intended to incorporate the views of the representatives of the clients pertaining to the measurement/assessment of the contractors’ wider performance.

The New Model:

Tender Price

Business Development

Strategic capabilities, Strategic Management, Performance Management, Industry leadership, and Networking

Stakeholder Management

Client, Project team partners, Employees, Wider community, and Image and reputation

Process Management

Tendering, Supply chain management, Risk management, OHS&R, EMS, QA &QM, and ITC

Innovation and Learning

Top management leadership, Culture and environment, KM initiatives, Utilising and implementing shared ideas, and lateral support

Tender Evaluation

Contractor’s Wider Performance
How to answer this questionnaire?

You are **only** required to provide your response with regard to your desirability of each of the issues identified in this questionnaire being adopted for non-lowest-price selection criteria for construction tendering, using a 1 to 5 scale. The four levels (A to D) identified in this questionnaire are to get data from contractors and have nothing to do with this particular survey. However, the descriptions provided under those levels provide some explanation about the issue in question. In fact, each of these levels represents a profile of the contracting organization as it progresses in its journey towards Best Practice (from A to D).

*Note: You are also kindly requested to add your comments regarding any performance measures that, in your opinion, are important but have not been identified in this model.*
Contractors’ Wider Performance Measurement:

1 Business Development Perspective – Issues 1-1 to 1-5

Rationale behind this perspective measurement is that for a contractor to succeed in the business the continuous development of the essential strategic capabilities is paramount. This differentiates the company from other rivals leading to business success. Building strategic capabilities necessarily requires contractors to have a strategic intention. Thus, effective strategies are to be in place at the correct time and then these strategies should be updated with the latest feedback from continuous strategic learning process. Importantly, having a performance measurement system with leading indicators of business success would be highly helpful in providing such a timely strategic feedback to them. Additionally, industry leadership and better networking with business stakeholders also have greater bearing on the business development of the contractors.
### Issue 1-1 Developing strategic capabilities—The way in which you can demonstrate how you develop your strategic capabilities

The desirability of this issue being adopted for non-lowest-price selection criteria for construction tendering is where: 1 = very UNdesirable to 5 = very desirables

<table>
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<tr>
<th>Level A</th>
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<tbody>
<tr>
<td>We understand the importance of developing our strategic capabilities to be on par with other contractors. However, our financial position does not appropriately support this to be carried out. We seek the assistance from the government to achieve our goal.</td>
<td>We are in the process of planning for identifying our own capabilities as well as new capabilities with higher potential for the future success. We are still unconfident in going ahead with the development programs due to uncertainties in our business environment.</td>
<td>We have already implemented well-structured programs aimed at developing both our own and new strategic capabilities. As a result we have started to reap enormous benefits.</td>
<td>As for Level C but we have also analysed the feedback that we have obtained so far from the implementation and monitoring of such programs. We are now in the process of continuously improving the existing programs and also introducing new programs.</td>
</tr>
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### Issue 1-2 Strategic Management—The way in which you can demonstrate how you manage your strategies

The desirability of this issue being adopted for non-lowest-price selection criteria for construction tendering is where: 1 = very UNdesirable to 5 = very desirable

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<tbody>
<tr>
<td>We understand the importance of getting feedback about the performance of our strategies. However, such endeavour consumes more organisational resources and outputs of such an exercise immediately become obsolete in the more turbulent construction business environment.</td>
<td>We occasionally get feedback of our strategic implementation programs. We usually do so when encountered with bad performance failures and/or recession in the industry. This information is often lost or difficult to use after a while.</td>
<td>Performance of our strategies is reviewed at regular management meetings and responsibilities of managers are assigned for timely corrective actions, if necessary. We generally use such information for decision-making processes and quarterly / annual performance reviews.</td>
<td>Our business plans are developed alone with a set of appropriate performance measures and thus, information relating to performance measures are captured, analysed and discussed at management meetings. We use detailed business development and project performance information to fine-tune our business strategy.</td>
</tr>
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</table>
### Issue 1-3  Performance Measurement / Management—The way in which you can demonstrate the approach you adopt to collect information about your strategic performance and also the optimum use of it

*The desirability* of this issue being adopted for non-lowest-price selection criteria for construction tendering is where: \( 1 = \text{very UNdesirable} \) to \( 5 = \text{very desirable} \)

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<tbody>
<tr>
<td>We understand the importance of measuring performance of projects on completion. We don’t bother too much in this regard because we have reasonable workload at present.</td>
<td>We randomly measure performance of our major projects relating to client objectives of cost, time and quality. We verbally ask the managers who were in charge of those projects from head office to provide such information.</td>
<td>We systematically and regularly collect project performance information through our staff at site while project in progress and also on completion. We analyse them in detail and record all contextual issues, which governed such project outcomes.</td>
<td>As for level C, we also involve all major project stakeholders in our project reviews. We have a team responsible for carrying out wider performance reviews and reporting upon the company wide performance. We always benchmark our performance against industry best practices and strive to maintain our leadership.</td>
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</table>

### Issue 1-4  Industry leadership in providing value —The way in which you can demonstrate the way you mobilise necessary techniques and processes to enhance your value to the paying client

*The desirability* of this issue being adopted for non-lowest-price selection criteria for construction tendering is where: \( 1 = \text{very UNdesirable} \) to \( 5 = \text{very desirable} \)

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<tbody>
<tr>
<td>Most of our past clients have been satisfied with project outcomes that they have specified. We usually are not required to provide additional advice.</td>
<td>We usually suggest cost/time saving as well as functionality ideas only when requested—generally only when projects start to go wrong.</td>
<td>We systematically and regularly look for ways to improve value-for-money. We often provide buildability, value analysis (VA/VM), functional flexibility and/or other advice.</td>
<td>As for Level C, we also have a clear track record of instigating creative innovative solutions to problems and winning major projects through our value adding alternative proposals.</td>
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<td>Level A</td>
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<td>Level D</td>
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<tr>
<td>We understand the importance of networking in the growth of our company. Though we don’t emphasise currently on networking, we are too sure that we have other means to grow.</td>
<td>We usually do networking with clients when there is a need for more jobs and when the industry trend is heading towards recession. We do networking occasionally.</td>
<td>We do networking with current clients, consultants, and other company stakeholders. We also usually send out our newsletters, leaflets, etc. containing our recent remarkable achievements and improvements for our past clients and industry partners.</td>
<td>As for Level C. We also do regular presentations to our industry stakeholders aimed at communicating and transferring the new knowledge that we acquire time to time. Thus, we induce our stakeholders to value our networking and try to get optimum use out of it.</td>
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</table>

**The desirability** of this issue being adopted for non-lowest-price selection criteria for construction tendering is where: 1 = very UNdesirable to 5 = very desirable
2 Stakeholder Management Perspective – Issues 2-1 to 2-5

The project stakeholders such as client, the supply chain partners, contractors’ project teams managing the project and also the wider community each have an impact upon project success. In addition, image and reputation of the contractors among project stakeholders ‘do matter a lot’ when it comes to successful project delivery.

<table>
<thead>
<tr>
<th>Issue 2-1</th>
<th>Client Service — How you treat your paying clients when attempting to deliver added value and profitable and successful projects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The desirability</strong> of this issue being adopted for non-lowest-price selection criteria for construction tendering is where: 1 = very UNdesirable to 5 = very desirable</td>
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</tr>
<tr>
<td><strong>Level A</strong></td>
<td>Site management generally makes a concerted effort to keep the client satisfied. We focus on maintaining or building our reputation with project award decision makers.</td>
</tr>
<tr>
<td><strong>Level B</strong></td>
<td>We seek informal feedback from the client/client representatives on how well the project went and we also have performance indicators to measure customer satisfaction. We keep records of testimonials and use these in PR activities. We focus on our reputation and attempt to broaden our client base through reputation.</td>
</tr>
<tr>
<td><strong>Level C</strong></td>
<td>We have developed company-wide systems for maintaining specific and validated feedback. We use this to improve our relationship with clients. We focus on relationship building to generate repeat business and/or alliances. While satisfying specified client needs we anticipate client needs and also stimulate new market needs.</td>
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</table>

Clients’ Questionnaire
### Issue 2-2  Project Team Partners — How you treat your project team partners (including consultants) and supply-chain members when attempting to deliver added value and profitable and successful projects

**The desirability** of this issue being adopted for non-lowest-price selection criteria for construction tendering is

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
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<tbody>
<tr>
<td>A</td>
<td>We try to keep project team partners as happy as possible. For example, we hold periodical BBQs—we often sent cards/small gifts at the festive season.</td>
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<tr>
<td>B</td>
<td>We usually help suppliers or subcontractors in distress to keep them solvent till the end of the job. We informally monitor their staff morale and respond if needed. We also more concern about our ethical behaviour when we deal with all project team partners.</td>
</tr>
<tr>
<td>C</td>
<td>We have implemented a policy to gather feedback/improvement suggestions from project team partners. We use this information for wider company activities (such as resource procurement, recruitment, training, etc.).</td>
</tr>
<tr>
<td>D</td>
<td>We have a systemic approach to gathering 360° feedback from project team partners. We also frequently carry out brainstorming sessions to identify continuous improvement opportunities and take actions. Our strategy is focussed on being a preferred team partner.</td>
</tr>
</tbody>
</table>

### Issue 2-3  Managing Employees — How you manage your own employees when attempting to deliver added value and profitable and successful projects

**The desirability** of this issue being adopted for non-lowest-price selection criteria for construction tendering is

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>We understand that the people are the most important asset in our company. We often allow employees to take time off for family emergencies when necessary and expect them to eventually make up the time. We have no specific reward systems.</td>
</tr>
<tr>
<td>B</td>
<td>We respond to and support our staff in times of family or health crisis and we always attempt to be family friendly. We also have a more responsive management style to motivate teams and people. Rewards dominate individual performance. We avoid losing key people by paying whatever rewards are justifiably necessary.</td>
</tr>
<tr>
<td>C</td>
<td>We provide a range welfare facilities and carrier development opportunities for our employees. Our management style is adapted to suit ability/circumstances of team members and focus on alignment of company objectives with employees’ aspirations. We substantially use team-based reward systems.</td>
</tr>
<tr>
<td>D</td>
<td>We promote family friendly policies. We systematically assess the impact our workplace has upon team members. We take action to improve this impact upon team members and also those that support them. We emphasise more on learning and we substantially use mentoring/helping rewards along with the rewards for individual and team performance.</td>
</tr>
</tbody>
</table>
### Issue 2-4  Wider Community Concerns—How you make a positive influence on society at large when attempting to deliver added value and profitable and successful projects

*The desirability* of this issue being adopted for non-lowest-price selection criteria for construction tendering is

<table>
<thead>
<tr>
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<th>Level B</th>
<th>Level C</th>
<th>Level D</th>
</tr>
</thead>
<tbody>
<tr>
<td>We abide by all OHS and EMS laws and requirements. We have no policy or particular expectation of our corporate citizenship image. We have PR and legal advisors to help us respond to reasonable community expectations. Our main concern is to avoid bad publicity and capitalise on good PR.</td>
<td></td>
<td>We do all that is reasonably expected of us. We highly acknowledge contributions made by the community on successful project delivery. We respond to requests from charitable bodies or sponsorship requests. We actively support and sponsor various community groups.</td>
<td>As for Level C. We undertake a stakeholder analysis prior to commencing construction works and deploy community relation managers on our projects. We work with community groups affected by our projects. We take an active role in improving the image of our industry and our community supporters by actively supporting professional, industry and community groups.</td>
</tr>
</tbody>
</table>

### Issue 2-5  Image and Reputation Building—How you make a positive influence on project stakeholders when attempting to deliver added value and profitable and successful projects

*The desirability* of this issue being adopted for non-lowest-price selection criteria for construction tendering is

<table>
<thead>
<tr>
<th>Level A</th>
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</tr>
</thead>
<tbody>
<tr>
<td>We do our job and we think our projects meet client requirements and therefore, we highly believe that our image and reputation will be developed automatically. We are anxious about developing our image and reputation among paying customers and we understand the importance of good reference and word of mouth in securing more projects form similar clients.</td>
<td></td>
<td>We use independent surveys of clients, consultants, supply-side partners, and community at large to improve our image and reputation. We also undertake a post-project evaluation to find out how our product performed against expectations and how our ‘brand’ image is perceived.</td>
<td>As for Level C. We also seek feedback and undertake R&amp;D to find new ways to improve both project outputs and outcomes for end-users. Our focus is on our role in the particular project, industry, and societal improvement, including advice on project functionality.</td>
</tr>
</tbody>
</table>
3 Process Management Perspective - Issues 3-1 to 3-5

The purpose of the following questions is to ascertain the level of competence that contractors can demonstrate to manage the whole project cycle compared to relevant best practices.

<table>
<thead>
<tr>
<th>Issue 3-1</th>
<th>Tendering —How you demonstrate your capacity to deliver profitable and successful projects at the tendering phase</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The desirability</strong> of this issue being adopted for non-lowest-price selection criteria for construction tendering is where: 1 = very UNdesirable to 5 = very desirable</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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<th>Level C</th>
<th>Level D</th>
</tr>
</thead>
<tbody>
<tr>
<td>We understand the importance of carrying out an analysis of our past tendering and commercial success to focus our concentration upon most successful market types, clients and geographical areas. However, we tender for most available projects and don’t lose tendering opportunities given by clients/their representatives.</td>
<td>We are planning to only tender on projects that have higher future prospects and always make planned $ return. We occasionally undertake analysis of tendering and commercial success. However, usually we don’t update this information and on the other hand, often this information is lost or difficult to use after a while.</td>
<td>We formulate our tendering policy on the basis of the results of our regular tender and commercial success analysis. Once we get the tendering opportunity we see whether the project in question meets our tendering policy. If so, we carefully analyse the project requirements and prepare our realistic project plans that can be easily adopted during the construction phase. Our tender is always responsive.</td>
<td>As for level C. We also get our project teams with the superior first hand experience in handing similar type of projects to provide insights in order to make the project more success. Our tender is always accompanied by alternative proposals with the clear identification of the pros and cons of each alternative. We also have also developed plans how to expand into new business areas or clients that we have identified for future business expansion.</td>
</tr>
</tbody>
</table>
### Issue 3-2 Supply Chain Management—How you work with your project supply chain teams (subcontractors or suppliers) to deliver profitable and successful projects

**The desirability** of this issue being adopted for non-lowest-price selection criteria for construction tendering is

where: 1 = very UNdesirable  to 5 = very desirable

<table>
<thead>
<tr>
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<th>Level C</th>
<th>Level D</th>
</tr>
</thead>
<tbody>
<tr>
<td>We leave much of the decision-making of how work will proceed to our subcontractors and suppliers. We put pressure on them if it looks like a problem is developing. Site meetings only when needed.</td>
<td>We leave much of the decision-making of how work will proceed to our site management team. Site management staff inform our supply chain teams when we need things. Generally monthly site meetings.</td>
<td>We develop good relationships to work effectively and smoothly with our supply chain partners whom we have a very close and intimate relationship. We work closely with them to develop, coordinate and implement plans. Regular or real-time meetings.</td>
<td>As for level C. We work with them to build upon their ideas. Our logistics and production is closely integrated and we usually respond in real-time. We also usually try to acquire main sub-contractors and resource suppliers and strive to provide complete packages to our clients.</td>
</tr>
</tbody>
</table>

### Issue 3-3 Risk Management—How you effectively manage project risks to deliver profitable and successful projects

**The desirability** of this issue being adopted for non-lowest-price selection criteria for construction tendering is

where: 1 = very UNdesirable  to 5 = very desirable

<table>
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</thead>
<tbody>
<tr>
<td>We understand the importance of proactive risk management. We give most decision-making powers to our capable site managers – we place our trust in the site manager. We don’t have company standards for planning and management of cost, time and work place relations. We undertake no specific or formal risk analysis.</td>
<td>Once we win a project we prepare budgets, time and safety plans using our company wide standards. We scrutinise project performance (usually monthly) or more frequently if the project is ‘going wrong’. We specifically analyse risks only when the project in trouble.</td>
<td>Usually potential projects are assessed against risk and return methodology along with pricing and costs. Because we carefully analyse our project plans (such as budget, time, safety, industrial relations, community relations, environmental, etc.) during the tender process. Risk management is integral with our planning and control.</td>
<td>As for level C. We also integrate risk management plans with project scheduling and incorporate a range of scenarios to seek options for flexible decision making in reality. We also carryout extensive project audits while project in progress and build upon the pre-project plans. Highly proactive and continuous risk management.</td>
</tr>
</tbody>
</table>
### Issue 3-4  OHS& R, EMS, QA and QM — How you facilitate a supportive working environment for your project and supply chain teams to deliver added value and profitable and successful projects

The desirability of this issue being adopted for non-lowest-price selection criteria for construction tendering is

<table>
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</thead>
<tbody>
<tr>
<td>We understand the importance of maintaining good performance records in respect of OHS&amp;R, EMS, QA and QM systems. However, we give priority to cost and time requirements of our clients and find it slightly difficult to balance our interests with the requirements imposed by our business environment.</td>
<td>We have company-wide standard systems for OHS&amp;R, EMS, QA&amp;QM and we always focus on compliance. We believe that this is sufficient to respond to market demands. We either are or shortly will become an ISO accredited company.</td>
<td>We are moving towards integrated company-wide OHS&amp;R, EMS and QM systems. Team members are trained and encouraged to strive for a TQM outcome. We stress the importance of good systems.</td>
<td>As for Level C but also for decision-making, communication and management systems. From our point of the relevant accreditation is only the first step. Therefore, we always emphasise on benchmarking, review and continuous improvement.</td>
</tr>
</tbody>
</table>

### Issue 3-5  Information Technology and Communication — How you facilitate a supportive infrastructure for your project and supply chain teams to deliver added value and profitable and successful projects

The desirability of this issue being adopted for non-lowest-price selection criteria for construction tendering is

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Much of our communication exchange is paper-based and verbal. Documents are boxed and filed upon project completion. Decision-making tends to be ad hoc and often not documented or confirmed for future reference. We leave training up to the individual concerned.</td>
<td>We maintain good records for making or defending claims using a variety of software on computers on-site. We tend to have some difficulty in transferring data/information for basing decisions upon. Training is provided only when justified and needed.</td>
<td>We mostly have networked information-processing facilities between sites and regional offices. We use email and electronic data transfer of files. We encourage and actively pursue IT system training when required. Our IT systems help facilitate quick decision-making.</td>
<td>We generally link our enterprise information systems with our supply chain partners. Most information is exchanged through networks and is compatible. We initiate training for IT systems for both our staff and our supply chain members. We use this to support joint decision-making between our supply chain and us.</td>
</tr>
</tbody>
</table>
### 4 Innovation and Learning Perspective – Issues 4-1 to 4-5

Clients, stakeholders and project participants often ignore this perspective and yet it represents a significant intangible benefit/asset that in some cases may be worth more than the physical assets produced as part of the project.

**Issue 4-1  Top Management Leadership — How your company value innovation and learning when attempting to deliver added value and profitable and successful projects**

_The desirability_ of this issue being adopted for non-lowest-price selection criteria for construction tendering is __.

*where: 1 = very UNdesirable to 5 = very desirable*

<table>
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<tbody>
<tr>
<td>We understand the value of <strong>successful</strong> innovation and learning.</td>
<td>We encourage employees to take only controlled risks when new situation calls for some experimentation. However, we are still uncomfortable with excessive failures.</td>
<td>We encourage, support and lead innovation and learning initiatives in the company. We recognise and reward innovation. We always treat failure as a learning experience and try to disseminate it throughout the company enabling employees to build upon the idea and make it a success later on.</td>
<td>As for Level C. We also have a comprehensive set of measures of innovation performance. We allocate sufficient funding for innovation and learning each year directly and also through R&amp;D. We keep an eye on other industries to transfer usable knowledge into construction innovation and we have entered into some joint venture / partnership type contracts purely aimed at innovation and learning objectives.</td>
</tr>
</tbody>
</table>

Clients’ Questionnaire  Page 13 of 16
### Issue 4-2  
**Culture and environment — How your culture and environment support transfer of knowledge when attempting to deliver added value and profitable and successful projects**

*The desirability* of this issue being adopted for non-lowest-price selection criteria for construction tendering is... 

<table>
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</thead>
<tbody>
<tr>
<td>We keep alert to good ideas. We have no formal or policy on how to exchange and share ideas/knowledge with others. Our reward systems do not recognise the value of knowledge sharing.</td>
<td>We realise that learning between employees and also from others is important. We have an informal system of noting good ideas for improvement. We use informal social gatherings to get our people connected, and exchange ideas and knowledge. We have no effective system to store this knowledge for later retrieval and use. Our focus is on individual learning.</td>
<td>We carefully store knowledge. We participate in meetings, seminars, conferences, etc. and actively support interactions with competitors and supply chain partners. We have formal programs aimed at making connections, enabling trust and enhancing co-operations among employees. We reward mentoring and focus on learning as an organisation.</td>
<td>We have a knowledge management approach and we systemise the exchange of ideas through hardware, software and people. We support our policy through R&amp;D and participating in cross-industry bodies involved in knowledge transfer. We seek out learning opportunities continuously. We have also deployed our key knowledge managers on major joint-venture/alliances type projects to gain valuable new knowledge.</td>
</tr>
</tbody>
</table>

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### Issue 4-3  
**Knowledge Management Initiatives — How you create, store, transfer and re-use knowledge and continuously learn when attempting to deliver added value and profitable and successful projects**

*The desirability* of this issue being adopted for non-lowest-price selection criteria for construction tendering is... 

<table>
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<th>Level D</th>
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</thead>
<tbody>
<tr>
<td>Any ideas or knowledge we have access to tend to be in people’s heads or their own filing systems.</td>
<td>We have files where we store information on lessons learned, good ideas etc. These are usually out of date, difficult to access or in incompatible forms. We mainly use information we have stored for estimating costs and in preparing time plans etc.</td>
<td>We undertake well-structured independent project reviews across wider perspectives, and analyse and store the knowledge gained for further exploration. We have invested in knowledge management hardware and allow access for only authorised people.</td>
<td>As for level C. We have been experimenting with KM hardware for over 5 years and have developed systems and approaches to convert as much tacit knowledge into explicit knowledge as possible. We are aware that we have a long way to go—we continue to experiment/improve our capacity.</td>
</tr>
</tbody>
</table>
### Issue 4-4  Utilising and Implementing Shared Ideas—How you implement shared innovation and learning when attempting to deliver added value and profitable and successful projects

The desirability of this issue being adopted for non-lowest-price selection criteria for construction tendering is 1 = very UNdesirable to 5 = very desirable

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>We often find it difficult to use our internally generated innovations and new knowledge. People move to other projects, either have difficult remembering critical details or have left the organisation. We do not focus on benefits derived from innovation.</td>
<td>We tend not to share ideas with others, as they can become our competitors at any time. People tend to only feel safe implementing their ideas in a small work groups. Our focus is on benefits to local work group through learning. We find little opportunity to use knowledge gained from shared ideas because we are always only minor players.</td>
<td>We routinely experiment with new innovations tested and proved elsewhere that we can adapt. We have a systematic approach to evaluating success/failure by experts. We openly discuss ideas and experiences to canvass reaction and learning from our staff both on site and our supply chain teams. Our focus is on organisational as well as individual learning.</td>
<td>We work jointly with our stakeholders to gain new market knowledge. Knowledge gained and transferred is an important value-adding activity that provides a competitive advantage for us in building our relationships with our stakeholders. Our alliances contracts highly support this initiative. We build in rewards for experimenting and implementing new ideas into our rewards and promotion policy.</td>
</tr>
</tbody>
</table>

### Issue 4-5  Lateral Supports —How you get lateral supports from other industries when attempting to deliver added value and profitable and successful projects

The desirability of this issue being adopted for non-lowest-price selection criteria for construction tendering is 1 = very UNdesirable to 5 = very desirable

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<th>Level D</th>
</tr>
</thead>
<tbody>
<tr>
<td>We have limited or no access to new technological market information.</td>
<td>We have access to <strong>construction specific</strong> technological market information through industry contacts. Thus, we can respond quickly for the changes in the technological environment.</td>
<td>We have greater access to new technologies through our contacts in <strong>other industries</strong> and once we get the right signals we recruit high calibre professionals and train them to use news-sophisticated technologies prior to purchasing the technology. We are proactive in the adoption of the market technologies.</td>
<td>As for level C. We have our partners who are the leaders in the technological invention. We work together in order to tailor new technologies to suit construction best practices. We also try to identify the requirements for a new technology and work with them to create a best-suited technological solution.</td>
</tr>
</tbody>
</table>
Please Comment on any important non-lowest-price selection criteria issues that do not appear to have been included in the above questions

Tender price:

From your point of view what should be the appropriate performance split between the tender price and the particular contractor’s wider performance to use in a value-based tender evaluation method in Australia (eg. Hong Kong Housing Authority uses 70-80:20-30, and State of Hawai Facilities Group Public Works Division uses 30-50:50-70, respectively)?

1. 50-50
2. 70-30
3. 80-20
4. 90-10
5. ....................... (any other performance split, please specify)

Many thanks for taking the time to help us with this survey !!!
# Appendix D – Value-Based Contractor Selection Criteria

## 1.0 BUSINESS DEVELOPMENT PERSPECTIVE MEASURES

<table>
<thead>
<tr>
<th>RII</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td><strong>Ability to develop strategic capabilities</strong> – awareness of importance; planning for identifying own and new capabilities, implementing programs for developing strategic capabilities; monitoring those programs and getting feedback for continuous improvement; and introducing new programs</td>
</tr>
<tr>
<td>0.66</td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td><strong>Ability to manage strategies</strong> – getting continuous feedback about performance of strategies; reviewing performance of strategies at regular meetings and taking actions; using this information for decision making, developing business plans alone with a set of appropriate performance measures; tracking performance of strategies through performance measures; and using detailed business development and project performance information to fine-tune strategies</td>
</tr>
<tr>
<td>0.74</td>
<td></td>
</tr>
<tr>
<td>1.3</td>
<td><strong>Use of performance measurement systems</strong> – awareness regarding importance of project performance measurement; measuring project performance while project in progress and also on completion; recording all project performance information, involving project stakeholders in project reviews; engaging a team to undertake company-wide performance reviews; and benchmarking performance against industry best practices and striving to maintain leadership</td>
</tr>
<tr>
<td>0.79</td>
<td></td>
</tr>
<tr>
<td>1.4</td>
<td><strong>Industry leadership in providing value</strong> – providing additional advice on enhancing project performance for clients to add value for money (emphasizing buildability functional flexibility, environmentally friendly etc.); undertaking systematic and regular analysis to look for ways to improve value on projects; and undertaking value analysis (VA/VM) on projects before commencement</td>
</tr>
<tr>
<td>0.88</td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td><strong>Level of networking with stakeholders</strong> – awareness of the importance of networking; continuous networking with all important project stakeholders; delivering industry presentations aimed at communicating and transferring the new knowledge and thus inducing industry partners to value the networking</td>
</tr>
<tr>
<td>0.68</td>
<td></td>
</tr>
</tbody>
</table>

## 2.0 STAKEHOLDER MANAGEMENT PERSPECTIVE MEASURES

<table>
<thead>
<tr>
<th>RII</th>
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</thead>
<tbody>
<tr>
<td>2.1</td>
<td><strong>Client focus when attempting to deliver a project</strong> – making a concerted effort to keep the clients satisfied; building reputation among clients and project award decision makers and expand the client base through reputation; getting formal and informal feedback from clients and their representatives and having company-wide systems for maintaining specific and validated feedback, using this information to improve relationship with clients; focusing on relationship building; measuring client satisfaction using a set of indicators; greater focus on satisfying, anticipating and stimulating client needs</td>
</tr>
<tr>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>2.2</td>
<td><strong>Being a preferred team partner</strong> – keeping partners happy; helping suppliers or subcontractors in distress and uplifting staff morale; ethical practice; getting feedback/improvement suggestions and using them for wider company activities; conducting brain storming sessions to identify continuous improvement opportunities; strategy is focused on being a preferred team partner</td>
</tr>
<tr>
<td>0.86</td>
<td></td>
</tr>
<tr>
<td>2.3</td>
<td><strong>Ability to manage own employees</strong> – recognizing people as the most important asset; attempting to be family friendly; adopting more responsive management style to motivate teams and people; avoiding people turn-over; providing welfare and carrier development facilities to employees; flexible management to suit ability/circumstances of team members and focusing on alignment of company objectives with employees’ aspirations; systematically assessing the impact that work place has on team members and taking actions to improve this impact on team members and also those support them (shadow stakeholders); emphasising learning and substantially using mentoring/helping rewards alone with the rewards for individual and team performance</td>
</tr>
<tr>
<td>0.76</td>
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</tr>
<tr>
<td>2.4</td>
<td><strong>Ability to address wider community concerns</strong> – abiding by all OHS &amp; R and EMS laws and requirements; responding to reasonable community expectations; capitalizing on good PR; responding to requests from charitable bodies or sponsorship requests and supporting and sponsoring community groups; carrying out stakeholder analysis before commencing construction and deploying community relation managers on projects; working with community groups affected by the projects; playing an active role in improving the image of the industry and our community by actively supporting professional, industry, and community groups</td>
</tr>
<tr>
<td>0.68</td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td><strong>Ability to build image and reputation</strong> – anxious about developing image and reputation among stakeholders; carrying out independent surveys among them; undertaking post-project evaluations; embarking on R&amp;D to find new ways to improve project outputs and outcomes for end users; focusing on the role in the individual projects, industry, and societal improvement</td>
</tr>
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<td>0.69</td>
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</table>
### 3.0 PROCESS MANAGEMENT PERSPECTIVE MEASURES

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td><strong>Responsive tendering practices</strong> – continuously analysing and reviewing tendering and commercial success; bidding only for certain projects that meet company tendering policies; analyzing project requirements and preparing realistic project plans that can be adopted during the construction phase; getting experienced site staff to provide insights to make projects more successful; providing alternative proposals with the clear identification of all pros and cons of each proposal; having plans to expand into new business areas or clients identified for future business expansion</td>
<td>0.87</td>
</tr>
<tr>
<td>3.2</td>
<td><strong>Management of and integration with supply chain partners</strong> – developing good relationship to work effectively and smoothly with supply chain partners; working closely with supply chain partners to develop, coordinating and implementing project plans; working with supply chain partners to build on their ideas; having integrated logistics and production; real time meeting with supply chain partners; acquiring main subcontractors and resource suppliers and providing complete packages to clients</td>
<td>0.78</td>
</tr>
<tr>
<td>3.3</td>
<td><strong>Adoption of proactive and continuous risk management practices</strong> – preparing project plans such as budget, time, quality, safety, industrial relations, environmental, etc. at tendering stage; assessing potential projects against risk and reward method alone with pricing and costs; making risk management process integral with the project planning and control mechanism; integrating risk management plans with project scheduling and incorporating a range of scenarios to seek options for flexible decision making in reality; carrying out extensive project audits while project in progress and build on the pre-project plans</td>
<td>0.85</td>
</tr>
<tr>
<td>3.4</td>
<td><strong>Ability to provide supportive working environment (OHS &amp; R, EMS, QA and QM practices)</strong> – awareness of the importance of OHS &amp; R, EMS, QA and QM; having a company-wide standard for these systems and striving to achieve compliance; having accreditation with ISO; higher integration between all these standards and also integrating these standards with the company decision making, communication and management systems; providing training for employees on these systems and striving for TQM outcome; benchmarking, reviewing and continuous improvement in performance</td>
<td>0.74</td>
</tr>
<tr>
<td>3.5</td>
<td><strong>Level of information technology infrastructure</strong> – comprehensive record keeping using variety of software; having networked information-processing facilities between sites and regional offices; providing IT systems training for staff and supply chain partners; using IT systems to facilitate quick decision-making within organization and between organization and supply chain partners; linking enterprise systems with supply chain partners and information (compatible) exchange through networks</td>
<td>0.71</td>
</tr>
</tbody>
</table>

### 4.0 INNOVATION AND LEARNING PERSPECTIVE MEASURES

<table>
<thead>
<tr>
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<th>Description</th>
<th>Score</th>
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<tbody>
<tr>
<td>4.1</td>
<td><strong>Top management support for innovation and learning</strong> – awareness of the importance of innovation and learning; encouraging, supporting and leading innovation and learning initiatives in the company; recognizing and rewarding innovation and learning; treating failure as a learning experience and disseminating the knowledge throughout the company; having a comprehensive set of performance measures of innovation and learning performance; allocating funds annually for innovation directly/through R&amp;D; transferring usable knowledge from other industries into construction innovation; entering into joint venture/partnering contracts aimed at boosting innovation and learning performance</td>
<td>0.67</td>
</tr>
<tr>
<td>4.2</td>
<td><strong>Availability of appropriate culture and environment (social infrastructure) for innovation and learning to occur</strong> – realizing the value of learning between employees and also from others; having formal policies on how to exchange and share ideas/knowledge with others; having systems to note good ideas for improvement and also to store knowledge gained from others; using societal gatherings to get our people connected to exchange knowledge; participating in meetings, seminars, conferences, etc. and actively supporting interactions with competitors and supply chain partners; having formal programs aimed at making connections, enabling trust and enhancing co-operations among employees; rewarding mentoring and focusing on learning as an organization; having KM approach and systemizing the exchange of ideas through hardware, software and people; supporting KM policy through R&amp;D and participating in cross-industry bodies involved in knowledge transfer</td>
<td>0.72</td>
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<tr>
<td>Section</td>
<td>Description</td>
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<tr>
<td>4.3</td>
<td>Knowledge management initiatives under way — having files to store information on lessons learned, good ideas, etc.; undertaking well-structured project reviews across wider perspectives, and analysing and storing the knowledge gained for further exploration; experimenting with knowledge management hardware for considerable period of time and having systems and approaches to convert as much tacit knowledge into explicit knowledge as possible; continuous experimentation/improvement of capacity</td>
<td>0.69</td>
</tr>
<tr>
<td>4.4</td>
<td>Level of utilisation and implementation of shared ideas — focusing on benefits derived from shared ideas and organizational learning; experimenting with innovations tested and proved elsewhere that can be adapted; having systematic approach to evaluate joint success or failure by experts; openly discussing ideas and experiences to canvass reaction and learning from staff on site and supply chain partners; working jointly with stakeholders to gain new market knowledge; using knowledge gain and transference as an important value adding activity that forms a basis for relationship building with stakeholders; having alliance-type contracts for jointly developing ideas; having rewards and promotion policies for experimenting and implementing new ideas</td>
<td>0.72</td>
</tr>
<tr>
<td>4.5</td>
<td>Availability of lateral support from other industries — having greater access to new technologies in construction and also in other industries; highly proactive in the adoption of new technologies and having partners who are the leaders in technological invention; working together with other industries to tailor new technologies to suit construction best practices; identifying the requirements for new technologies and working with partners to create best-suited technological solutions</td>
<td>0.68</td>
</tr>
</tbody>
</table>

Table 3.1: Balanced Scorecard performance measures as Value Based Contractor Selection Criteria (Elaborated criteria).

Value-Based Contractor Selection Criteria
### Appendix E: PDCA Cycle

**Table 4.4: PDCA Cycle for Business Excellence in Construction**

<table>
<thead>
<tr>
<th>Performance Goal</th>
<th>Plan</th>
<th>Do</th>
<th>Check</th>
<th>Act</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.0 Business Development</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>1.1 Developing strategic capabilities</strong></td>
<td>Setting up awareness programs and achieving company-wide participation</td>
<td>Well communicating company’s vision and mission statements</td>
<td>Continuous monitoring and feedback</td>
<td>Revising existing programs</td>
</tr>
<tr>
<td></td>
<td>Planning for identifying own capabilities and also new capabilities</td>
<td>Implementing structured strategic capability development programs</td>
<td>360 degree feedback</td>
<td>Maintaining positive outcome for performance measures</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SWOT analysis</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Using appropriate performance measures e.g. no. of joint-venture, alliance or partnership contracts</td>
<td></td>
</tr>
<tr>
<td><strong>1.2 Proactive Strategic Management</strong></td>
<td>Making use of strategic performance information for timely decision making</td>
<td>Discussing strategic performance information at regular meetings</td>
<td>Continuous monitoring and feedback regarding strategic performance using performance measures</td>
<td>Taking actions to improve performance of existing strategies</td>
</tr>
<tr>
<td></td>
<td>Formulation of new strategies and revising existing strategies</td>
<td>Developing business plans alone with a set of appropriate performance measures</td>
<td>Carrying out surveys among customers, employees and other stakeholders</td>
<td>Implementing new strategies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Using detail business development and project performance information to fine-tune strategies</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1.3 Performance Measurement and Management</strong></td>
<td>Awareness programs</td>
<td>Conducting project performance reviews</td>
<td>Auditing while project in progress and also on completion</td>
<td>Continuously updating the performance measures</td>
</tr>
<tr>
<td></td>
<td>Wider performance measurement</td>
<td>Company-wide performance reviews</td>
<td>Independent assessment by external consultants</td>
<td>Rewarding best performers</td>
</tr>
<tr>
<td></td>
<td>Incorporating stakeholders’ feedback</td>
<td>Recording performance information</td>
<td></td>
<td>Taking remedial actions to close gaps between actual and desired performance</td>
</tr>
<tr>
<td></td>
<td>Benchmarking</td>
<td>Benchmarking against industry best practices</td>
<td></td>
<td>Maintaining positive trend for performance measures</td>
</tr>
<tr>
<td></td>
<td>Incorporating performance information with the company’s management information systems</td>
<td>Stakeholder performance measurement</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1.4 Delivering Value for Money</strong></td>
<td>Enhancing value for money for the clients</td>
<td>Undertaking systematic and regular value analysis on projects before commencement</td>
<td>Conducting post-project evaluations</td>
<td>Continuously looking for ways to improve value on projects through R&amp;D</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Providing additional advice on enhancing project performance</td>
<td>Carrying out surveys among key stakeholders</td>
<td>Striving to maintain positive feedback from key stakeholders</td>
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<td></td>
<td>Internal processes assessment</td>
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<td></td>
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<td></td>
<td>Reviewing respective performance measures</td>
<td></td>
</tr>
<tr>
<td>Performance Goal</td>
<td>Plan</td>
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<td>Check</td>
<td>Act</td>
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<tr>
<td>1.5 Networking with Stakeholders</td>
<td>Awareness about the importance of networking</td>
<td>Identifying useful networking partners and establishing contacts</td>
<td>Measuring effectiveness of networking through performance measures</td>
<td>Striving to maintain positive outcome for performance measures</td>
</tr>
<tr>
<td>Planning to increase the knowledge base through networking</td>
<td>Sending out newsletters, leaflets, annual reports, etc. containing remarkable achievements and performance improvements</td>
<td></td>
<td>Establishing and maintaining corporate image through networking</td>
<td></td>
</tr>
<tr>
<td>Keeping key stakeholders informed of company activities</td>
<td>Organising regular industry presentations aimed at communicating and transferring the new knowledge acquired over the time</td>
<td></td>
<td>Expanding networking to include even shadow stakeholder groups</td>
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</tr>
<tr>
<td>Planning to induce key stakeholders to value networking with the company</td>
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</tbody>
</table>

2.0 Stakeholder Management

2.1 Client Service | Achieving total client satisfaction | Getting feedback from clients and taking prompt actions | Measuring customer satisfaction and performance of customer service department using appropriate indicators | Alliances/partnerships with clients |
| Repeated businesses | Relationship building and attempting to broaden client base through reputation | | Benchmarking customer satisfaction and maintaining positive trends |
| Getting good references or testimonials from clients when needed | Developing company-wide systems for maintaining specific and validated feedback, and using them for PR activities | | Anticipating and also stimulating new market needs |
| Broadening client base | | | Customer management training |

2.2 Managing Project Team Partners | Satisfying project team partners and helping those in distress | Implementation of a policy to gather feedback (360°) / improvement suggestions from project team partners | Carrying out surveys Review of programs/sessions | Increasing response rate and reducing response time |
<p>| Ethical practices | Monitoring the staff morale and making timely response if needed | | Continuous strategic focus on being a preferred team partner |
| Getting contributions for company development | Using feedback information for company activities such as resource procurement, recruitment, training, etc. | | Encouraging organizational learning with partners |
| Continuous improvement | Having brainstorming sessions to identify continuous improvement opportunities | | |</p>
<table>
<thead>
<tr>
<th>Performance Goal</th>
<th>Plan</th>
<th>Do</th>
<th>Check</th>
<th>Act</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3 Managing Employees</td>
<td>Valuing people</td>
<td>Responding to and supporting staff in times of family or health crisis</td>
<td>Assessing the impact workplace has on team members and those who support them and take action to improve this impact</td>
<td>Striving to maintain positive trend for performance indicators</td>
</tr>
<tr>
<td></td>
<td>Being family friendly</td>
<td>Rewarding employees for their better performance and also for mentoring/helping rewards</td>
<td>Carrying out surveys</td>
<td>Team management and teamwork training</td>
</tr>
<tr>
<td></td>
<td>Flexible management</td>
<td>Having team based reward systems</td>
<td>Measuring effectiveness of people management</td>
<td>Establish review cycle for programs</td>
</tr>
<tr>
<td></td>
<td>Empowerment</td>
<td>Trying to retain key employees</td>
<td></td>
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<tr>
<td></td>
<td>Teamwork</td>
<td>Providing a range of welfare facilities and career development opportunities</td>
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<td></td>
<td>Alignment of company objectives with employees' aspirations</td>
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<td></td>
<td>Emphasis on learning</td>
<td></td>
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</tr>
<tr>
<td>2.4 Wider Community Concerns</td>
<td>Being responsible for the environment</td>
<td>Abide by all OHS and EMS laws and requirements</td>
<td>Measuring performance</td>
<td>Working with community groups affected by projects</td>
</tr>
<tr>
<td></td>
<td>Contributing to community activities</td>
<td>Implementation of policies for enhancement of corporate citizenship image</td>
<td>Conducting surveys</td>
<td>Striving to maintain positive trend for indicators</td>
</tr>
<tr>
<td></td>
<td>Being proactive and informative</td>
<td>Responding to requests from charitable bodies</td>
<td></td>
<td>Organising environment awareness training and safety training</td>
</tr>
<tr>
<td></td>
<td>Playing an active role in improving the image of the industry and community supporters</td>
<td>Actively supporting and sponsoring various community groups</td>
<td></td>
<td>Establishing review cycle for programs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Undertaking stakeholder analysis</td>
<td></td>
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<tr>
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<td></td>
<td>Deploying community relations managers on projects</td>
<td></td>
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<td></td>
<td></td>
<td>Supporting professional, industry and community groups</td>
<td></td>
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</tr>
<tr>
<td>2.5 Image and Reputation Building</td>
<td>Capitalising on image and reputation</td>
<td>Seeking feedback and undertaking R&amp;D to find new ways to improve both project outputs and outcomes for end-users</td>
<td>Measuring performance</td>
<td>Striving to maintain positive trend for indicators</td>
</tr>
<tr>
<td></td>
<td>Securing more projects</td>
<td>Utilising independent surveys of clients consultants, supply-side partners, and community at large to improve image and reputation</td>
<td>Conducting surveys</td>
<td></td>
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<td></td>
<td></td>
<td>Undertake post-project evaluation</td>
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<td>Performance Goal</td>
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<tr>
<td>3.0 Process Management</td>
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</tr>
<tr>
<td>3.1 Responsive Tendering</td>
<td>Concentrating on most successful market types, clients, etc.</td>
<td>Analysis of past tendering and commercial success</td>
<td>Measuring performance</td>
<td>Striving to maintain positive trend for indicators</td>
</tr>
<tr>
<td></td>
<td>Integrating business plans with tendering policies</td>
<td>Tendering only for projects that have higher future prospects and always make planned &amp; return</td>
<td>Review of tendering</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carefully analysing project requirements and preparing realistic project plans which can be easily adopted during the construction phase</td>
<td>Pattern/success, etc.</td>
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<tr>
<td></td>
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<td>Getting project teams with first hand experience to provide insights before tendering</td>
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<td></td>
<td>Providing alternative proposals with the clear identification of pros and cons of each alternative</td>
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</tr>
<tr>
<td>3.2 Supply Chain Management (Subcontractors and Suppliers)</td>
<td>Real-time meeting</td>
<td>Working closely with supply chain partners to develop, coordinate, and implement plans</td>
<td>Measuring performance</td>
<td>Alliances/partnerships with supply-chain partners</td>
</tr>
<tr>
<td></td>
<td>Close and intimate relationship</td>
<td>Working with them to build on their ideas</td>
<td>Conducting surveys</td>
<td>Striving to maintain positive trend for indicators</td>
</tr>
<tr>
<td></td>
<td>Incorporating their ideas</td>
<td>Integrating logistics and production processes with the supply chain partners</td>
<td></td>
<td>Joint training programs</td>
</tr>
<tr>
<td></td>
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<td>Responding in real-time</td>
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<td></td>
<td></td>
<td>Acquisition of main subcontractors and resource suppliers</td>
<td></td>
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</tr>
<tr>
<td>3.3 Risk Management</td>
<td>Proactive management</td>
<td>Integrating risk management plans with project scheduling and incorporating a range of scenarios</td>
<td>Independent audits</td>
<td>Striving to maintain positive trend for indicators</td>
</tr>
<tr>
<td></td>
<td>Assessing potential risks at tendering stage</td>
<td>Assessing potential projects against risk and return method with pricing and costs</td>
<td>Measuring performance</td>
<td>Improving cross-functional communication</td>
</tr>
<tr>
<td></td>
<td>Integrated risk management</td>
<td>Carefully analysing project plans such as budget, time, safety, industrial relations, community relations, environmental</td>
<td></td>
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<tr>
<td>Performance Goal</td>
<td>Plan</td>
<td>Do</td>
<td>Check</td>
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<tr>
<td>3.4 OHS &amp; R, EMS, QA and QM</td>
<td>Continuous improvement in performance</td>
<td>Company-wide integrated systems for OHS &amp; R, EMS, QA and QM</td>
<td>External and internal audits</td>
<td>Training for employees and supply chain partners to strive for a TQM outcome</td>
</tr>
<tr>
<td></td>
<td>Easy implementation of systems</td>
<td>Incorporating communication, decision making and management systems into the above systems</td>
<td>Performance measures</td>
<td>Organising environment awareness training and safety training</td>
</tr>
<tr>
<td></td>
<td>Ensuring compliance</td>
<td>Benchmaking of performance, review and continuous improvement</td>
<td></td>
<td>Establishing review cycle for programs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Seeking or maintaining ISO accreditation</td>
<td></td>
<td>Striving to maintain positive trend for indicators</td>
</tr>
<tr>
<td>3.5 Information Technology and Communication</td>
<td>Quick and effective communication and decision-making</td>
<td>Record keeping using a variety of computer software</td>
<td>Performance measures</td>
<td>Training for employees and supply chain partners on IT systems and applications</td>
</tr>
<tr>
<td></td>
<td>Joint decision-making with supply chain partners</td>
<td>Having networked information processing facilities between sites and regional offices</td>
<td>System audit and internal assessment</td>
<td>Be on par with competitors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Using IT to gather and transfer data electronically</td>
<td>Feedback from supply chain partners</td>
<td></td>
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<td></td>
<td></td>
<td>Linking enterprise’s information systems with supply chain partners</td>
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<tr>
<td>4.0 Innovation and Learning</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>4.1 Top Management Leadership</td>
<td>Encouraging innovation and learning</td>
<td>Supporting and leading innovation and learning initiatives</td>
<td>Performance measures</td>
<td>Transferring usable knowledge from other industries</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Treating failure as a learning experience and trying to make it a success later on</td>
<td>Internal assessments</td>
<td>Striving to maintain positive trend for indicators</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Allocating sufficient funding for innovation and learning</td>
<td></td>
<td>Recognition/rewards for improvement efforts</td>
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<tr>
<td></td>
<td></td>
<td>Encouraging partnerships/alliances type contracts aimed at improving innovation and learning performance</td>
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<td>Performance Goal</td>
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</tbody>
</table>
| 4.2 Culture and Environment | Knowledge acquisition  
Exchange of ideas  
Dissemination of knowledge throughout organisation | Having social gatherings to get people connected  
Participating in meetings, seminars, conferences, etc.  
Encouraging interactions with competitors and supply chain partners  
Having formal programs aimed at making connections, enabling trust, and enhancing cooperation among employees  
Systemising the exchange of ideas through hardware, software and people  
Participating in cross-industry bodies involved in knowledge transfer  
Carefully analysing and storing the knowledge gained | Performance measures  
Internal assessments  
Independent audits | Employing knowledge managers on major joint-venture/alliance projects  
Seeking out learning opportunities continuously  
Striving to maintain positive trend for indicators |
| 4.3 Knowledge Management Initiatives | Maximum utilisation of knowledge | Conducting well-structured project reviews across wider perspectives  
Analysing and storing knowledge for further exploration  
Converting tacit knowledge into explicit knowledge  
Investing in KM hardware | Performance measures  
Internal assessments  
Independent audits | Improving cross-organizational communication  
Striving to maintain positive trend for indicators |
| 4.4 Utilising and Implementing Shared Ideas | Working jointly with key stakeholders to improve project performance  
Organisational and individual learning | Discussing ideas and experiences to canvass reaction and learning with supply chain partners  
Keeping supply chain partners informed of all improvement activities and also seeking their inputs  
Making knowledge gaining and transferring an important value adding activity that leads to building relationships | Performance measures  
Internal assessments  
Independent audits | Improving cross-organizational communication  
Striving to maintain positive trend for indicators  
Rewards for experimenting and implementing new ideas  
Partnership/alliance contracts |
<table>
<thead>
<tr>
<th>Performance Goal</th>
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<th>Check</th>
<th>Act</th>
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</thead>
<tbody>
<tr>
<td>4.5 Lateral Support</td>
<td>Gaining market knowledge regarding new technology</td>
<td>Having partners in other industries</td>
<td>Performance measures</td>
<td>Improving communication with outsiders Striving to maintain positive</td>
</tr>
<tr>
<td></td>
<td>Responding quickly to market changes</td>
<td>Working together with partners to tailor new technologies to suit</td>
<td>Internal assessment</td>
<td>trend for indicators Rewards for innovations</td>
</tr>
<tr>
<td></td>
<td>Being competitive in the market</td>
<td>construction best practices</td>
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<td></td>
<td>Communicate the requirements for new technology and working with</td>
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<td></td>
<td></td>
<td>them to create best-suited technical solutions</td>
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Appendix F: The Concept behind the on-line performance assessment tool

From the research results we found the RII of all 20 BSC elements. The Total of the RII of all 20 elements can be calculated (say RII 1-20). By calculating the percentage of each RII on the Total RII (RII 1-20), we can arrive at the percentage representation of each RII on Total RII (i.e. RII 1 x 100 / RII 1-20; RII 2 x 100 / RII 1-20…. RII 20 x 100 / RII 1-20). Those results will be the maximum score that can be allocated to each of the elements and cumulative of the maximum points will be 100. That means, if a contractor’s current performance in respect of all 20 elements is 100 points. Therefore, an average points for each level will be = maximum score / 4 (say it as index) and this indeed will be embedded in the on-line system. When a contractor selects one of the four levels, the point belonging to that level (1 or 2 or 3 or 4) will be multiplied by this particular index to arrive at the score for that particular element. The performance score of a contractor will be calculated by adding the scores of all the 20 elements. Refer to the next page for an illustration regarding the calculation of performance score for the Contractor C1.
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