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Intellectual capital: Managerial perceptions of organisational knowledge resources

Mark Valentine St Leon
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THESIS

Intellectual Capital: Managerial Perceptions of Organisational Knowledge Resources

Presented by

Mark Valentine St Leon
B Ec G Cert TQM CA Certificate of Workplace Training

#0956837

**Submitted in fulfilment
of the requirements of the
Master of Business (Management)
14 August 2000.**

**Supervisor
Professor Alan Brown**

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Edith Cowan University**

TITLE

The full title of this thesis is 'Intellectual Capital: Managerial Perceptions of Organisational Knowledge'. This thesis is being submitted by Mark Valentine St Leon in fulfilment of the requirements of the Master of Business (Management).

ABSTRACT

This study addresses the question 'To what extent does organisational type and managerial role define managers' perception of Intellectual Capital?' Our understanding of the phenomenon of Intellectual Capital is an emerging one. The most recent attempts to describe and define Intellectual Capital identify a dynamic 'action' perspective as well as a static 'perception' perspective.

Intellectual Capital broadly describes the resources of knowledge available to an organisation, whether embodied in human or non-human forms, and which are capable of being transformed into and codified as productive organisational assets. The emergence, development and application of concepts of Intellectual Capital herald the arrival of the Knowledge Era. The perception of Intellectual Capital as a major organisational resource and the active management of Knowledge Resources of which it is comprised may be strategically important to the continuous generation of organisational growth and comparative advantage. Organisational type as well as managerial function may be crucial to the recognition and management of Intellectual Capital.

Two hypotheses were tested using a cross-sectional design. Specifically, the research was directed at five types of senior managers (general manager, finance, human resources, information technology and marketing) in three broad types of Australian organisations: business, government and non-profit organisations. A large sample of executives drawn from a range of organisations were surveyed on their reactions to a range of concepts that, the literature suggests, are associated with the management of Knowledge Resources.

To address the 'perceptual' perspective on Intellectual Capital, it was first speculated that the type of organisation in which a manager is employed (business, government, government business enterprise or non-profit) and/or a managerial role (general manager, finance, human resource, information technology or marketing manager) and/or the interaction between organisational type and managerial role will significantly explain their perception of the financial value of the Knowledge Resources that could

comprise the elements of Intellectual Capital. It was established that the effect of managerial role, but not organisational type, on managers' perception of the financial value of Intellectual Capital was significant.

To address the 'action' perspective on Intellectual Capital, it was hypothesised that the type of organisation in which a manager is employed (business, government, government business enterprise or non-profit) and/or managerial role (general manager, finance, human resource, information technology or marketing) and/or the interaction between organisational type and managerial role will significantly explain their active management of the Knowledge Resources identified with the emerging concept of Intellectual Capital. It was found that organisational type, but not managerial role, significantly explains managers' tendency to actively manage Knowledge Resources.

Since the commencement of research of this study, in 1996, discussion about Intellectual Capital and the closely associated issue of Knowledge Management has continued unabated. The most recent literature consulted (2000) suggests that these issues continue to mount in their importance and confirm the ascendancy of knowledge as a basic productive resource. However, in the absence of an established, cohesive body of theory and documented experience, widespread 'real world' experimentation will be required if these issues are to be satisfactorily addressed. If organisations are to more effectively identify, measure and manage their Intellectual Capital, the responsibilities for initiating and executing these tasks will fall upon the managers of organisations. This study has tentatively demonstrated that the perceptions that different types of Australian managers hold of Intellectual Capital lack uniformity and that different types of Australian organisations have yet to develop suitable policies and strategies that would facilitate its management. Unless these factors are addressed, the benefits Australian organisations could obtain from the Knowledge Era may be prejudiced or retarded.

Length: 38,790 words approximately (Chapters 1 - 5 inclusive).

DECLARATION

I certify that this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any institution of higher education and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Mark Valentine St Leon
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24 January 2001

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CHAPTER 1

INTRODUCTION

1.1 Research purpose

The purpose of this study is to extend understanding of the phenomenon of Intellectual Capital and contribute to its emerging theoretical foundations.

With the arrival of the Knowledge Era, the resources that embody knowledge are replacing land, labour and capital as the most important resources of society. The full spectrum of these resources available to an organisation - Knowledge Resources - collectively comprise its Intellectual Capital. Under conventional accounting and managerial paradigms, Intellectual Capital escapes meaningful measurement, financial valuation and management. As a consequence, the people principally responsible for the allocation of resources - managers and investors - may mis-allocate or overlook their Intellectual Capital. The perceptions that contemporary Australian managers hold of the financial value of Intellectual Capital could justify the adoption of the concept as an essential element of financial reporting and managerial decision making.

The review of business and academic literature provided not only a philosophical rationale for a study of perceptions of Intellectual Capital but accentuated concepts that would be of specific interest in designing an appropriate survey instrument.

1.2 Background

There are now no serious systematic institutional alternatives to liberal democracy and market-based capitalism for the world's most advanced countries. As a result, the state is no longer the key promoter of economic growth and social transformation (Fukuyama, 1995, p.102). Freer trade and freer investment will characterise the global village in the next decade (Ruthven, 1998, p.39). In future, the economies that perform the best will not be those whose governments help particular industries but those economies that develop and manage their Knowledge Resources more effectively (Woodall, 1996, p.44). The release of a tremendous amount of energy, creative activity and economic development will eventually confirm the ascendancy of knowledge as society's major resource (Drucker, quoted by Jones, 1990, p.178).

Knowledge is not a natural resource in the tradition of economic theory but a socially constructed resource (Toffler, 1991, p.82). Innovation is dependent upon its application (Donald, 1996, p.74) and, indeed, economic history shows that the accumulation and application of human capital (but one example of a Knowledge Resource) drive technological progress and therefore economic growth (Nussbaum, 1988, p.102). For example, public and private investments in maintaining the health, education and training of human capital explain the economic success of many nations (Farrell, Weber and Schroeder, 1990, p.88). As a further example, the effective use of human knowledge leads to the development of new versions of capital goods that are more productive than previous versions of these goods (Stokey, cited in Tallman and Wang, 1992, p.8).

In traditional economic theory, economic growth was explained by the basic factors of production: land, labour and capital, and combinations thereof, all of which are in scarce supply (Toffler, 1991, p.78). These theoretical foundations sufficed in the industrial era, when manufacturing was of greater importance than the service sector, and when manufacturing was chiefly concerned with the conversion of raw materials into finished products (Mathews and Perrera, 1996, p.256). Today, the fundamental logic of the existing economic order is at odds with sustainable business practices (Allee, 2000, p.31). The era of labour-intensive manufacturing is at an end (Toffler, 1991, p.163). The service sector is assuming a greater importance than the manufacturing sector (Mathews and Perrera, 1996, p.256) and the proportion of total employment in service industries is increasing relative to the traditional manufacturing industries (Toffler, 1991, p.71). In this emerging Knowledge Era, important structural changes are taking place in the nature of economic activity (Miller and Wurzburg, 1995, p.16) and the knowledge movement is shaking the very foundations of how an organisation is created, evolves and matures, dies or is reformed (Rogers, 1996, p.7). The quality of information, its accessibility and its application to the means of production have become fundamental to the wealth creation process (Tecker and Eide, 1995, p.96; Wriston, 1995, p.6) because information becomes knowledge when it is received and interpreted by the receiver (Shannon, cited by Sveiby, 1997, p.42). As both input and output, the growing value of knowledge is central to the new economy (Stewart, 2000, p.199).

The natural resources that corporations have traditionally mined and refined as a source of value have been replaced by the resource of knowledge (LaBarre, 1996, p.54). Today, knowledge is replacing labour and materials (Carmody, 1991, p.14) and its human embodiment is replacing natural resources (Donald, 1996, p.74; Horne, 1988, p.7) as the dominant factor of production. Already in Western societies, more people collect, handle and distribute information - the 'raw material' of knowledge - than any other form of work (Mason, 1986, p.5). Today, more Australian workers collect, store, retrieve, check and disseminate data - the 'raw material' of information - than produce food, fibres, minerals and manufacturing products (Jones, 1990, p.173). Australia's strengths in the 'old' economy - an abundance of physical resources and the concentration of financial capital in the hands of a few intermediaries - may prove to be its weakness in the new knowledge economy (James, 2000, p.59) as countries rich in natural resources risk falling into the commodity trap: the belief that their natural resources rather than their human capital will remain the source of their prosperity (Stewart, 2000, p.199).

Increasingly, every organisation depends on knowledge such as patents, processes, management skills, technologies, information about customers and suppliers, and old-fashioned experience (Stewart, 1991, p.44). Knowledge is assuming the single most important source of future wealth and power (Toffler, 1991, pp.148, 212) because whatever people buy, sell or do, knowledge is increasingly embodied as its raw material (Stewart, 1995a, p.209). To function effectively, all organisations rely increasingly on knowledge (Toffler, 1991, p.163). Knowledge Management is about enhancing the use of organisational knowledge through sound practices of information management and organisational learning (Broadbent, 1997, p.8). Knowledge Management include the valuation of knowledge intensive companies; managing knowledge to improve organisational performance; sharing knowledge and tracking knowledge-based activities for competitive advantage (Sharma, 2000, p.44). If knowledge is to be accumulated and productively applied, workers require the intellectual skills to deal with information, appropriate technologies and access to the information itself (Mason, 1986, p.10). Knowledge Resources now represent the primary resource for creating

and sustaining long run competitive advantage (Saint-Onge, 1996, p.10; Thurow, 1996, p.74ff; Harari, 1994, p.56; Nonaka, 1991, p.97) and over the next 25 years, Australia will have to develop an institutional order that enables people to more effectively utilise Knowledge Resources (Kasper, 1992, p.51ff).

Once knowledge has been created, it is of no use if it cannot be applied to the business operations of the company (Roos, Roos, Edvinsson and Dragonetti, 1997, p.18). Today, there is renewed interest in the valuation of intangible assets, especially human 'assets' (Edmonds and Rogow, 1986, p.44) and in understanding how these 'assets' can generate competitive advantage (Sherer, 1995, p.671). Instead of merely measuring and managing physical and financial assets, intangible knowledge assets are now being cultivated and leveraged to create and add value (LaBarre, 1996, p.53; Bennis, 1995, p.6; Dickson, 1995, p.14). Some intangible assets are rapidly increasing in importance relative to tangible assets (von Krogh and Roos, 1996, p.333; Stewart, 1995b, p.157) and posing challenges to people responsible for the allocation of resources, whether managers or investors (Stewart, 1995b, p.157), because these assets are not presently given any meaningful valuation (Wriston, 1995, p.7). The new service industries, for example, require greater investments in human capital than physical assets (Vickery and Wurzburg, 1992, p.15). The contacts and power of a knowledge company's marketing and sales force, the organisational capacity of its management and the ideas of its employees are more important than its material assets (Toffler, 1991, p.59). Not only is knowledge central to the operations of the organisation, it may even represent the most valuable organisational asset (Kerr, 1995, p.42; Paré, 1991, p.58). To avoid the negative impact of corporate acquisitions, mergers and downsizing programs (Sharp and Lewis, 1993, p.75), knowledge assets demand management like any other organisational assets (Stewart, 1994, p.24). Mergers often fail to work for knowledge-based organisations because of cultural conflict (Sveiby, 1997, p.101). Downsizing produces knowledge scarcity by eliminating employees whose resulting absence shows them to be the holders of essential knowledge (Davenport and Prusak, 1998, p.43).

Although the application of knowledge leads to the realisation of its value (Edvinsson and Sullivan, 1996, p.358) we have still to understand and define it in terms of its quality and productivity (Drucker, 1994, p.67). Little empirical work has been done to unravel the relationships between learning,

innovation and competitiveness (Tidd, 1997, p.16). Because there is no meaningful economic correlation between knowledge input and knowledge output, the value of Intellectual Capital is not necessarily related to the cost of acquiring it (Stewart, 1997, p.173). The traditional measures used by investors to evaluate potential investments, such as the price/earnings ratios or the price-to-book value ratios, are no longer reliable in the new economy (Laderman, quoted by Cole, 2000, p.46). According to the annual report of Sweden's most successful information technology company of recent years, financial ratios such as the return on equity are of no value for control (Sveiby, 2000, p.47).

Although crucial to organisational performance in the Knowledge Era (Drucker, 1994, p.64) and central to the new economy, knowledge violates all the rules that apply to other resources. It is inexhaustible (Toffler, 1991, pp.59,152), can be sold without sacrificing ownership (Stewart, 1991, p.55), and can grow without bound (Stokey, cited in Tallman and Wang, 1992, p.8). It accumulates slowly, shaped and channelled by hundreds of daily managerial decisions (Leonard-Barton, cited in LaBarre, 1996, p.54). Wherever knowledge connects with knowledge, such as the interactive social environment of the workplace, new combinations of knowledge are spontaneously created (Allee, 1997, p.99). Although expensive to create, it is cheap and fast to use, accessible at any time, its value a multiple of the sum of its individual parts (Stewart, 1991, p.60). Where knowledge is the major element in providing a product or service, up-front costs tend to be large, marginal costs relatively low (Stewart, 1991, p.55). Knowledge defies the basic economic principle of scarcity because it proliferates in some proportion to use and distribution. What is scarce in the new economy is the ability to understand and use knowledge (Woodall, 1996, p.44) since we are only beginning to learn how to apply knowledge to knowledge itself (Allee, 1997, p.229). Knowledge accumulates slowly over time, and is shaped, channelled and nudged in certain directions through hundreds of daily managerial decisions (Leonard-Barton, quoted by Edvinsson and Malone, 1997, p.66). If we want an organisation's knowledge resources to be used more effectively, we need to better understand the forces that move it (Davenport and Prusak, 1998, p.25). Although knowledge assets need to be treated as carefully as other assets (Stewart, 1991, p.45), traditional financial accounting mechanisms fail to account for organisational Knowledge Resources (Rogers, 1996, p.6).

These apparent contradictions explain the growing interest in the measurement and management of Intellectual Capital, the term now widely applied to describe the knowledge possessed by an organisation's workers and the information with which they work. Value is created at the intersection of the different classes of Intellectual Capital (Dzinkowski, 2000, p.34) and Intellectual Capital will have a greater impact upon the exploitation of future opportunities than on current routine operations (Roos, Roos, Edvinsson and Dragonetti, 1997, p.104). Bontis (1996a, p.3) credits the American economist John Kenneth Galbraith with first employing this term in print as early as 1969. Today, markets seem to both recognise Intellectual Capital and assign some quasi-value to it (Bontis, 1996b, p.42; Bouillon, Doran and Orazem, 1995/96, p.40). The 'multifaceted phenomenon' of Intellectual Capital is of particular interest (Bontis, 1996b, p.42) to firms that derive their profits from innovation and knowledge-intensive services (Edvinsson and Sullivan, 1996, p.356) because if it is not periodically renewed, a firm's Intellectual Capital will erode as technological change and global competition accelerate (Stewart, 1991, p.54). For example, employee knowledge, skills and abilities become increasingly obsolete in the face of unrelenting technological change and economic globalisation (Hitt, Hoskisson, Harrison and Summers, 1994, p.43). As another example, a customer base can be explored for unarticulated consumer needs as well as unserved markets and thus serve as a basis for innovation (Amidon, 1997, p.84). The accumulation, transformation and valuation of knowledge therefore lie at the heart of Intellectual Capital management (Dzinkowski, 2000, p.32).

1.3 Definition

There is as yet no universally acceptable definition of Intellectual Capital. Although it would appear that practitioners, business journalists and academicians have the same broad set of practices in mind and that, over time, their impressions are converging, different authors (and even the same authors at different times) emphasise different dimensions of the phenomenon. One major difficulty of developing an unambiguous definition is exacerbated by the fact that different elements of Intellectual Capital could be of differing relative importance to differing types of organisations. For examples: a non-profit welfare organisation might quite justifiably hold a widely different perspective from a business enterprise to the proposition of

'customer capital'; the objective of achieving 'higher-valued asset' levels would be of greater interest to a business enterprise than it would to a public authority. While much of the Intellectual Capital theory and most of the experience to emerge so far has been drawn from the banking and insurance sectors, the concept itself is widely applicable and therefore demands a universally acceptable definition. At the present time, there is still room for experimentation in quantifying and reporting on the Intellectual Capital of an organisation (Dzinkowski, 2000, p.36). In this regard, experience derived from practical application rather than government regulation should lead the way (Sveiby, 2000, p.47).

Despite the considerable inconsistencies in current descriptions of the phenomenon of Intellectual Capital, the more recent descriptions are consistent with the following model definition -

That part of total organisational wealth that represents its intellectual assets: the organisational resources of knowledge codified into productive organisational assets and which are subject to continuing and skilful transformation in order to enhance organisational performance and thus increment organisational wealth.

In other words, Intellectual Capital may be thought of as the total stock of knowledge-based equity in an organisation. Intellectual Capital may be both the end result of a knowledge transformation process or the knowledge itself that is transformed into intellectual assets of the firm (Dzinkowski, 2000, p.33).

1.4 Research question

Robbins (1993, pp.44-52) proposes three increasingly complex levels of analysis of behaviour in organisations. The dependent variables to be selected at each level customarily reflect research questions of individual, group or organisational behaviour or attitude. For the perceived determinant of those behaviours, the independent variable may be selected from either the individual, group or organisational levels. The objective of this study is therefore expressed in terms of this research question.

To what extent is managers' perception of the financial value of the Knowledge Resources that comprise Intellectual Capital defined by managerial role (general manager, finance, human resource, information technology or marketing) and/or organisational type (business, governmental or non-profit)?

This research question will be addressed by two hypotheses designed to test the strength of two basic prerequisites that are considered to be critical to the leverage of organisational Knowledge Resources into Intellectual Capital. These are: the perception managers hold of the financial value of Knowledge Resources as Intellectual Capital (H_1), and the actions managers take to actively transform uncodified Knowledge Resources into codified forms of Intellectual Capital (H_2). These hypotheses are presented at 2.4.7 and 2.5.24 respectively.

1.5 Significance

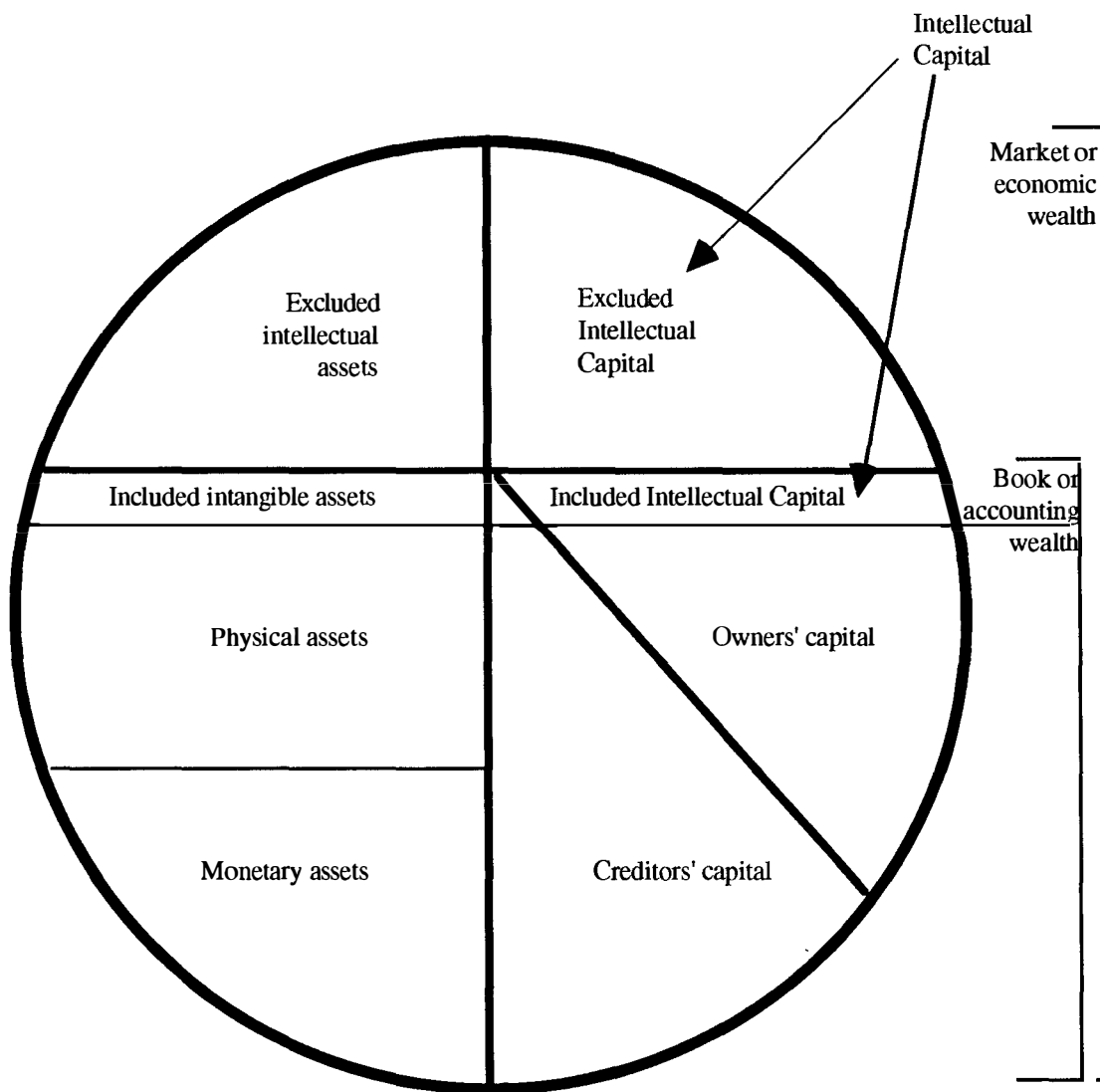
Although effective organisational and managerial performance depend upon the distribution of financial objectives and financial accountability (Drucker, 1992, p.246), the fundamental changes taking place in markets and organisational structures are creating powerful incentives for organisations to manage what previously has not been managed in any systematic way, their Intellectual Capital. For example, Tidd (1997, p.16) argues the need for better models of the technological, market and organisational factors that facilitate or constrain innovation. The current volatility in world share and commodity markets are simply manifestations of the emergence and workings of the new, knowledge-based economy (Stewart, 2000, p.199). The Internet revolution has made a more accurate system of measuring Intellectual Capital imperative (Moodie, 2000, p.42). The speed at which some of the Internet start-up companies are listed creates challenges for both market regulators and investors. How they should be valued in the absence of an operating track record and appropriate accounting standards? (Ravlic, 2000b, p.59). New millennium managers will need to develop new behaviours to value Intellectual Capital and manage it like an asset (Klaila and Hall, 2000, p.48).

The traditional transaction-based accounting model fails to capture the discrepancy between book and market values of knowledge-intensive companies (Sharma, 2000, p.44). Established accounting conventions relegate the Knowledge Resources that comprise Intellectual Capital, if they are recognised at all, to the category of intangible assets. The conventional accounting paradigm recognises tangible assets, as well as a very limited range of intangible assets, as the firm's only productive assets, that portion of the left side semi-circle in **Diagram 1** below the thick horizontal line. Where the acquisition of an intangible can be traced to a specific financial transaction and it meets other accounting criteria relating to an asset, it will only be brought to account as an asset at its amortisable original cost, not its current value. Furthermore, intangible Knowledge Resources such as human capital and customer capital will be excluded altogether on the grounds that they are internally generated in the course of operations, were not acquired for specific consideration and do not meet other established asset criteria such as ownership and control. Yet, in knowledge-based companies, it is precisely these assets that collectively comprise almost most of the wealth-creating components of the business. Since traditional accounting measures of earnings, cash flow and book value fail to satisfactorily account for such resources, their management and their impact upon financial position, profitability and share value are prejudiced (Zarowin, cited by James, 1998, p.57; James, 1993, pp.195-199).

Despite the exclusion of valuable Knowledge Resources under the existing accounting paradigm and despite the conservative treatment of those intangible assets that remain, the latter's proportion of total organisational wealth is still significant: 181 listed Australian companies currently report internationally recognised intangible assets with a total book value of \$59.9 billion, some 5% of their aggregate asset base (Ravlic, 2000a, p.29). Many of these companies are now required to amortise intangible assets over the best estimate of their useful lives, usually a period not exceeding 20 years (International Accounting Standards Committee, 1998, p.5), an exercise that is pointless since the market will simply add back any amortisation to the share price (McCourt, quoted by Tabakoff, 1999, p.31).

DIAGRAM 1 | STRUCTURE OF ORGANISATIONAL WEALTH

PRODUCTIVE ASSETS = ORGANISATIONAL WEALTH



Unless managers can identify and attach a realistic financial value to Knowledge Resources that comprise Intellectual Capital, these resources are

liable to be mis-managed or even overlooked. For example, if measured in conventional terms, the rate of return on an organisation's total assets¹, a basic measure of asset productivity utilisation, would be limited to tangible assets in the above diagram (Hoggett and Edwards, 1996, p.1086). Were the organisation's Intellectual Capital to be recognised, however, its Knowledge Resources would also be included in its measure of total assets, and lead to an alternative computation.

Making knowledge productive may involve a disengagement from the familiar accounting model as well as those of organisation and management (LaBarre, 1996, p.54). Accounting for Intellectual Capital will ultimately require the invention of new financial and management accounting concepts and practises (Dzinkowski, 2000, p.33). Presently, only a few large Australian public companies are attempting to systematically measure and report their Intellectual Capital to shareholders. Compared with European and North American organisations, Australian companies have yet to develop a comprehensive framework for collecting and reporting this information (Guthrie and Petty, 2000, p.65).

Abundant anecdotal evidence demonstrates that business pragmatism is 'pulling' the issue of Intellectual Capital rather than the application of theory 'pushing' it (James, 1996b, p.69). Although American business schools have responded by creating suitable interdisciplinary initiatives, it is industry, rather than academics or consultants, which is grappling with the emerging issues on a real-time basis (Rogers, 1996, p.6). A large number of Australian companies recognise the need to develop measures of Intellectual Capital although debate rages as to how far such measures should be taken. Presently, Australian companies do not compare favourably with their overseas counterparts when assessing the ability to manage, develop, support, measure and report their Intellectual Capital (Guthrie, quoted by Moodie, 2000, p.43). The international accounting community supports the growing effort to understand the complexities of Intellectual Capital management, accounting and reporting, yet recognises that generally accepted practises will take a long time to evolve (Dzinkowski, 2000, p.36). The Institute of Chartered

¹ The return on total assets equals the sum of operating profit before tax and interest expense, divided by average total assets.

Accountants in Australia has already recognised Intellectual Capital as among the key issues facing business over the next 20 years. In Denmark, the Danish Agency for Trade and Industry recently started a 3 year project involving 19 companies, the aim being to develop standards for Intellectual Capital reporting. New Zealand's public sector auditor is understood to have begun auditing government departments and agencies for their management of Intellectual Capital as well as their more traditional assets (Moodie, 2000, p.43).

A word search of the ABI-Inform Global series on CD-ROM revealed a small but steady increase in the frequency of appearance of the keywords 'Intellectual Capital', implying increasing discourse about the subject. **Table 1** contrasts the appearance of the keywords 'human capital' already entrenched in the literature of economics (Bannock, Baxter and Davis, 1992, p.198).

TABLE 1	KEYWORD FREQUENCY	
	Intellectual Capital	Human capital
Period		
Jan 1971 - Dec 1985	2	248
Jan 1986 - Dec 1991	15	539
Jan 1992 - Dec 1993	15	281
Jan 1994 - May 1996	34	332

How might the concept of Intellectual Capital be of interest to organisations? To different types of organisations, Intellectual Capital may mean different things. For example, one conceivable form of Intellectual Capital held by any organisation is its relationship with its customers or clients. Yet this form of Intellectual Capital will be of differing consequence to differing types of organisations. A profit-making business organisation such as a motor vehicle distributor may aim to maximise the number and quality of 'customer' relationships in terms of its retention and renewal of satisfied customers. A non-profit organisation such as a community welfare association may aim to maximise the quality of its 'customer' relationships in terms of the number of welfare recipients satisfactorily finalised. A governmental organisation, such as a national taxation office, may aim to maximise the number and quality of 'customer' relationships in terms of minimising the estimated number of tax evaders and/or the estimated amount of taxation revenue evaded.

How might the concept of Intellectual Capital be of interest to managers? A general manager could conceivably point to an increment in organisational Intellectual Capital as evidence of the effective management of an organisation's Knowledge Resources. Recognition of Intellectual Capital could enable: a finance manager to measure and accurately report upon a broader array of organisational resources than is possible under conventional accounting methods; a human resource manager to effectively link human resource policies to organisational performance outcomes; an information technology manager to more effectively report the contribution, as well as the cost, of a systems upgrade to organisational performance outcomes; and a marketing manager to demonstrate the extent to which planned organisational performance outcomes depend upon the value of maintaining existing customer relationships.

In Australia, however, we have little idea of the tendency of Australian organisations and managers to recognise and manage Intellectual Capital. Although the concept of Intellectual Capital has so far been subject to little academic analysis, contemporary business literature suggests that the concept is emerging as a key management issue. The effective identification, measurement and management of Intellectual Capital may critically depend upon the degree to which perceptions of the financial value of this 'multi-faceted' phenomenon and actions over its management converge between different types of organisations and different types of managers.

1.6 Methodology

The literature review failed to reveal any closely replicable research in the field of Intellectual Capital. To seek a suitable alternative precedent, methodologies employed in other managerial studies were examined but none of these provided completely appropriate models for replication. Therefore, a methodology was developed to meet the specific requirements of this study as outlined in Chapter 4. An inductive, quantitative survey approach was employed to capture the 'big picture' of the extent to which Knowledge Resources are perceived and actively managed by managers in Australian organisations.

The two hypotheses presented in 2.4.7 and 2.5.24 were tested using a cross-sectional design. The research survey was directed at the five key managerial functional responsibilities (general manager, finance, human resource, information technology and marketing managers) within each of three broad types of Australian organisations (business, government and non-profit organisations). The numbers of organisations (317) and managers (1,448) surveyed were expected to improve the statistical power and generalisability of the results.

The survey instrument was grounded in the literature review. A copy of the survey instrument is exhibited in **Appendix A**. Before finalising the survey instrument, a draft was pre-tested for clarity and relevance.

Demographic information about the respondents (managerial role, age, gender etc) and their organisations (organisational type, size, national headquarters) was obtained on **Items 1 to 4** and **Items 38 to 47**. Item 2 (organisational type) and Item 40 (managerial role) provided the dependent variables for the tests of **Hypothesis 1** and **Hypothesis 2** respectively. The remaining items were used to explore more deeply, on a post hoc basis, the results obtained from the tests of each hypothesis. **Items 5 to 7** were intended to establish the outcomes, if any, arising from (a) managers' perceptions of Intellectual Capital and (b) managers' active management of Knowledge Resources. These items were used to explore, on a post hoc basis, the results obtained from the tests of **Hypotheses 1** and **2**. **Items 8 to 31** were intended to establish the degree to which managers actively manage the Knowledge Resource within their respective functional domains. An **Index of Knowledge Resource Action** (see 3.10.2 below) was constructed upon these items and served as the independent variable for the test of **Hypothesis 2**. Perceptions of Intellectual Capital were addressed by **Items 32 to 37**. Each item was intended to establish the degree to which managers believe that their organisation should place a realistic financial value on its different types Knowledge Resources. An **Index of Intellectual Capital Perception** (see 3.10.1 below) was constructed on the basis of these items and served as the independent variable for the testing of **Hypothesis 1**. One further item at the end of the survey form (Item 48), requested respondents to share any anecdotal experience of the management of knowledge in Australian organisations.

Face validity was determined in the initial screening procedure described in 3.5. Content validity was addressed by developing the 'action' and 'perception' variables to reflect the scope and emphasis of the literature on 'knowledge management' as set out in 2.4 and 2.5. Although construct validity can be established through convergent and discriminant validity (Sekaran, 1992, pp.172-3), this would require a body of Intellectual Capital theory. However, there is none. Construct validity was therefore improved by constructing indices of 'Intellectual Capital Perception' and 'Knowledge Resource Action', based on factor scores obtained in the course of the principal components analysis, as presented at 3.10 below.

A copy of the survey instrument was mailed to each of the 1,448 executives listed in the final mailing list. A total of 612 useable responses were received. The overall response levels were not significantly different between managerial and organisational types. Of the total 18,972 data cells (31 items x 612 observations), less than 1% had missing cell values. The means of each variable were assigned to these missing cell values. Inter-item consistency reliability was established using Cronbach's alpha co-efficient.

A review of the responses suggested a need to recognise an additional organisational category, 'government business enterprises', as a fourth organisational category for analysis. In view of the profit making orientation of these enterprises as well as the material level of responses that had been received from executives in this type of government organisation, it was considered that they should be treated as a separate and additional organisational category.

To test the two hypotheses, an Index of Intellectual Capital Perception (ICP) and an Index of Knowledge Resource Action (IKA), principle components factor analysis with varimax rotation was used to assess underlying dimensionality. A single factor was produced for each index. For ICP this was 'valuing knowledge resources not presently captured by traditional accounting paradigms'. For IKA, it was 'managing internally to maximise organisational learning'. These factors accounted for 53.6% and 18.2% of the variance generated by respective rotated factor loadings. Although each factor's explanation of the proportion of variance fell short of the commonly

accepted threshold (60%), it was considered that each was deserving of further analysis, in view of the exploratory nature of this analysis and the emergent character of Intellectual Capital, with any resulting findings being appropriately qualified.

1.7 Limitations

There are no precedents for a study of this topic in an Australian context. There are only contemporary descriptive or anecdotal precedents available in an international context. Of necessity, the study embodies viewpoints descriptive of emerging trends in other industrialised nations, particularly the United States of America, that may not necessarily be generalisable to an Australian context nor to any context over an extended period.

The exploratory scope of this study has necessarily excluded an intensive consideration of the -

- principles by which Intellectual Capital should be measured
- quantitative and qualitative performance outcomes arising from the active management of Intellectual Capital
- implications for workers of the recognition of Intellectual Capital
- social and economic implications of the recognition of Intellectual Capital.

In view of Intellectual Capital's emergent status, the operational definition adopted as well as working definitions of associated terms may not necessarily be generalisable nor valid over an extended period.

1.8 Outline

The remaining chapters of this study will be devoted to a review of relevant contemporary literature (Chapter 2); the methodology employed and data collected (Chapter 3); the results and discussion (Chapter 4); and the summary and conclusions (Chapter 5).

Table 2 summarises the abbreviations that will be employed in the text from this point.

TABLE 2		ABBREVIATIONS EMPLOYED	
Abbreviation	Meaning		
BUS	Non-government business enterprise		
FIN	Chief finance officer/finance manager/finance director		
GEN	General manager/chief executive officer/managing director		
GBE	Government business enterprise		
GLM	General linear model		
GNO	Government and non-profit organisations combined		
GOV	Government non-business department/statutory authority		
HRM	Human resource manager/director		
HSD	Honestly significant difference		
ICP	Index of intellectual capital perception		
IKA	Index of knowledge resource action		
ITM	Information technology manager/director		
MKT	Marketing manager/director		
MR	Managerial role		
NON	Non-finance managers combined		
NPO	Non-government non-profit organisation		
OECD	Organisation for Economic Cooperation and Development		
OT	Organisational type		

Table 3 (overleaf) summarises the terminology that will be employed in the text from this point.

TABLE 3	TERMINOLOGY EMPLOYED
Terminology	Meaning
Action	With respect to Intellectual Capital, the active managerial transformation of uncodified Knowledge Resources into codified and financially valued forms of Intellectual Capital.
Elements	The six essential components of Intellectual Capital: human, structural, intellectual property, customer, cultural and social capital.
Information Age	The current human era in which information is emerging as society's major productive resource.
Intellectual assets	Organisational resources of knowledge codified as productive organisational assets and subject to continuous and skilful transformation in order to enhance organisational performance and thus increase organisational wealth.
Intellectual Capital	That part of total organisational wealth that represents financial equity in its intellectual assets.
Knowledge Era	The emerging human era in which knowledge is expected to be society's major productive resource.
Knowledge firm	Organisations that leverage their Knowledge Resources to create competitive advantage.
Knowledge Resources	Identified but uncodified organisational resources that await formal codification and financial valuation as intellectual assets.
Perception	With respect to Intellectual Capital, managerial willingness to codify and attach a realistic financial value to otherwise uncodified Knowledge Resources, thus ensuring their management in pursuit of increasing organisational wealth.
Sub-elements	Any subsidiary elements of any of: human, structural, intellectual property, customer, cultural and social capital, which are considered to be the basic elements of Intellectual Capital.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Section 2.2 describes the different types of organisations and managers for which the concept of Intellectual Capital may be of immediate relevance. Section 2.3 describes contemporary issues and developments in the accounting for Knowledge Resources, the underlying rationale for Intellectual Capital. Section 2.4 describes the elements of Intellectual Capital - the Knowledge Resources - brought to light by the review of the literature and gives rise to the first hypothesis for investigation. **H₁** tests the perceptions that managers hold of the desirability of placing a financial value on these Knowledge Resources. Section 2.5 describes the range of actions brought to light by the review of the literature that managers can take to transform uncodified Knowledge Resources into codified forms of Intellectual Capital. This gives rise to the second hypothesis for investigation, **H₂**, which tests the extent to which managers actively manage their Knowledge Resources. Section 2.6 outlines the discontinuities in our existing knowledge brought to light by the literature review. A summary of findings is presented in Section 2.7.

2.2 Organisations and managers

Different types of managers in different types of organisations may hold differing perspectives on the recognition, measurement and management of Knowledge Resources and therefore on any concept of Intellectual Capital. With what types of organisations and with what types of managers are we concerned?

2.2.1 Organisations

There is already an increasing divergence between the nature of organisational activities and the methods by which the activities of an organisation may be described, analysed and evaluated (James, 1993, p.195). As Drucker (1992, p.245) argues, an enterprise's maximisation of short-term financial profitability, its traditional performance benchmark, on behalf of its principal stakeholder group (the owners) may ultimately be counter-productive. Instead, the ultimate objective of an enterprise should be the

maximisation of its long term wealth-producing capacity in order that each of its stakeholder classes may be satisfied, a postulation that demands a perspective on organisational 'wealth' not only beyond the customary single perspective of the organisation's legal owners but beyond the customary business perspective of an enterprise established for the purpose of generating a monetary profit alone. To Allee (2000, p.19), limiting our concept of organisation to the traditional boundaries of the enterprise also limits our understanding of the value a firm possesses in its wider economic, social and environmental spheres.

Apart from an enterprise's legal owners, stakeholders comprise employees (including managers), customers, suppliers and the community (Atkinson, Banker, Kaplan and Young, 1997, pp.503-9). Notions of organisational 'wealth' and 'wealth producing capacity' may not be uniform between classes of stakeholders. To varying degrees, stakeholder perceptions of organisational wealth may embrace 'assets' that are not quantified (or even quantifiable) by conventional accounting methods, such as human skills, information systems and customer relationships. Furthermore, stakeholder entitlement to the enjoyment or consumption of such 'assets' may not be recognised (nor even capable of being recognised) in conventional accounting reports. The lack of formal methods for reporting Intellectual Capital acts against the interests of the wider community of corporate shareholders (Guthrie, cited by Moodie, 2000, p.45).

To further complicate matters, notions of organisational 'wealth' and 'wealth producing capacity' may not be uniform between types of organisations. It is probably not possible to arrive at a 'one-size-fits-all' approach in reporting Intellectual Capital for the sector where there is presently the greatest evidence of Intellectual Capital, the service sector, because of its diversity (Whyte, quoted by Moodie, 2000, p.45). The current wave of privatisation as well as converging commercial and social interests have led to the broad classification of organisations as either for-profit businesses, governmental or non-profit (Mullins, 1994, p.72). Although the force of technological change and the rise of Intellectual Capital may eventually replace these organisational structures with something else, the best way to organise a modern corporation still awaits invention (Thurow, 1996, p.81; Dar, 1995, p.26).

Business organisations can no longer rely upon a mastery of standardisation and mass production and a relatively static technological environment to maximise profits. Instead, their success is now critically dependent upon their ability to continuously adapt to rapidly changing technological and market conditions through the effective management of a more educated workforce (Vakharia, 1995, p.38). Kurtzman's assertion (1996, p.20) that many business leaders are not doing enough to manage their Knowledge Resources may mirror the observation of Blount and Joss with Mair (1999, p.51) that companies that fail to keep pace with environmental change are eventually forced to accommodate the resulting new realities by submitting to dramatic change of their own.

Government agencies are becoming more consumer-oriented (Rogers, 1996, p.6) partly because efficient, internationally competitive government is vital if private industry is to raise its own productivity (Kasper, 1992, p.52). Government agencies are, by necessity, being forced to produce significantly more results for the consumer than can be provided by incremental improvements (Rogers, 1996, p.6). At one extreme, these agencies find it difficult to value and keep track of their Intellectual Capital (Kurtzman, 1996, p.20). At another extreme, this has produced a push in the public sector towards the privatisation of government-owned business enterprises, a phenomenon that parallels the fashion of restructuring in the private sector (Toffler, 1991, p.253).

In Australia, government-owned business enterprises enjoy anti-competitive privileges through their dominance of key areas of the service and infrastructure support industries (Haynes, 1994, p.123). Until privatised, these enterprises are almost uniformly the most bureaucratic, slowest to reorganise, the least willing to adapt to changing customer needs and the last to adopt advanced technology (Toffler, 1991, p.410). When privatised, they may be overwhelmed by the work necessary to establish a proper customer focus (Shaw and Perro, 1992, p.19).

In non-profit organisations, human capital alleviates the under-resourcing of financial and organisational capital, leaving committed workers to carry the 'human debt' of working for these organisations (Kaplan, 1992, p.24). Non-profit organisations have found that the direct application of for-profit

business approaches to the management of their resources does not necessarily ensure the maintenance of financially sound, high-output results (Kaplan, 1992, p.25). During the 1980s, achievement oriented non-profit organisations, frequently under-organised for the work they have to do, tend to address deficiencies of financial capital by exploiting the human capital available to them - the commitment of their workers who, in turn, diminish their own quality of life in service of the organisation (Harrison, cited by Kaplan, 1992, p.24). Analysing a non-profit credit union's financial results from the human resource as well as the financial perspectives, Cooke (1994, p.44) demonstrates how the effectiveness and productivity of its staff (which is the largest operating expense as well as the major provider of the customer service) can be better evaluated. Leading non-profit organisations of the future will develop a knowledge-based operational philosophy based on the sufficiency and appropriateness of the organisation's collective knowledge assets (Tecker and Eide, 1995, p.100).

Arbitrary classifications aside, an emerging interdisciplinary 'community of practice' now recognises that organisations, whether for-profit or non-profit, must grapple with the effective management of knowledge (Rogers, 1996, p.5). Although they may have widely differing stakeholders and missions, all types of organisations are subject to the emerging imperatives of the Knowledge Era, whether governmental, non-profit, or business organisations. These are therefore the organisational types that require evaluation at the present time.

2.2.2 Managers

Essentially, managers shape information in order to make sensible decisions about the allocation of a company's human, financial and physical capital (Petre and Harrington, 1996, p.60). Because of its soft, abstract and academic nature, 'knowledge' is not a particularly inspiring concept to them (Allee, 1997, p.14). Nevertheless, the job of managers is changing. Increasingly, they must liberate and enable, rather than supervise and motivate (Anon., 1990, p.30). They are becoming less occupied with operational matters and increasingly occupied with setting strategy, managing capital, litigating, lobbying and substituting information for other factors of production (Toffler, 1991, p.226). The management of opportunities and the management of operations require two very different logics (Roos, Roos, Edvinsson and Dragonetti, 1997, p.117).

Many managers are currently incapable of collaborating because of their mental orientation, lack of interpersonal skills and lack of exposure to environments with a level of interdependence. Collaboration and a skilful knowledge exchange requires participants who can actively hear and listen, detect the assumptions of others with whom they are in conversation, recognise their own assumptions and understand how these assumptions influence their own reactions (Saint-Onge, 1996, p.14). A group of people which builds a measurement system also builds a team and creates a common language, despite differences in their functional backgrounds (Meyer, 1994, p.102). Judgement and communication competencies will be critical in the new knowledge-based organisations. Career paths will increasingly reflect communication skills instead of technical skills. This shift will not only improve market focus but will almost certainly lead to more equitable work practices (Carmody, 1991, p.14). Better educated managers may be only part of the answer if the so-called 'screening' hypothesis holds true: the argument that employers use additional education as a screen, or filter, to place better-educated workers into the better paying jobs regardless of whether their superior levels of education necessarily yield a higher level of productivity (Strober, 1990, p.216).

Gender differences in the corporate realm are still a reality, creating barriers that deter or prevent all but a few women from moving into ranks of senior management (Moore, 1998, p.20). This is attributable to the structural discrimination entrenched through the male dominance of most Australian institutions, and a masculine lack of understanding or acceptance of alternative organisational paradigms (Still, Guerin and Chia, 1992, p.17). Although women potentially benefit from the growing workplace emphasis on the softer skills of networking, team building and ethical behaviour, the paucity of women in senior managerial positions is largely explained by male-dominated organisational cultures (Still, cited in Zbar, 1995, p.102).

As organisations learn to generate and transform knowledge into productive, value-adding activities, ambiguity surrounds the role of the general manager. On the one hand, the transition that organisations have to undertake calls for tough leadership (Kerr, 1995, p.45) but, on the other hand, the concept of authority embodied in the designation of general manager is no longer appropriate in contemporary organisational settings (Anon., 1993a, p.34).

Managers, generally, are rewarded for integrating ideas by incorporating valuable insights into their decision-making regardless of the particular school of thought from which their insights derive (Strober, 1990, p.238). However, functional responsibilities imply specialisation and segmentation between disciplines that may cause knowledge 'demarcation' if managers have little tolerance of each other's disciplines.

Australian business has found that the most troublesome area of knowledge demarcation lies between the human resource and information technology areas. Information technology tends to attract highly technical people who may not be especially social, whereas human resource management tends to attract socially oriented people who may not be attuned to technical areas. In addition to this schism, the conventional financial methods employed to evaluate information technology are often inappropriate to describe the interaction between people and machines (James, 1993, pp.122-3). The 'productivity paradox' explains why commensurate economic returns for investments in information technology have yet to be realised (Rogers, 1996, p.6). Like the introduction of the railroad in the latter half of the 19th century, the substantial productivity gains anticipated from the current proliferation of information technology will have to await mastery of the most efficient way to use the new technologies and the development of concomitant forms of organisation (Woodall, 1996, p.13; Keen, 1992, p.14). In the meantime, opinions of general managers will be polarised between those who regard information technology as a strategic resource and those regard it as an overhead cost. Only by focussing on business imperatives can information technology managers add value to their organisational role (Banaghan, 1996, p.70ff).

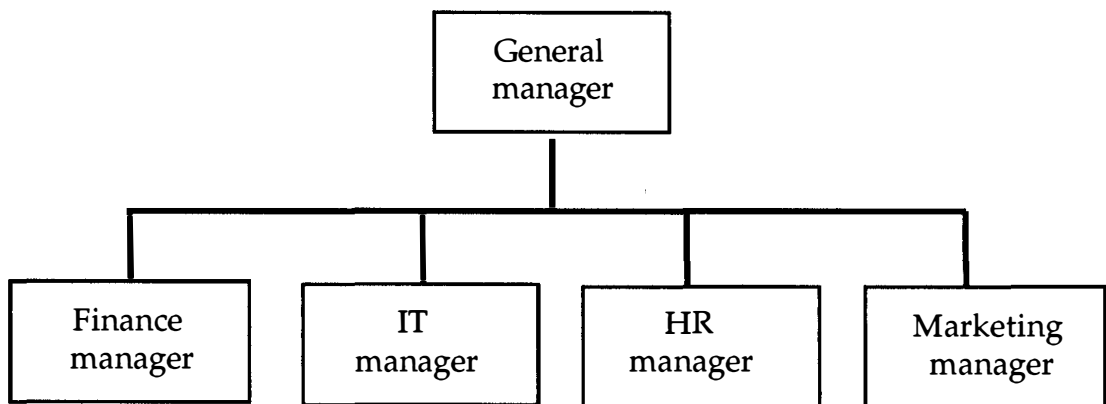
In contrast, demarcation between the human resource and marketing functions is becoming less conspicuous as new forms of corporate loyalty based on shared corporate values and vision have encouraged their convergence (Pollock, 1995, p.7ff).

The social fabric of work is being strongly affected by technological change and human resources managers must make the effort to understand the causes and effects of the changes taking place (Negroponte, cited by Ettore and McNerney, 1995b, p.15). For example, young employees are closer to the future

in terms of generational outlook and behaviour, yet top managers frequently have their 'intellectual capital' invested in the past (Hamel, cited by Ettore and McNerney, 1995a, p.153). In general, human resource managers may have to distinguish between the so-called 'boomers' (born post-1945), who are social and collegial, acclimatised to learn and perform in groups, and so-called 'busters' (aged early 20s to early 30s), solitary, gender blind 'technosavants' who move from job to job in pods, following a 'boomer' manager to whom they owe more allegiance than to an organisation. To allow 'busters' a sense of achievement in a team environment and a sense of enjoyment from their work, human resource managers may have to bring the two generations together (Kennedy, cited by Ettore and McNerney, 1995a, p.15). In any case, companies need to set aside the well-established assumption that age and capability are necessarily linked to each other (Sherry, 2000b, p.66).

A review of published Australian annual reports for a range of profit-making, governmental and non-profit organisations suggested a predominance of five broad types of senior managers: general, finance, human resource, information technology or marketing. Australian organisations typically embody the essential managerial structure presented in **Diagram 2**.

DIAGRAM 2 | **TYPICAL AUSTRALIAN MANAGERIAL STRUCTURE**



Only the role of a general manager (often called a chief executive officer) embraces all aspects of organisational performance and results. The functional responsibilities of other senior managers embrace aspects of organisational operations and performance that reflect their respective professional

disciplines and crucial organisational roles. Together, these managers are the people who will be the first to grapple with issues arising from the effective management of knowledge (Rogers, 1996, p.5) and therefore represent the managerial roles that require evaluation at the present time.

2.3 Accounting for Knowledge Resources

Technological and social developments render existing accounting rules obsolete, distorting prices and the allocation of resources (Vickery and Wurzburg, 1992, p.16). Techniques such as activity-based costing have improved accounting measures but still lag far behind modern business realities, especially in their treatment of crucial intangibles such as knowledge, customer satisfaction, quality cycle time and employee motivation (James, 1996b, p.68). As organisations turn from the exploitation of physical and natural resources to the refinement of knowledge as the major source of value, established models of organisation, existing models of management and accounting will have to be overturned (LaBarre, 1996, p.54). Traditional financial accounting mechanisms fail to calculate and calibrate the most important resources of the firm, its intellectual capacity (Rogers, 1996, p.6). Accounting categories such as goodwill only crudely reflect the mounting importance of this capacity (von Krogh and Roos, 1996, p.333; Toffler, 1991, pp.225-6). Accountants will have to find ways to assess the net economic value added by various informational activities (Toffler, 1991, p.153) to justify investments in the human and social capital of the firm (Rogers, 1996, p.6; Bouillon, Doran and Orazem, 1995/96, p.40). Growing acceptance of the value of Intellectual Capital will inevitably lead to the creation of an exchange system to trade that value (Edvinsson and Malone, 1997, p.199-201) and reinforce demands for an appropriate system of valuation. In addition, new financial instruments are required to protect investors in an environment where tangible assets no longer provide the degree of security for invested capital that they once did (James, 1999, p.23).

To be meaningful, any purported measurement of Intellectual Capital will depend upon it being placed and considered in the context of other strategically important measurements (Dickson, 1995, p.14; Head, Handlon and Martin, 1995, pp.1-2; Thornburg, 1994, p.54). A major dimension of the conceptual and practical work on managing knowledge and Knowledge

Resources is how to visualise and measure them (von Krogh and Roos, 1996, p.334). The Organisation for Economic Cooperation and Development Jobs Study suggested that national authorities consider innovations in financial accounting and reporting practices and in systems for the measurement and recognition of human skills and abilities in order to improve the quality of indicators of economic well-being (Miller and Wurzburg, 1995, p.19).

Neither Australia nor any other country has developed an accounting standard to deal with the issue of Intellectual Capital. National accounting bodies are still to address the issue of Intellectual Capital although they recognise its emerging importance. Statement of Accounting Concepts 4 (Institute of Chartered Accountants in Australia, 1995), an important Australian accounting standard concerned with the definition and recognition of elements of financial statements, dictates that an 'asset' should possess a cost or other reliably measurable value, a requirement that would explicitly exclude Intellectual Capital from recognition and disclosure Australian financial statements (Parker, 1999, p.35ff). Some Australian accounting standards would appear to be of peripheral importance to the issue, however. These include: those aspects of Statement of Accounting Concepts 4 which define an asset in terms of its future benefits and its measurability and Accounting Standard 1013 (Parker, 1999, p.522ff), which sanctions the recognition of goodwill upon acquisition (but not if generated internally) and its subsequent write-off. To the Australian Accounting Research Foundation, Intellectual Capital is an issue that will probably have to be addressed from an accounting perspective eventually, in the same way that the issue of financial instruments had to be addressed during the early 1990s (Thomson, 1996, personal communication). An evolutionary approach rather than a regulatory approach is the most feasible way of encouraging organisations to account for their Intellectual Capital (Sveiby, cited by Moodie, 2000, p.45).

Financial accounting and reporting systems influence not only the statistics that employers and individuals might keep, but the economic value of factor inputs and relative factor prices. These in turn influence the allocation of resources (Vickery and Wurzburg, 1992, p.16). In the Information Age, companies may be critically dependent on 'non-tangible' items that do not warrant inclusion in a balance sheet (Geber, 1992, p.32), at least under existing

accounting standards. Unless the balance sheet can be radically re-designed to meet the exigencies of the new commercial environment, it will become less important as a financial report (James, 1999, p.22). High technology organisations, especially, are demonstrating that their chief assets are intangible ones such as knowledge rather than physical ones such as property, plant and equipment (James, 1996a, p.61). Some enormously successful enterprises have almost no tangible assets (Stewart, 1995b, p.157). In any case, as the so-called old economy businesses increasingly marry their traditional activities with the new world of e-commerce, an increasing proportion of their assets, too, will become intangible (Moodie, 2000, p.42). If knowledge represents such a valuable resource, it will require identification, measurement and management as does any other resource. Yet, part of the difficulty that the market faces in placing a value on a firm is the absence of any formal information regarding a firm's Intellectual Capital (Guthrie and Petty, 2000, p.63). Measurement and recognition of an organisation's structural intellectual assets in financial terms, despite their 'fuzzy' or subjective characteristics, would facilitate the management of these assets like any other organisational assets (Stewart, 1994, p.24). Alternatives to the existing sets of accounting rules demand exploration (Vickery and Wurzburg, 1992, p.16).

While the need is great for a modernising of accounting methods, there is likely to be great resistance (James, 1993, p.197). Despite a widening gap between accounting standards and financial reality (Elliott, quoted by Tabakoff, 1999, p.32), there are considerable methodological and technical problems of measurement that await clearer understanding and definition. It is also important not to threaten principles of prudence in accounting and reporting systems (Vickery and Wurzburg, 1992, p.16). The solution to these objectives present enormous practical and conceptual challenges which may have to await widespread 'real world' experimentation (James, 1996b, p.69). In the meantime, accountants would do well to acknowledge the limits of their existing models (James, 1999, p.23).

An organisation's knowledge base contains both technical and social elements that facilitate the continuous adaptation to changing external circumstances (Whipp, cited by Ryan, 1995, p.3). Some companies have invested heavily in assembling their Intellectual Capital, 'map' it and make it easy to use (Stewart, 1999, p.32). A knowledge 'map' shows people in the

organisation where to go when they need expertise and should go beyond conventional departmental boundaries (Davenport and Prusak, 1998, p.18). Managers who pause to map their organisation's 'central nervous system' will be more likely to maintain their bearings in the future (Kurtzman, 1996, p.20) yet few executives understand how to navigate this uncharted territory (Edvinsson and Sullivan, 1996, p.357; Stewart, 1991, p.45). The Swedish insurance conglomerate, Skandia, has developed a 'future accounting' model which emphasises the direction and percentage change of indexes of financial, customer, process and renewal and development focus, rather than specific numbers. A complementary 'cockpit panel' will illustrate such factors as the speed of intelligence growth, the rate of competence development and the rate of knowledge sharing (LaBarre, 1996, p.54). While Skandia and a few other organisations are beginning to learn how to measure and manage their Intellectual Capital (Thornburg, 1994, p.51ff; Barton, 1993, p.39), the path ahead is not clear.

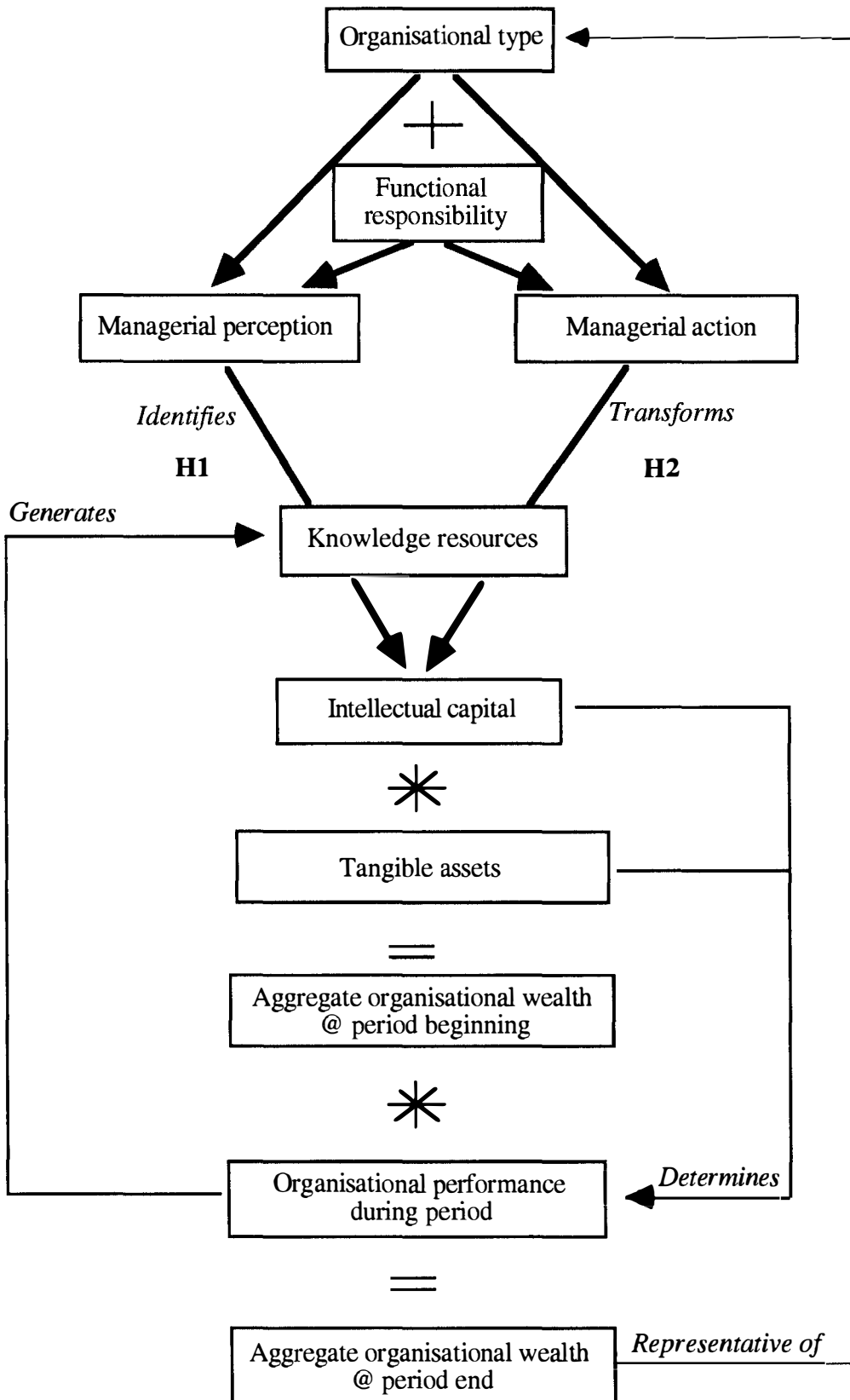
To Ward (quoted by LaBarre, 1996, p.56), understanding the nature of an organisation's work is the first step to take. Making routine what is routine releases people for more productive, creative tasks. By moving some work from a knowledge-work area to a structured operational area, the most productive use can be made of the pure knowledge work that remains. To Stewart (1991, p.45), it is necessary to locate intellectual assets and then to identify them, map them and then link them through software to databases, artificial intelligence and 'rules of thumb'. The objectives are to capture, capitalise and leverage an organisation's uncodified brainpower (Stewart, 1991, p.46). For Tecker and Eide (1995, p.102), a non-profit organisation's effective use of Intellectual Capital in sufficient and well-matched quantities will depend upon a continuously repeated process of defining the role of knowledge; identifying knowledge assets, estimating and then maximising their value in a portfolio of knowledge. In some firms, the management of Intellectual Capital has already assumed the importance of a professional management discipline (Stewart, 1995a, p.212) yet it is too early to assess how well these efforts are being repaid (Maglitta, 1995, p.86).

The most effective process measures are often those expressed in relative rather than absolute terms (Meyer, 1994, p.102). So, to evaluate the accumulation and returns on Intellectual Capital, managers can track and

measure the 'shadows' cast by intangible assets on other aspects of an organisation's activities (Stewart, 1991, p.52). One route towards measuring Intellectual Capital is to identify and quantify strategically important relationships within the organisation (Thornburg, 1994, pp. 51,54). Another route is to measure the knowledge levels of individual workers and their strategic relationships to the aggregate level of the organisation's Intellectual Capital (Thornburg, 1994, pp.54-6). In either case, the objective is not the financial measurement of Intellectual Capital in absolute terms but the development of a balanced system of measurable relativities. These systems should facilitate the management of Intellectual Capital, its contribution to overall asset growth (Edvinsson, quoted by Thornburg, 1994, p.51) and recognise that people are the true creators of value in today's organisations (Sharma, 2000, p.44).

How might these 'essential steps' be integrated within the conventional accounting model? No matter how abundant and how reliably measured, Intellectual Capital alone will not contribute to a superior organisational performance unless harnessed effectively to the organisation's complementary tangible assets. If the purpose of a 'model' is to isolate for investigation those elements that are decisive to our understanding of reality (Baran and Sweezy, 1970, cited by Remenyi, Williams, Money and Swartz, 1998, pp.134-5), the following model (**Diagram 3**, overleaf) suggests a framework for analysis of these processes in any type of organisation; and how Intellectual Capital and tangible assets could be positioned in relation to each other, to organisational wealth, and to organisational performance.


DIAGRAM 3 MODEL INTELLECTUAL CAPITAL FRAMEWORK



This model framework postulates that the value of Intellectual Capital to an organisation rests upon (a) appropriate managerial perceptions and transformations of the organisation's underlying Knowledge Resources and (b) the as yet unquantifiable impact arising from the effective integration² of the organisation's Knowledge Resources with its conventional physical and monetary resources, its tangible assets, in order to leverage continuously improving levels of organisational performance (c) the as yet unquantifiable impact of improving levels of organisational performance on existing organisational wealth in continuing to expand and re-juvenate the organisation's 'stock' of Knowledge Resources, all of which produce (d) a continuous expansion of organisational wealth in terms relevant to organisational type. Two fundamental pre-requisites in this framework, considered critical to the leverage of organisational Knowledge Resources into Intellectual Capital, are to be tested in terms of the hypotheses presented at 2.4.7 and 2.5.24 respectively. These are: the perception managers hold of the financial value of Knowledge Resources as Intellectual Capital (**H₁**), and the actions managers take to actively transform uncoded Knowledge Resources into codified forms of Intellectual Capital (**H₂**).

2.4 Perceptions of Knowledge Resources

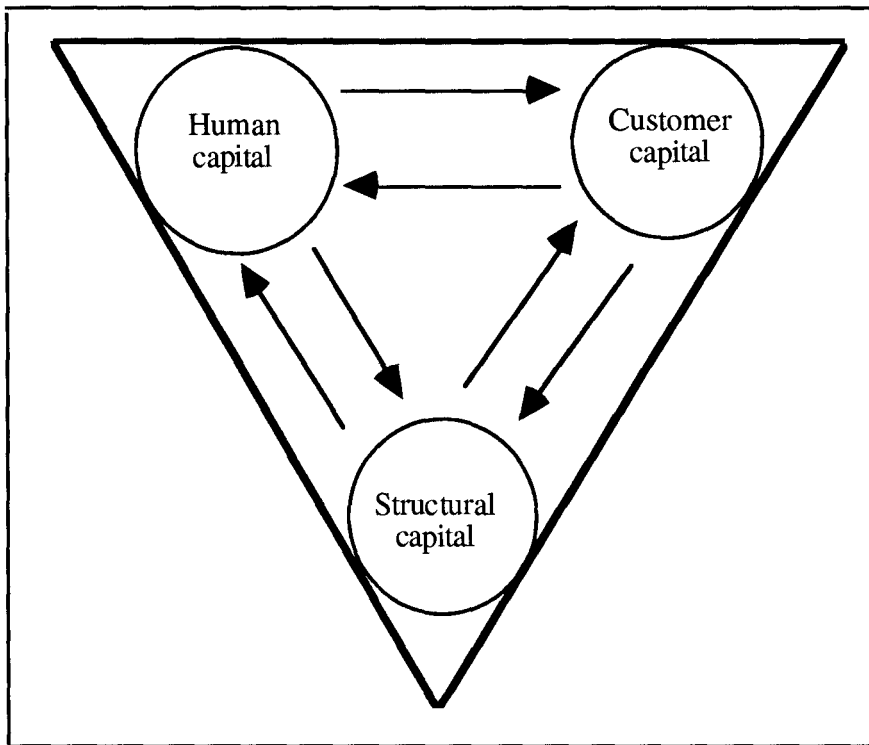
Edvinsson and Sullivan (1996, p.358) believe that Galbraith's intention in coining the term Intellectual Capital was to describe 'intellectual action' rather than 'intellect as pure intellect'. This implies that Intellectual Capital is a dynamic rather than a static form of capital and that it involves the active transformation of uncoded Knowledge Resources into codified and recognisable forms of organisational wealth. This is consistent with Sveiby's definition of knowledge as 'a capacity to act' (1997, p.37). However, many of the early attempts of business writers to describe or define Intellectual Capital recognised only a human element: 'the sum of everything everybody in a company knows that gives the company a competitive edge in the marketplace' (Stewart, 1991, p.44); 'the product of genetic inheritance,

² Represented by the synergistic multiple factor, , as yet unquantifiable. At the moment, it is impossible to say that the value of an organisation represents the mere summation of its constituent assets including its Knowledge Resources. Furthermore, the interaction between these elements may ultimately result in a value either below or above their summation (Edmonds and Rogow, 1986, p.46).

experience, education and attitude' of employees (Marcum, 1993/94, p.143); 'collective experience' (Rosenblum and Keller, 1994, p.28); 'ideas, innovations, learning and know-how' (Bennis, 1995, p.6); 'the ideas and passions of employees' (Ulrich, quoted by Thornburg, 1995, p.66); 'a platform and a pre-requisite framework for knowledge-based decision making' (Tecker and Eide, 1995, p.102); and an 'economy of competence' (Dar, 1995, p.22).

Other early attempts to describe Intellectual Capital took a perspective broader than the human element. These include descriptions such as 'knowledge, skill and information systems' (Stewart, 1994, p.24); 'human capital, market capital and confidence capital', the latter representing 'the opinions and attitudes of different stakeholder interest groups' (James, 1993, p.205); 'human, customer and structural capital' (Saint-Onge, 1996, p.10); 'human, customer and relational capital', the latter comprising social and customer capital (Bontis, 1996b, pp.43-4); and 'know how (or tacit knowledge) and intellectual assets (or codified knowledge)' (Edvinsson and Sullivan, 1996, p.362). Saint-Onge (cited in LaBarre, 1996, p.56) describes a 'double arrow dynamic': a continuous interaction between his three elements of Intellectual Capital - human, customer and structural capital - that generates the continuous 'spiral of capitalisation' depicted in **Diagram 4** below. For example, although human capital builds customer capital, the 'double arrow dynamic' means that better customer capital builds better structural capital and so on (Saint-Onge, 1996, p.14; Anon., 1993a, p.34).

DIAGRAM 4 SAINT-ONGE'S DOUBLE ARROW DYNAMIC



The most recent attempts to describe Intellectual Capital acknowledge a dynamic 'action' element as well as a static 'perception' element that reflects the original vision of Galbraith. These descriptions include 'intellectual material that has been formalised, captured and leveraged to produce a higher-valued asset' (Prusak, quoted by Edvinsson and Sullivan, 1996, p.357); 'knowledge used to increase order in the economic process' (Lumley, quoted by Edvinsson and Sullivan, 1996, p.357); 'knowledge with potential for value' (Petrash, quoted by Edvinsson and Sullivan, 1996, p.357); 'the sum of a company's islands of knowledge, its knowledge workers linked and coordinated for the benefit of the firm' (Ward, quoted by Edvinsson and Sullivan, 1996, p.357); 'a stock of knowledge that an organisation can use for productive purposes' (Edvinsson and Sullivan, 1996, p.357); and a 'fluid, philosophical process' that can only be momentarily captured in the form of a static, intangible asset (Bontis, 1996a, p.3). The diversity of descriptions in

circulation may explain why, in large Australian companies, the key components of Intellectual Capital are 'poorly understood, inadequately defined, managed inefficiently' and not reported consistently or within a consistent framework, despite the fact that awareness of Intellectual Capital is high (Moodie, 2000, p.45).

A synthesis of the foregoing descriptions of Intellectual Capital distinguished six broad forms of Knowledge Resources, the potential financial value of which could be realised through their leverage into organisational performance and wealth. These six broad forms are summarised in Table 4.

TABLE 4		BROAD FORMS OF KNOWLEDGE RESOURCES	
Form	Human capital		
<i>Description</i>	The skills and knowledge of people within an organisation (Snell and Dean, 1992, p.468).		
<i>Examples</i>	Individual knowledge, know-how, skills; knowledge workers; capabilities to formulate solutions; institutional memory; quality of leadership.		
Form	Systems capital		
<i>Description</i>	The organisational processes that lead to the production of outputs (derived from Saint-Onge, 1996, p.13).		
<i>Examples</i>	Information systems; explicit or codified knowledge (knowledge that is articulated in speech, writing and data).		
Form	Intellectual property		
<i>Description</i>	The intellectual assets over which a firm can assert rights of ownership, the source of commercialisable innovations and which can be readily traded in a disembodied form (derived Edvinsson and Sullivan, 1996, p.359).		
<i>Examples</i>	Intellectual assets that receive legal protection (eg as patents, copyrights, trade secrets, trademarks, designs).		
Form	Customer capital		
<i>Description</i>	An organisation's customers and customer relations (derived from Saint-Onge, 1996, p.13).		
<i>Examples</i>	Customer relationships; market knowledge; depth, width, attachment, and profitability of customers; what customers know and think about products and services, about the company and the company's employees.		

Form	Cultural capital
<i>Description</i>	An organisation's knowledge culture (derived from Saint-Onge, 1996, p.10).
<i>Examples</i>	Confidence, shared internal values; tacit or unarticulated knowledge, which springs from an organisation's culture, and includes the intuition, perspectives, beliefs, and values that people form as a result of their experiences; motivation, commitment, understanding of corporate goals.
Form	Social capital
<i>Description</i>	An organisation's established sense of moral community and trust (derived from Fukuyama, 1995, p.90).
<i>Examples</i>	Community relations; corporate image.

As yet, we have little idea of the relative strength, importance or interaction of the six perceived elements of Intellectual Capital identified in 2.4. Each was treated as a separate 'stand alone' variable pending the construction of composite indices of Intellectual Capital. When perceived in terms of their financial value, these six elements (or some combination thereof) could constitute managers' perception of the aggregate financial value of Knowledge Resources and therefore, (momentarily, at least), collectively represent an organisation's Intellectual Capital. The following subsections, 2.4.1 to 2.4.6, summarise what the available literature has to say about each of these six elements.

2.4.1 Human capital

Human capital comprises a monetary value of the skills and knowledge of people, the result of a firm's deliberate investment in either the hiring of certain individuals 'on the market' or their development in-house through human resource management. These investments represent both direct and opportunity costs. Increasing productivity justifies investments in them, although a firm does not 'own' this human capital since knowledge workers are largely free to move from one firm to another (Dickson, 1995, p.14; Becker, cited in Snell and Dean, 1992, p.469). In particular, organisations now need to realise the human capital gains created by increased female participation in the workforce to gain a competitive edge (Zanetic and Jeffery, 1997, p.12).

Human resources are the most fundamental element to the firm's revenue-generating capability. Human resources represent the collective capabilities of employees to solve customer problems. The firm-wide human resource is the knowledge and institutional memory about topics of importance to the company (Edvinsson and Sullivan, 1996, p.358). The expansion of non-manufacturing activity and the growing value of information as a commodity implies that human resources are not simply inseparable complements to tangible capital, but the very embodiment of productive capacity and therefore of wealth (Vickery and Wurzburg, 1992, p.16).

The skills and knowledge embodied in a firm's workforce represent human capital because they enhance productivity thereby adding value to a firm (Parnes, cited by Snell and Dean, 1992, p.469). This value is added either directly, by transforming the firm's product, or indirectly, by solving problems, co-ordinating work and exercising judgment. Human capital reflects a firm's deliberate management of its human resources, either through hiring certain individuals 'on the market' or developing them in-house (Snell and Dean, 1992, p.469). When leveraged within defined values and ambitious yet realistic targets, human capital generates significant returns and paves the way to competitive success (Saint-Onge, 1996, p.14; Anon., 1993a, p.34). The rigid organisational structures and bureaucratic controls often present in larger firms discourage the effective deployment and accumulation of human capital (Hitt, Hoskisson, Harrison and Summers, 1994, p.38).

The knowledge and expertise that workers continuously acquire make them a versatile, appreciating asset (Dickson, 1995, p.12) although they lack the characteristics of ownership, control or exchange that typify the conventional accounting definition of an 'asset'. Recording and integrating human resources information with information about other assets is necessary if human resources are to receive the valuation they deserve (Edmonds and Rogow, 1986, p.44). Compulsory financial statement disclosures regarding a firm's investments in human capital warrant serious consideration, since a statistically significant empirical relationship exists between investments in human capital and returns on investment (Bouillon, Doran and Orazem, 1995/96, p.40). After examining the management cultures of merging firms, Chatterjee, Lubatkin, Schweiger and Weber (1992, p.331) found a strong link between shareholder value and human capital.

2.4.2 Systems capital

Systems capital comprise the infrastructure that provides the environment that facilitates the creation and leverage of organisational knowledge by its human resource (adapted from Edvinsson and Sullivan, 1996, p.360). It includes the methods by which an organisation processes and communicates information, makes decisions and produces outputs. It also includes the arrangement of responsibilities and accountabilities that define the position of and relationship between members of an organisation (adapted from Saint-Onge, 1996, p.13). The more effectively people in the organisation are supported, the more effective and productive will be their use of organisational systems (Bentley, 1995, p.65) in transforming knowledge into value-adding activities. Sharp and Lewis (1993, p.78) imply that the proper valuation of management information systems in financial statements would preserve them from the negative impact of corporate acquisitions, mergers and downsizing programs.

2.4.3 Intellectual property

Florida (1991, p.569) and Garratt (1995, p.28) put forward the case for intellectual property rights as the appropriate system by which to commodify ideas and knowledge as organisational property. Innovations created by a firm's human capital are convertible into intellectual assets over which a firm can assert rights of ownership. Intellectual assets that receive legal protection become intellectual property. Intellectual assets, when coupled with structural business assets, a second major source of value for knowledge firms, are commercialisable as products or services in the market place (Edvinsson and Sullivan, 1996, p.360).

Garratt (1995, p.28) proposes the valuation of human learning, as manifested in the five internationally recognised forms of intellectual property protection, within an organisation to enable its treatment as a long term asset. The pricing of intellectual property is more complex than most product pricing because of the huge up-front development costs yet relatively inexpensive manufacturing costs (Gates, Myhrvold and Rinearson, 1995, p.259). To better align its value creating resources with its business strategy, Dow Chemical has developed a methodology for classifying, assessing and investing its patent portfolio (Petrasch, quoted by LaBarre, 1996, p.56).

2.4.4 Customer capital

A company's intellectual assets include assets that focus on customers and customer relations (Edvinsson and Sullivan, 1996, p.359). When a company's shares are sold for more than their book value, the difference is largely a recognition that the company has a strong and loyal customer base. Measuring that strength and loyalty is the challenge of customer capital (Edvinsson and Malone, 1997, p.36,37). The economic value of a customer relationship is no more 'invisible' than the market value of a house (Sveiby, 2000, p.47). Although time consuming, finding the data necessary to calculate a firm's customer capital can help to retain customers (Anon., 1995, p.182). Ultimately, we must be able to draw more definitive and quantifiable links between investments in learning and customer value (Rosenblum and Keller, 1994, p.29). Not only will the level of consumer sophistication increase but competitive strategies will become more easily replicable. Enterprises will therefore need all the insights they can glean to sustain competitive positioning in the market place (Amidon, 1997, p.84).

2.4.5 Cultural capital

Because organisational culture - the aggregation of individual opinions, shared opinions, and norms that it contains - acts as a powerful filter on its perceptions of the business environment, it should be supportive of its business strategies. Much of this culture is in the form of tacit or unarticulated knowledge (Saint-Onge, 1996, p.13) which can be harnessed for competitive advantage and cannot be accessed by competitors (McAulay, Russell and Sims, 1998, pp.42-3). Despite its nebulous characteristics, organisational culture provides the social energy that drives - or retards - organisational growth (Kilmann, Saxton and Serpa, cited in Hitt, Hoskisson, Harrison and Summers, 1994, p.38). For example, if organisational cultures continue to be based on traditional masculine values such as toughness, solitary achievement and competitive struggle, organisations are unlikely to succeed in a world where almost half their workforce, half of their competitors and more than half of all consumers are women (Zanetic and Jeffery, 1997, p.12). When comprised of commonly understood values, organisational culture can allow individuals to function quickly and reliably without debating each issue (Saint-Onge, 1996, p.12). Being a living organism, a company can develop a

collective sense of identity and fundamental purpose, what kind of world it wants to live in and how to make that world a reality (Nonaka, 1991, p.97). An organisation's size and diversification can negatively affect its culture as the greater degree of bureaucratic control required leads to the sacrifice of creative expression in favour of more consistent behaviour patterns (Hitt, Hoskisson, Harrison and Summers, 1994, pp.37-8).

In order to create value in Intellectual Capital, we must understand how knowledge is formed and how people and organisations learn to use knowledge wisely (Saint-Onge, 1996, p.13). Although markets can intuitively value an organisation's knowledge culture with an appropriate premium, conventional financial statements do not disclose this Intellectual Capital in any substantial way (Paterson, quoted by Thornburg, 1994, p.52). Corporate memory and informal information networks, examples of knowledge assets, demand valuation as an element of overall business performance (Parker and Benson, cited in Sharp and Lewis, 1993, p.78).

2.4.6 Social capital

The term 'social capital' refers to the social networks that help a society to function effectively, networks between business, community, education and local government, and 'connectedness' between its citizens based on high levels of trust (Robinson, 1998, p.2). The role that an enterprise plays in the larger economic, social and environmental systems seems to be largely overlooked in current discussions of Intellectual Capital (Allee, 2000, p.19). Today, there is a greater focus on managing intangible assets such as corporate image and trust (James, 1993, p.207). If an organisation has accumulated a sufficient stock of social capital, associations with external stakeholders form out of mutual trust and alleviate the need for extensive rules, contracts or bureaucracy (Fukuyama, 1995, p.90).

Without periodic renewal, social capital, like economic capital, depreciates (Fukuyama, 1995, p.94). The valuation of social capital would enable the effective monitoring of its accumulation, maintenance and inevitable depreciation.

2.4.7 Hypothesis 1

H₁ will test managers' perception of Intellectual Capital as 'pure perception', thereby establishing the strength of one of the major links in a 'fluid, philosophical process' (Bontis, 1996a, p.3) of Intellectual Capital. In **H₁**, the dependent variable will be an individual level variable, managerial perception of the need to place a realistic financial value upon organisational Knowledge Resources. The independent variables will be an individual level variable, managerial role (MR), and an organisational level variable, organisational type (OT).

Knowledge has accumulated exponentially in every field since the 1960s and new organisational systems are required for its application (Dickson, 1995, p.10). Deposits of knowledge are scattered throughout an organisation. These deposits are hard to find and prone to disappear without trace (Stewart, 1995a, p.209) especially if gained through experience and position in the organisation (Sharp and Lewis, 1993, p.75). Constantly replenished with streams of new ideas, reservoirs of knowledge within organisations constitute a continuous source of corporate renewal (Leonard-Barton, quoted in LaBarre, 1996, p.54).

However knowledge is to be defined, organisations will have to manage it better or perish (Rogers, 1996, p.6) because success depends more on capturing, codifying and disseminating Intellectual Capital than the mere allocation of physical and financial resources (Bontis, 1996b, p.42; Birkett, 1995, p.46). Many of the activities that take place inside an organisation are concerned with replenishing its continuously decaying inventory of Knowledge Resources, generating additional knowledge, and upgrading data into information and knowledge (Toffler, 1991, p.152). Although some influence and control over organisational knowledge are better than none at all (Rogers, 1996, p.6), no individual or group can monopolise responsibilities for knowledge in the knowledge-creating company (Nonaka, 1991, p.97). While the mechanisms for measuring Intellectual Capital await mastery, firms that invest the time and effort to define and evaluate their Knowledge Resources will generate competitive advantage, since knowledge will be a key differentiator in the new economy (Sharma, 2000, p.45). The effective management of these resources will impact positively upon performance (Bontis, 1996b, p.47) and

may smooth the path of corporate internationalisation since the transfer overseas of competitive advantage is a notoriously difficult process (Wu, cited by Dodgson and Kim, 1997, p.68).

New organisational models - people centred and market focussed - are replacing the traditional authoritarian, hierarchical models (Carmody, 1991, p.14) and the companies that are most prone to adopt these new organisational models are commonly called 'knowledge' companies (Edvinsson and Sullivan, 1996, p.357). Knowledge companies tend to have three things in common: high fixed costs such as research and development but low variable costs; network externalities through reliance upon common technology that bind firms to each other; and building upon customer familiarity with a firm's technology as a source of customer commitment (Arthur, quoted by Woodall, 1996, pp.37-8).

Do managers perceive a need to place a financial value upon their organisation's Knowledge Resources according to the type of organisation by which they are employed? Since the literature reviewed neither provides nor suggests an answer to this question, the first version of **Hypothesis 1** was developed -

Hypothesis 1-1.

Organisational type does not significantly explain managers' perception of the need to place a realistic financial value upon the organisation's Knowledge Resources.

In the old industrial hierarchy, a command of information as defined by the organisation chart was the basis of management and managerial authority (LaBarre, 1994, p.36). In the new economy however, the flow of information and the flow of physical goods frequently diverge (Stewart, 1997, p.30). In the new organisational models therefore, rapid business transformation demands new managerial positions that relate not to an authoritarian command over information but to flows of data, information or knowledge (Keen, 1992, p.12; Toffler, 1991, p.153). These positions reflect newly created business processes and cross-functional activities (Morris, 1996, p.15) that allow routine decision making to be delegated to lower organisational levels. The 'catch' is that

managers must communicate the organisation's strategies so well to those further down the hierarchy that subordinates will make decisions not only autonomously but consistent with overall organisational strategy (Thurow, 1996, p.81).

Managers will need to bring all kinds of perspectives to bear upon an organisation's knowledge base - including those of economics, sociology, philosophy, management and accounting - in order to gain a better understanding of these resources (von Krogh and Roos, 1996, p.334). However, managers' attitudes towards the management of Intellectual Capital may reflect the disciplinary, functional and personal perspectives embodied in their organisational role. For example, although advances in information technology lead to the realisation of many of the visions of management thinkers (Keen, 1992, p.12), and although information technology has made it possible to measure efficiently a wide range of business activities (James, 1996b, p.68), there are still no reliable methods for measuring the business value of this technology (Keen, 1992, p.14). As another example, managers who use the 'language' of finance and those who use the 'language' of behaviour will have to make consistent their underlying assumptions and critical perspectives if they are to communicate usefully (James, 1993, p.77). In the future, human resource managers will have to justify their strategies and functions in accounting and costing terms similar to their marketing and production counterparts (Nankervis, Compton and McCarthy, 1999, p.600ff) because, for example, without specific quantitative standards against which to judge their performance, a training department is at the mercy of management's changing attitudes toward training (Lombardo, 1989, p.61).

Do managers perceive a need to place a realistic financial value upon their organisation's Knowledge Resources according to their functional responsibility? Since the literature reviewed neither provides nor suggests an answer to this question, the second version of **Hypothesis 1** was developed -

Hypothesis 1-2_o

Managerial role does not significantly explain managers' perception of the need to place a realistic financial value upon the organisation's Knowledge Resources.

2.5 Actions on Knowledge Resources

This section describes the range of actions brought to light by the review of the literature that managers can take to transform uncodified Knowledge Resources into codified forms of Intellectual Capital. This gives rise to the second hypothesis for investigation, **H₂**, which tests the extent to which managers actively manage their Knowledge Resources.

The review of literature brought to light 24 broad 'actions' that managers can take to 'leverage' their uncodified Knowledge Resources into codified forms of Intellectual Capital. When perceived in terms of the emerging descriptions of Intellectual Capital outlined in 1.3, each of the actions - when actioned - express one element or another of organisational Intellectual Capital. In their totality, they represent action - or lack thereof - with respect to the transformation of Knowledge Resources into codified forms of Intellectual Capital. The extent to which managers are inclined to pursue any or all of these actions on Knowledge Resources will suggest the practical importance that they attach to their management regardless of how strong or weak their perceptions of the desirability of placing a financial value upon different forms of Intellectual Capital. The following subsections, 2.5.1 to 2.5.23, summarise what the available literature has to say about each of these actions.

2.5.1 Questioning the conventional

Varieties of participative management and employee involvement are spreading in the 1990s, partly because the traditional systems of managing are failing (Lawler III, quoted in Anon., 1990, p.49). The job of managers is no longer to supervise and motivate, but to liberate and enable (DePree, quoted in Anon., 1990, p.36). To work efficiently, workers will need to think and have the latitude to exercise their judgements (Carmody, 1991, p.14). The best

managers actively manage their organisation's knowledge and resources by stimulating the exchange of ideas and cross-fertilising the knowledge generated throughout the organisation (Henderson, 1994, p.102).

2.5.2 Seeking solutions to problems

Successful companies realise that organisational survival and growth are dependent upon unleashing people's potential (Carmody, 1991, p.14). In firms organised according to a continuous improvement paradigm, human resources provide the improvements in quality, cost, deliverability and design that give the firm its strategic advantage in the marketplace (Cole and Mogab, 1995, p.80ff). Employers increasingly depend on the skills of all their employees to improve efficiency, quality, and customer service, and to develop new applications for existing products and services (Carnevale, 1989, p.33). Enabling employees to participate directly in the redesign of processes that generate new methods of work maximises the return on human capital (Morris, 1996, p.17). The self managing work team provides workers with incentives to continuously improve the production process by tapping the collective knowledge of a group (Florida, 1991, p.570). Integrated manufacturing tends to 'upskill' employees into 'knowledge workers', whose responsibilities involve problem solving rather than physical work (Zuboff, cited in Snell and Dean, 1992, p.473).

2.5.3 Encouraging employee involvement

The new entrepreneur has the knowledge necessary to put together appropriately skilled and knowledgeable people (Thurow, 1996, p.279ff), since the skills of individuals are required to apply knowledge (Thurow, 1996, p.74). In today's knowledge economy, the ideas and participation of people at every level can be elicited from a wide base of talent and skill (Helgesen, 1995, p.10). Formal and informal structural characteristics of organisations can interfere with the interaction between specialist knowledge and strategic decision making, something that human resources management seldom addresses (Ryan, 1995, p.3). Maintaining a distinction between those who make decisions and those who carry them out will lead to the wastage of the human Intellectual Capital generated in the minds of workers (Helgesen, 1995, p.10).

Shaw and Perro (1992, p.17) point out that a strong management team making critical decisions by consensus is pre-requisite to the attraction of venture capital. Carmody (1991, p.14) argues that boards of organisations should include people who represent the organisation's investment in human capital as well as people whose focus is financial or technical. Ultimately, organisations will move from an authoritarian toward a shared decision-making approach, and closer to actual worker ownership (Mark, quoted in Anon., 1990, p.32). Employee stock ownership has risen with the Information Age and is more prevalent in knowledge-intensive businesses than traditional companies (Stewart, 1997, p.103). Increased insider ownership of an organisation's equity will yield increased efficiency and fewer conflicts between managers and shareholders (Jensen, quoted in Anon., 1990, p.60).

2.5.4 Harnessing diversity

As companies embody more social and cultural diversity, they will become more tolerant, more willing to use differences, rather than sameness, as criteria for individual success within the organisation (Houghton, quoted in Anon., 1990, p.56). Learning is stimulated when diversity is encouraged (Dodgson and Kim, 1997, p.70). Although the predominant meaning of the term 'culturally diverse' has included race, ethnicity and gender, other areas such as age, sexual orientation, and physical abilities/qualities have also been suggested (Kemmerer and Arnold, 1993, p.38).

The most dramatic socio-economic change to take place in recent years has been the growing proportion of working women (Kemmerer and Arnold, 1993, p.38). In Australia, 42% of women now work and any organisation which continues to predicate its policies and practices on the male, Anglo-Saxon monoculture that once prevailed risks overlooking some of the very people who are likely to make a difference (Carmody, 1991, p.15). Women bring different styles and perspective to the workplace in terms of the different ways they communicate, the different values and behaviours they demonstrate and in the different styles they use to operate. Nevertheless, women are often unable to perform at their best in corporate cultures that are uncompromisingly competitive, territorial and confrontationist (Zanetic and Jeffery, 1997, p.12).

Ideally, all levels of an enterprise workforce should reflect the norms, values and beliefs that exist in the operating environment. A workforce that is representative of a diverse society can better anticipate, interpret and integrate into business level strategies the environmental forces that impact upon the organisation (Loden and Rosener, cited in Kemmerer and Arnold, 1993, p.38). The strategic advantages that may be generated from deploying culturally diverse groups are just beginning to be understood (Kemmerer and Arnold, 1993, p.38) possibly because the cost of maintaining counterproductive cultures is rarely recognised (Zanetic and Jeffery, 1997, p.13).

2.5.5 Retaining people

Nordhaug (cited by Gooderman, 1995, p.529) says that an organisation's competence base, the aggregate of employee competencies, comprises the primary resource of any firm. Core competencies and strategic capabilities are themselves manifestations of investments in knowledge (Birkett, 1995, p.46). Companies are losing people who believe their contribution and knowledge are not adequately recognised: they end up applying their capabilities elsewhere (Dickson, 1995, p.11). Firms should be building closer relationships with their key knowledge workers to retain their commitment and proprietary knowledge (Thurow, 1996, p.288) since Intellectual Capital leaves a company each time a company dismisses, lays off or retires a worker (Kurtzman, 1996, p.20). The loss of a highly skilled worker can destroy the effectiveness of a team for long periods of time and at a high cost (Toffler, 1991, p.208).

Reward systems should induce individuals to join a firm and perform well over time (Snell and Dean, 1992, p.475). The successful company identifies and develops the critical skills it needs and promotes from within (Shaw and Perro, 1992, p.18). Making jobs more interesting and challenging as well as developing employee skills enhances productivity (Carmody, 1991, p 14). Staff turnover, absenteeism, job relocation and away-from-home training demand responses from companies appropriate to the underlying community changes that are taking place (Carmody, 1991, p 14). As the global competition for people with leadership capabilities and the capacity to manage ambiguity escalates, companies will retain and develop their own people as a primary source of 'talent' (Sherry, 2000b, p.66).

2.5.6 Developing people

Individual, corporate, and national economic success will all require new and much more extensive skills than were required in the past (Thurow, 1996, p.76). The economic value of investing in new technologies depends on collateral improvements in the skills of workers employing the new technologies (Vickery and Wurzburg, 1992, p.15). As a result, the creation of wealth will become increasingly dependent upon investments in human capital (James, 1993, p.195), by developing new competencies through training and development (Bontis, 1996b, p.42; Birkett, 1995, p.46). Changing demands in the workplace determine education and training requirements and re-define the enterprise as the provider, not simply as the consumer, of further education and training (Vickery and Wurzburg, 1992, p.15). Continuous training and education of every individual at every level of the organisation provide intellectual tools in the form of human capital. They facilitate the transformation of acquired human capital into work performance (Nordhaug, cited by Gooderman, 1995, p.530; Welch, quoted in Anon., 1990, p.30).

Training will not focus on the storage of information in human minds but will emphasise how to access and use information as need arises (Harless, quoted in Anon., 1996, p.77). The new knowledge industries will facilitate employee development and locate opportunities for employees to apply their continuously expanding knowledge and ability (Miles and Snow, 1995, p.10). Dickson (1995, p.14) argues that expenditure on people represents an investment. Minimising the investment in human resource development may be profitable in the short term, but firms will sacrifice productivity gains and adaptive capability if employee potential weakens over the longer term (Snell and Dean, 1992, p.497) and will find that their human capital is difficult to replenish (Keen, 1992, p.12). Employers who invest in a skilled, flexible workforce position themselves to take advantage of new technology and thus develop an enduring competitive advantage (Reich, quoted in Anon., 1996, p.78). Skilled, well-educated workers can anticipate and welcome change (Groth, 1994, p.24) and adapt better than unskilled workers to technological change (Chao and Kozlowski, cited in Snell and Dean, 1992, p.472).

However, any investment by profit-maximising firms in skills training will tend to be firm-specific (Askildsen and Ireland, 1993, p.241; Becker, cited in

Snell and Dean, 1992, p.469) as the benefits of investments in general employee training will accrue to other firms in an environment of high labour mobility (Cole and Mogab, 1995, p.83). Investment in specific employee training reinforces the mutual interest of the two parties in maintaining a long-term employment relationship (Strober, 1990, pp.218-9). Methods of measuring improvements in worker productivity, whether acquired through training and/or experience, remain underdeveloped (Miller and Wurzburg, 1995, p.17).

2.5.7 Outsourcing human resource requirements

Benchmarking of performance against increasing international competition is leading to higher levels of outsourcing facilitated in part by the availability of compatible information systems (James, 1993, p.207). Manufacturing organisations are outsourcing to cope with accelerating growth (Shaw and Perro, 1992, p.17) and freely relocating their human capital within the organisation (Senko, 1991, p.38). Although investing in human resources can contribute to a stable workforce (Cole and Mogab, 1995, p.104), the returns on these investments are not immediate. Risk-averse managerial behaviours tend to lower managerial commitment to the development of human capital (Groth, 1994, p.24; Hitt, Hoskisson, Harrison and Summers, 1994, p.36).

2.5.8 Leveraging workers' knowledge

The knowledge of workers is economically valuable to an organisation if it serves organisational objectives (Flamholtz, cited in Morse, 1973, p.590). Many organisations seek to translate human intelligence into innovative capacity (Anon., 1993a, p.34). Companies that leverage individual potential to improve institutional performance (Carnevale, 1989, p.27) can generate competitive advantage from the commercialisation of the knowledge possessed and created by their human resources (Miller and Wurzburg, 1995, p.16).

Firms that invest in their human capital will develop workers who are capable, prepared, adaptable and willing to extract value from a changing environment of opportunities (Groth, 1994, p.25). However, this requires a corporate culture that allows knowledge to flow freely, which means breaking

down hierarchies, scrapping rules that stifle new ideas (Stewart, 1991, p.52) and transforming organisational processes into strategic capabilities that consistently provide superior value to the customer (Bontis, 1996b, p.42; Birkett, 1995, p.46). Japanese firms pursue innovation to minimise the risk of corporate atrophy (Cutler, 1993, p.7). In contrast, if the low levels of spending by Australian firms on research and development this far into the Information Age affect their capacity to innovate, the savings generated may be turn out to be hugely expensive (Head, 2000, p.64). For companies to be innovative, the creativity of employees must be allowed to flourish (Thomason, 2000, p.12). The collective knowledge of workers can accumulate in the form of product and process innovations that can outdistance and even replace laboratory breakthroughs (Florida, 1991, p.569). Human resource managers can help organisations achieve transformation by unlocking creativity and releasing corporate imagination (Hamel, quoted in Ettorre and McNerney, 1995a, p.12). If employees have more discretion, their economic impact on production increases (Helfgott, cited in Snell and Dean, 1992, p.472) but employees must be informed of, and kept focussed upon, common organisational goals (Shaw and Perro, 1992, p.17).

2.5.9 Distributing information effectively among employees

The more correct the information a business entity has about itself, the more competitive it can become (McMann and Nanni, 1994, p.58). Under the new system of wealth creation, it is intelligent reorganisation and sophisticated electronic information exchange, not working harder, that accelerate production (Toffler, 1991, p.231). With the shift to quality and teamwork, sharing ideas and generating new knowledge become essential for success (Miller and Wurzburg, 1995, p.19). Exploiting the 'informed' environment means opening the information base of the organisation at every level, and ensuring that each worker has the knowledge and authority to engage with the information productively (Zuboff, 1995, p.202). As a result of new technologies, we are seeing a redistribution of information, and therefore knowledge and power, to people at all organisational levels in knowledge-based organisations (Helgesen, 1995, p.10; Toffler, 1991, p.210).

Access to relevant knowledge becomes more problematic as firms grow and become more complex (Edvinsson and Sullivan, 1996, p.359). Although there

is risk in giving everybody access to corporate information, and potentially some loss, the gains can surpass the losses provided that everyone working understands the master plan and uses it as a yardstick to make decisions (Jobs, quoted in Anon., 1990, p.36). The repositioning of branch level back-office functions to regional processing centres during the restructuring of a major Australian bank during the 1990s ensured that staff could capture, store and retrieve information at a consistent level of quality (Blount and Joss with Mair, 1999, p.111).

2.5.10 Promoting employee learning

Production methods, applications of technology and the provision of customer value now require continuous improvement. Markets and operating environments are constantly changing. To cope with these demands, worker capabilities and organisational design have to be continuously developed, adapted and leveraged (Rosenblum and Keller, 1994, p.29; Toffler, 1991, p.206). Learning is fundamental to innovation (Leonard-Barton and Nonaka and Takeuchi, cited by Dodgson and Kim, 1997, p.69). A culture of continuous learning is one in which every individual in the firm dedicates to action (Rosenblum and Keller, 1994, p.28).

Inhibitors of learning identified by Nordhaug (cited by Gooderman, 1995, p.530) include micro-level barriers such as opportunities to practice and, at the macro level, the impact of work systems and culture. To offset this, core competencies must be embedded in key organisational processes (Bontis, 1996b, p.42; Birkett, 1995, p.46). The firm should provide the opportunities to learn and consistently reinforce its signals, messages, and actions (Rosenblum and Keller, 1994, p.28).

Change means that factual information becomes obsolete faster and the knowledge built upon it becomes less durable (Toffler, 1991, p.419). The more accelerated the rate of change in business, the more one-of-a kind situations emerge (Toffler, 1991, p.164) and managers will learn to draw the distinction between 'productive' (or 'excellent') mistakes and 'unproductive' mistakes. The former at least offers the opportunity to learn from errors and to inform and continue to improve future actions. In the process, organisations can learn how workers generate value and how to effectively measure that value (Head, Handlon and Martin, 1995, pp.5-6). Although a project may not result

in a new product, the information gained may be valuable if it is deployable in the future (Lewent, quoted by Nichols, 1994, p.91). Wang (1997, p.49) demonstrates that an interface between research and development activities on the one hand and marketing on the other play an important role in a firm's competence-building process by exerting influence on both the direction and speed of innovation. Every new product not only adds to the stock of knowledge but reduces the cost of future innovation (Gould and Ruffin, 1993, p.30) and accelerates the speed with which a company can bring new products to market, thus improving its strategic direction (Shaw and Perro, 1992, p.17).

2.5.11 Advancing organisational learning

Learning is critical to enhancing and realising the value creating potential of an organisation (Rosenblum and Keller, 1994, p.28) as it is the principal process by which management innovation may occur (Stata, quoted by Hitt, Hoskisson, Harrison and Summers, 1994, p.42). During the 1980s, managers of non-profit organisations who responded to changes in the external environment by relying on borrowed methods and systems instead of initiating appropriate methods and systems of their own often became trapped by what Argyris and Schon refer to as 'single-loop' learning (Kaplan, 1992, p.24).

A firm's inventory of skills and knowledge depreciates if not used (Argotte, Beckman and Epple, cited in Fukao and Otaki, 1993, p.95) and regenerates with increasing speed (Toffler, 1991, p.164). Augmentations of knowledge capital continually destroy previous investments in learning in a process of 'creative destruction' (Jones and Newman, 1995, p.897-8). The best managers may even suspend efficiency temporarily to discover and implement better ways of delivering their products and services (Helgesen, 1995, p.11).

The concept of the organisation as a socio-technical system and of the ways that task interacts with process demand re-examination (Ryan, 1995, p.9). For example, investments in technology, human resource capabilities, business directions and financial imperatives will need to be integrated better to maximise productivity (Schein, quoted in Anon., 1996, p.78; James, 1993, p.122). Physical capital-intensive industries show low returns on assets partly

because investments in learning necessary to improve organisational systems are inadequate in relation to investment in plant. Organisations need to track learning curves to measure improvements and how long they take to achieve (Stewart, 1991, p.54).

2.5.12 Maintaining effective systems

Organisational systems enable the retrieval and distribution of organisational information and knowledge. They represent the 'codified brainpower' embedded within the organisation even after workers depart (Stewart, 1994, p.24; Thornburg, 1994, p.51). These systems have to be continually re-engineered into smooth, fluid information processes if they are to contribute to the generation of Intellectual Capital (Bontis, 1996b, p.42; Birkett, 1995, p.46). Innovation applies as much to managerial processes as it does to the invention of new ideas (James, 2000, p.59). Organisations that successfully manage their Knowledge Resources continuously develop the internal systems necessary to maintain an adequate rate of commercialisable inventions (Edvinsson and Sullivan, 1996, p.362).

2.5.13 Planning strategically

The ability to recognise trends and to 'see' the future is essential to corporate survival (Mintzberg and Quinn, cited by Roos, Roos, Edvinsson and Dragonetti, 1997, p.13). Top management must ensure the organisation achieves profitability over the next one to three years and must therefore understand how paradigm shifts in technology will affect long term success (Petre and Harrington, 1996, p.54). Setting very general strategic guidelines, organising and accounting for capital, litigating and lobbying, and substituting information for all the other factors of production increasingly consumes top management in the large corporation (Toffler, 1991, p.226). As organisations will not get to the future strictly by being event-driven, human resource managers must help nurture a new generation of executives who have a truly long-term view (Hamel, quoted in Ettore and McNeerney, 1995b, p.56). Human resource planning and investment in human capital will increase in budgetary significance as organisations seek to ensure a labor force of adequate size and quality (Jones, 1988, p.14) and strategically allocate organisational resources on the basis of measurable competencies and capabilities (Bontis, 1996b, p.42; Birkett, 1995, p.46).

An organisation's human resource activities should result in a workforce that possesses the knowledge and skills required for the future. Since the needs of an increasingly culturally diverse marketplace are becoming commensurably difficult to anticipate, multicultural participation in the workplace demands strategic planning reflective of societal needs and values if competitive advantage is to be achieved (Kemmerer and Arnold, 1993, p.39). Connecting human resource planning with strategic business planning can energise the converging interests of employee and employer interests to pursue learning and development. (Miller and Wurzburg, 1995, p.19; Hitt, Hoskisson, Harrison and Summers, 1994, p.43; Stewart, 1991, p.46). For example, an effective interface between research and development activities and marketing in pharmaceutical firms begins with conceptual development at both the corporate and product levels, well before project implementation (Wang, 1997, p.49).

2.5.14 Designing effective systems

Effective management information systems will be crucial to decision making quality (Wriston, quoted in Anon., 1990, p.62). The design of these systems should reflect corporate strategy (Shaw and Perro, 1992, p.17) because they define the way in which its underlying processes function (Saint-Onge, 1996, p.13). Systems shape the way employees act and interact (Anon., 1994b, p.79) and also how customer satisfaction and market share are secured (Welch, quoted in Anon., 1990, p.30). Incentive systems can focus energies on technologies or innovations of business interest. Other systems can evaluate and screen innovations to identify those that offer the greatest potential value to the firm (Edvinsson and Sullivan, 1996, p.362). Some management processes will be generic in certain innovation contexts while others will be specific (Tidd, 1997, p.16). Well-designed information systems can facilitate knowledge management by mapping knowledge and information resources both on-line and off-line; training, guiding and equipping users with knowledge access tools; building knowledge outworks; and monitoring outside news and information (Maglitta, 1995, p.85).

2.5.15 Sharing information with competitors

The failure to manage information and other knowledge assets properly can expose Intellectual Capital to vulnerability (Tecker and Eide, 1995, pp.102-3; Mason, 1986, p.5) since the possibilities for the diversion of information to a competitor are real, despite access limits and passwords (Toffler, 1991, p.155). The ability to rapidly penetrate markets, the long lead times required for research (in contrast to shorter product life cycles) and stiffer competition have led to the professionalisation of competitor intelligence (Toffler, 1991, p.150). Nevertheless, properly managed, benefits arise from sharing sensitive information with other organisations. An individual item of information can be extremely costly to produce yet cheap to reproduce (Mason, 1986, p.9).

A firm's ability to leverage the intellectual property of other companies to the benefit of both parties may be a source of value (Edvinsson and Sullivan, 1996, p.363). By collaborating on research and development programs on a pre-competitive basis instead of pursuing individual programs, some enterprises are beginning to overturn the law of diminishing returns (Rogers, 1996, p.6). Competitive pressures, technology convergence, a loyal customer base, and the increasing importance of intangible assets favour a more co-operative style of wealth creation that facilitates both diversification and volume (James, 1993, p.207; Kume, quoted in Anon., 1990, p.37). Corporate knowledge, skills, experience and business processes as well as information stores and systems become more valuable when shared through global networks (Edvinsson, quoted by Maglitta, 1995, p.84). The new organisational variables (Rogers, 1996, p.6) will include multiple stakeholders: suppliers, partners, customers and sometimes even competitors enjoined in carefully designed schemes for profitable growth. Engaging in co-production will be a more effective determinant of success than striving to produce the best products and services alone (James, 1993, p.206).

2.5.16 Developing ideas for application

The application of good ideas depends on favourable circumstance and the prevailing wisdom (Galbraith, quoted by Sykes, 1993, p.102). Innovative ideas formulated at the grass roots or by creative people at the margins enable

organisations to achieve competitive advantages. They evolve by a process of trial and error, incorporating new information as it is gathered (Bennis, 1995, p.6; Helgesen, 1995, p.10).

Some knowledge workers are creators, capable of creating new juxtapositions or interpretations of old ideas, while others match new ideas against strategic and practical considerations, deleting any that are irrelevant (Toffler, 1991, p.153). Either way, a continuous and vibrant flow of fresh ideas ensures a bank of talent available to meet business goals (Jennings, quoted by Thornburg, 1995, p.68).

As a resource, ideas are potentially saleable. Many are supplied (often at no charge) by customers themselves or even (wittingly or not) by competitors. They are inexhaustible but we lack appropriate accounting and management theories to guide how we may extract value from them (Toffler, 1991, p.152). New forms of property relations must maximise the creativity of human labour power while channelling and controlling it as a source of private property and capital accumulation (Florida, 1991, p.569).

2.5.17 Converting knowledge into property

Competition limits the ability of organisations to share knowledge. Maximising human creativity and intellectual labour power while channelling and controlling it as a source of private property and capital accumulation becomes the new objective of capitalist social relations. Intellectual property rights turn knowledge and ideas into private property (Florida, 1991, p.570) and reduce entrepreneurial uncertainty, thereby maximising the social benefits of entrepreneurial risk-taking (Kasper, 1992, p.58). As well as state-sponsored forms of intellectual property protection (such as patents and copyrights), oaths of confidentiality, trustworthiness and loyalty protect intellectual property at the operational level (Mason, 1986, p.9). Trade secrets and contractual agreements between firms or between firms and individuals allow corporations to exercise rights of ownership over the knowledge and ideas as well as the products produced by the people they employ (Florida, 1991, p.569).

2.5.18 Seeking customer opinions

The individual and collective mindsets of customers shape their perceptions of value provided by the products or services they buy (Saint-Onge, 1996, p.12). Provided they have gained an understanding of how customers choose, use and evaluate the organisation's products, managers can choose what value to provide, strive to provide superior value, communicate this value to customers and assess the delivery of value (Bounds, Yorks, Adams and Ranney, 1994, p.202). While engineering and design are keys to the 'building in' of product quality, they cannot alone guarantee customer satisfaction (Bounds, Yorks, Adams and Ranney, 1994, p.268). Direct interaction with customers is no longer limited to the sales force and certain levels of management. The customisation of products and systems means that the customer increasingly participates in the areas of production, engineering and development (James, 1993, p.207). Linking customers with suppliers and designers with production engineers simplifies the design and manufacture of products according to customer specifications and demand (Stewart, 1991, p.60).

2.5.19 Distributing customer feedback

Customer-oriented companies use their systems to enforce control while permitting freedom to act and channel critical information to decision makers and provide the necessary resources to get the job done (Shaw and Perro, 1992, p.17). Employees are best placed to track shifts in customer expectations and to synthesise knowledge, experience and application of business processes, products and policies to generate customer satisfaction (Morris, 1996, pp.15-16). Networking of customer service activities enables those closest to the point-of-sale to validate the need for change (Rogers, 1996, p.6).

2.5.20 Managing relationships with customers

Since customers are no longer perceived as a renewable, inexhaustible resource, a company's single most important asset may now be its control of a loyal and profitable base of customers (James, 1993, p.207). Placing customers at the centre of an organisation's management philosophy (Kume, quoted in Anon., 1990, p.37) and smooth, fluid information processes are necessary to

secure customer satisfaction and market share (Welch, quoted in Anon., 1990, p.30). Providing superior value to customers attracts not only more customers but the best employees as well (Rosenblum and Keller, 1994, p.29) since a firm, through 'employment branding', can more easily differentiate itself from competitors in a labour market where talent may be in short supply (Sherry, 2000a, p.66).

New products generally come from either one of two directions: marketing 'pull' or technological 'push'. Balancing the two is crucial, since they are interdependent (James, 1993, pp.118-9). Since a product begins to become obsolete as soon as it breaks even, companies that understand the dynamics of research need to begin to work on new product as soon as the existing product begins to yield a profit (Drucker, cited by James, 1993, pp.118-9). Customers can become a real source of learning and knowledge to generate the collaborative knowledge advantage needed to compete successfully (Amidon, 1997, p.85).

Customer-oriented companies maintain close ties with their customers in high and low-tech ways and maintain high-quality standards and consistency in their products. Within a decentralised structure, but guided by centrally formulated policy, marketing and sales plans and staff tend to be at least partly oriented geographically to allow quicker reactions to changes and opportunities in the local market (Shaw and Perro, 1992, p.16). The most successful organisations are continuously restructuring their organisation's flow of knowledge to strike a balance between quality, customer service and efficiency because being good at only one is not enough (Wriston, 1995, p.7; Shaw and Perro, 1992, p.19). By flattening its organisation structure into one more organic or molecular, Xerox Canada has better aligned its customer focus and its corporate Intellectual Capital (Anon., 1993a, p.34). Companies can achieve customer focus by aligning their intellectual assets, organisational capabilities and values with corporate strategy (Shaw and Perro, 1992, p.19) but this will in turn necessitate the more careful management of intangible assets such as corporate image, trust, customer satisfaction, employee skills and commitment (James, 1993, pp.204-7).

2.5.21 Harnessing tacit knowledge

To become learning systems and to avoid repeating the same mistakes, organisations need to review all aspects of corporate memory that its informal information networks economically yield, including the 'soft' data of opinions, attitudes and stories, operating intelligence, corporate memory and insights (Sharp and Lewis, 1993, p.75).

Nonaka (1991, p.98ff) and Saint-Onge (1996, p.10ff) discern two levels of knowledge held within an organisation: explicit and tacit knowledge. Explicit knowledge is knowledge articulated in speech, writing and data. The greater level of knowledge in an organisation, however, is tacit or unarticulated knowledge. This type of knowledge includes the intuition, perspectives, beliefs and values that people form as a result of their experiences. The speed of change in the Knowledge Era demands that greater emphasis be placed on the continuous renewal of the tacit knowledge embedded in an organisation's culture and extracting meaning from this knowledge.

At an organisational level, tacit knowledge comprises the collective set of beliefs and assumptions of everyone in the organisation and determine perceptions, interpretations and reactions to the world outside (Saint-Onge, 1996, p.10). The creation of new organisational knowledge depends not only on processing objective information but on tapping these tacit and often highly subjective insights, intuitions and hunches of individual employees and making those insights available for testing and use by the company as a whole (Nonaka, 1991, p.98). Companies can capture this Intellectual Capital through formal and informal means, with or without the assistance of information technology (Stewart, 1991, p.52). The tacit or unarticulated knowledge held within an organisation should be consistent in all aspects that affect the firm's activities. The failure to develop shared assumptions may frustrate subsequent communications between members of the organisation, and between customers and the organisation, and lead to counter-productive actions (Saint-Onge, 1996, p.12; James, 1993, p.77). Group sessions systematically bring individually or collectively held assumptions (an organisation's tacit knowledge) to the surface, yielding information about how to deal with the business, customers or employees. By making explicit the beliefs that underlie these assumptions and then determining how these

beliefs and values may need to change to accomplish objectives in the new business environment, tacit knowledge may be appropriately re-shaped (Saint-Onge, 1996, pp.13-14).

2.5.22 Developing an appropriate culture

There is a strong linkage between strategy and culture. An organisation's culture acts as a powerful filter on its perceptions of the business environment and, thus, contributes to the design of its future strategies. However, these strategies cannot be successfully implemented if the culture fails to deliver a supportive organisational behaviour (Saint-Onge, 1996, p.13). Employees often lack a shared understanding of the organisational values, principles and priorities that can be relied upon as a 'directional beacon' when they have to deal with difficult and unexpected situations (Blount and Joss with Mair, 1999, p.186). Chatterjee, Lubatkin, Schweiger and Weber (1992, p.331) demonstrate that investors are sceptical about mergers where the cultures of the top management teams are perceived to be incompatible, while they are supportive of mergers where the cultures appear to be compatible.

Managerial energy absorption in mergers and acquisitions, higher debt levels, increasing diversification and size, inappropriate downsizing and lack of managerial vision tend to perpetuate short-term, risk-averse corporate behaviours and cultures (Groth, 1994, p.24; Hitt, Hoskisson, Harrison and Summers, 1994, p.36). Successful companies develop cultures that allow them to move faster, communicate more clearly, and involve everyone in a focused effort to serve ever more demanding customers (Welch, quoted in Anon., 1990, p.30) although management has relatively little understanding of how to change organisational culture (Saint-Onge, 1996, p.13). Neither organisational leaders nor individuals within an organisation may be able to recognise the need for organisational change. In any case, existing organisational structures and culture may represent a major barrier to successfully implementing any change in an organisation's strategic orientation (Saint-Onge, 1996, p.13). If they are to keep pace with global competition, organisations must foster an appropriate learning culture that develops within employees the skills and attitudes. An entrepreneurial

spirit, the fostering of a long-term and global focus, and re-emphasising product quality are the prerequisites for success in a global marketplace (Hitt, Hoskisson, Harrison and Summers, 1994, p.41).

2.5.23 Generating positive community relations

Environmental forces such as legal mandates, ecological concerns, governmental regulations, economic conditions and technological changes impact upon organisational life (Kemmerer and Arnold, 1993, p.39). The community ultimately defines the legal and moral environment in which the organisation must operate (Atkinson, Banker, Kaplan and Young, 1997, p.507). Leading organisations endeavour to create benefits for the communities in which they operate even if this does not lead to a maximisation of profits in the short term (Bounds, Yorks, Adams and Ranney, 1994, p.224). The creation of these benefits represents social capital, through the generation of trust with the broader community. Since organisations are responsible for carrying out nearly all economic activity, organisations depend upon a sense of moral community, ethical rules or norms that serve as the basis for trust with the wider community (Fukuyama, 1995, p.90). Since no single person can understand the technical significance of every major development, an organisation may not possess the capacity or willingness to examine technical questions in a wider social context (Jones, 1990, pp.173-4). To overcome this dilemma, managers must encourage the formation of ties with the wider intellectual community (Henderson, 1994, p.103).

2.5.24 Hypothesis 2

H₂ will test managers' perception of Intellectual Capital as 'action', according to Galbraith's original intended meaning, thereby establishing another major link in the model Intellectual Capital framework presented in **Diagram 3**. In **H₂**, the dependent variable is an individual level variable, managers' active management of Knowledge Resources. The independent variables will be an individual level variable, managerial role (MR), and an organisational level variable, organisational type (OT).

The perception (in the purest sense of that term) that a manager may hold of a need to place a realistic financial value upon organisational Knowledge Resources necessarily implies recognition of the existence of these resources. However, 'recognition' alone would not necessarily imply managers' inclination to actively manage those resources in pursuit of organisational goals. As Galbraith originally postulated, the concept of Intellectual Capital implies the active management of Knowledge Resources to serve the pursuit of organisational goals ('action'). For example, it is the ability of companies to 'leverage' (or transform) their Knowledge Resources into a codified form of value (that we may call Intellectual Capital) rather than the mere existence of these resources that accounts for the high value that the market place puts on many knowledge companies (Edvinsson and Sullivan, 1996, p.357).

Having fewer people to manage, more technology and more information liberate the creativity and initiative of front-line organisational managers (Maglitta, 1995, p.86). The best of them constantly challenge conventional wisdom, integrate knowledge from a broad array of disciplines and focus on continuously refurbishing the innovative capabilities of the organisation (Henderson, 1994, p.102). If they are given the latitude to set goals, strategies, actions and measurements they can link strategically important elements of human capital and structural capital to leverage ever higher levels of productivity (Dutton, 1995, pp.36-7; Head, Handlon and Martin, 1995, p.4ff; Edvinsson, quoted by Thornburg, 1994, p.54). When allowed to become entrepreneurial, managers can control their own destiny and feel responsible for the results they generate (Mark, quoted in Anon., 1990, p.32).

The greatest challenge facing managers is to create an organisation that can share knowledge (Stewart, 1991, p.60) explaining why customer-focused companies bond separate organisational units by encouraging cross-functional coordination, discouraging barriers and fiefdoms and focusing employees on common goals. (Shaw and Perro, 1992, p.17). Investors increasingly invest in the quality of an organisation's management rather than the book value of its assets (James, 1993, p.204). Hence, the extent to which managers add value to corporate Knowledge Resources will increasingly determine their performance ratings and remuneration (Toffler, 1991, p.153).

The amount of knowledge is not nearly so important as its productivity (Drucker, 1993, p.186). Since Intellectual Capital is a dynamic rather than a static form of capital (Edvinsson and Sullivan, 1996, p.358) it is useless unless it moves (MacDonald, quoted by Stewart, 1991, p.60). Only then can it be leveraged into improved levels of performance and productivity (Kurtzman, 1996, p.20; Snell and Dean, 1992, p.469). For example, the leveraging of organisational Knowledge Resources can reduce time to market, research and development costs, and boost productivity (Maglitta, 1995, p.85). Leverage can be achieved through acts of value creation, such as investing in human capital, or through acts of value extraction, such as commercialising the firm's intellectual properties (Edvinsson and Sullivan, 1996, p.357).

The organisations which manage knowledge best are those whose survival and prosperity depend upon it (Kurtzman, 1996, p.20). Do managers within different types of organisations manage their Knowledge Resources any differently to each other? Since the literature reviewed neither provides nor suggests an answer to this question, the first version of **Hypothesis 2** was developed -

Hypothesis 2-1_o

Organisational type will not significantly explain managers' tendency to actively manage Knowledge Resources.

Do different functional managers manage their Knowledge Resources in different ways from each other? Since the literature reviewed neither provides nor suggests an answer to this question, the second version of **Hypothesis 2** was developed -

Hypothesis 2-2_o

Managerial role will not significantly explain managers' tendency to actively manage Knowledge Resources.

2.6 Knowledge discontinuities

The need for a system that will not only maximise human creativity but transform that creativity into organisational wealth is the striking feature to

emerge from the literature review. However, references to Intellectual Capital, its measurement and management, that were uncovered were of a descriptive or anecdotal, rather than academic, nature and varied widely in their perceptions of this phenomenon. It is apparent that debate about Intellectual Capital is being relentlessly 'pulled' into the mainstream of discussion by business pragmatism, rather than being 'pushed' by a desire to extend the frontiers of management theory. As empirical research into Intellectual Capital lags behind its emerging recognition, the literature review has demonstrated that there is clearly wide scope and ample justification for research into the phenomenon.

Of the 102 articles cited in this review, only 9 were of Australian origin. This relative paucity suggests that the phenomenon of Intellectual Capital awaits in Australia the widespread attention and consideration that it has already received in other OECD countries. A research study of Intellectual Capital grounded in the Australian experience could materially advance the quantity and quality of national discussion and debate about the phenomena.

The literature review tended to confirm Woodall's observation (1996, p.44) that, ironically in this Information Age, information on the management of Knowledge Resources is scarce. If there is scope and justification for empirical research into Intellectual Capital in general and in an Australian context in particular, what aspects accompanying the phenomenon are most deserving of consideration?

Although the review brought to light various attempts to codify perceived categories of Knowledge Resources and to transform those resources into productive elements of organisational wealth, directions for complementary and supportive research efforts were implied rather than explicitly stated. Different types of organisational structures and different types of managerial roles could enhance or retard the management of Intellectual Capital. Consideration of these potentially crucial aspects was conspicuously absent in the literature. As a result, the parameters of organisational type and managerial function were chosen as the basis, respectively, for the research hypotheses.

2.7 Summary

The review of business and academic literature established, firstly, that Intellectual Capital (perceived principally in its human, systems, intellectual property, customer, cultural and social embodiments) represents an authentic, if somewhat loosely defined, element of organisational wealth in this Knowledge Era. The review established, secondly, that managers may take a wide range of actions to actively manage the Knowledge Resources at their disposal in order to enhance organisational performance. Organisational performance is the ultimate determinant of organisational wealth and therefore of increments to an organisation's stock of Intellectual Capital.

Apart from the lack of comprehensive definitional and measurement criteria, the literature review indicated that the phenomenon of Intellectual Capital lacks a clear methodology for its active management, including among other things the transformation of uncodified Knowledge Resources into codified and recognisable assets. Although it is apparent from the literature review that Knowledge Resources represent both a valuable source and a valuable by-product of organisational performance in the Knowledge Era, neither their contribution nor their accumulation can be maximised while meaningful and integrated criteria for their transformation into Intellectual Capital - through definition, recognition, measurement and management - remain underdeveloped.

CHAPTER 3

METHODOLOGY

3.1 Introduction

The literature review failed to reveal any closely replicable research in the field of Intellectual Capital although several research studies provided convenient 'signposts' to guide the development of a methodology to meet the requirements of the study. In this chapter is described the development of a methodology suitable for the execution of a study of Intellectual Capital.

Section 3.2 addresses the qualitative and quantitative dimensions involved in the selection of an appropriate methodology. Section 3.3 describes methodologies brought to light. Section 3.4 outlines the procedures embodied in the design of the survey. Section 3.5 describes the survey instrument. Section 3.6 establishes the validity of the measures used. Section 3.7 outlines the survey procedure. Section 3.8 presents summaries and preliminary analyses of the responses. Section 3.9 establishes survey response reliability. Section 3.10 develops two indices of Intellectual Capital on variables of interest. Section 3.11 outlines refinement to the rationale underlying the theoretical constructs considering the factor analysis undertaken. Section 3.12 presents a chapter summary.

3.2 Methodology dimensions

A methodology represents an operational framework within which to conduct research and 'within which the facts are placed so that their meaning may be seen more clearly' (Leedy, 1959, cited by Remenyi, Williams, Money and Swartz, 1998, p.285). The development of an appropriate methodology for this study of Intellectual Capital involved a consideration of the broad, alternative methodological approaches: whether qualitative or quantitative, inductive or deductive.

Qualitative research relies on evidence that is not quantifiable. Although the Literature Review brought to light many anecdotal and experiential studies of Intellectual Capital, none provided replicable models for a qualitative research study. In any case, the obvious practical difficulties associated with conducting a within-organisation investigation of Knowledge Resource

management precluded the adoption of a qualitative approach for this study. The case study approach advocated by Yin (1994, p.11ff), was not appropriate for an exploratory study as this approach would limit the small number of organisations for study in the time available, and any results obtained would not necessarily be generalisable to a wider population.

The adoption of a quantitative, in preference to a qualitative approach, usually requires a clear understanding of the type of evidence required and how to collect and analyse that evidence within a well-defined theoretical framework. This framework may be derived either from a review of the literature or from previous research sufficient to enable the researcher to start with a clear expectation of how a particular phenomenon is likely to behave which the researcher can formalise into a model or paradigm (Remenyi, Williams, Money and Swartz, 1998, p.134). The relative abundance of descriptive information about Intellectual Capital, brought to light from the literature review, provided ample material with which to construct the model Intellectual Capital framework presented in **Diagram 3** and therefore a rationale to adopt a quantitative approach for this study.

Nevertheless, the selection of a quantitative approach in preference to a qualitative approach does not preclude the use of qualitative evidence. Indeed, the two approaches are not mutually exclusive and researchers should be ready to draw upon both kinds of evidence to address different aspects of a research problem (Remenyi, Williams, Money and Swartz, 1998, p.125). As explained below, the survey instrument was designed to not only collect numerically based data from respondents but supportive qualitative information (in the form of comments volunteered about their organisation's management of Knowledge Resources) as well.

Induction involves the inference of a generalised conclusion from the patterns observed between particular instances (Remenyi, Williams, Money and Swartz, 1998, p.284) and is of greater importance to business and management research than deduction. Using an inductive process, it is entirely acceptable to formulate a research topic or question from experience or intuitive notions rather than reflection on established theory and concepts (Remenyi, Williams, Money and Swartz, 1998, p.105). Using induction, the researcher can simultaneously address the theoretical features of a topic and

the 'grounding' of these features in empirical observations or evidence, thus generating a 'grounded' theory (Glaser and Strauss, 1967, cited in Remenyi, Williams, Money and Swartz, 1998, p.76). Inductive studies that attempt to build a theory of Intellectual Capital from observation of, and participation in, the context of the business issue investigated are few in number (von Krogh and Roos, 1996, p.335). Indeed, the literature reviewed for this study uncovered only one inductive research study of Intellectual Capital, the quantitatively based 'exploratory' study by Bontis (1996a).

Deduction, on the other hand, involves the derivation of a conclusion by logical reasoning from general or universally held premises (Remenyi, Williams, Money and Swartz, 1998, p.281). This research approach is appropriate in a relatively mature field of study where a widely accepted body of seminal theory is available to signpost research directions and where a new or improved theory may be developed out of an analysis and synthesis of ideas and concepts already established within the discipline. However, in a relatively new field of research such as business and management studies, and of Intellectual Capital in particular, the paucity of established and widely accepted theories may render the deduction approach irrelevant (Remenyi, Williams, Money and Swartz, 1998, p.75).

In selecting a suitable methodology, precedent should be followed wherever possible unless a suitable case can be made for a new methodological approach (Remenyi, Williams, Money and Swartz, 1998, p.66). Although the literature review suggested a suitable problem to be researched, it did not bring to light a previously applied methodology that could be fully replicated in the current study. The foregoing consideration of the broad dimensions of methodology strongly suggested that an inductive, quantitative approach was warranted and that a survey approach was appropriate to capture the 'big picture' of the extent to which Knowledge Resources are perceived and actively managed by managers in Australian organisations. The 'patterns' in managerial perceptions and managerial actions were suggested by the literature reviewed, from which two inductive, declarative, non-directional hypotheses (Gay and Diehl, 1992, p.74) were formulated, the perception managers hold of the financial value of Knowledge Resources as Intellectual Capital (H_1), and the actions managers take to actively transform uncoded Knowledge Resources into coded forms of Intellectual Capital (H_2) which were presented at 2.4.7 and 2.5.24 respectively.

3.3 Methodology precedents

The literature review brought to light methodologies - quantitative and inductive - employed in studies tangential to the phenomenon of Intellectual Capital. Features of the methodologies employed in these earlier studies were incorporated in the design of the methodology outlined in the following subsections.

Bontis (1996a, p.1ff) established that (a) constructs of Intellectual Capital could be measured validly, and (b) the relationships among these constructs could explain organisational performance. As Intellectual Capital is an organisational-level concept, Bontis emphasised the importance of a sense of 'scope' in future survey designs: the scope of an organisation for which the respondent acts should represent the scope of which they are most knowledgeable. Consequently, in this study, managers were requested to respond to the survey questionnaire from the particular perspective of their executive role in the organisation.

Bouillon, Doran and Orazem (1995/96, p.30ff) empirically tested a sample of 260 firms to demonstrate that enterprise investments in human capital are systematically related to enterprise rates of return. The authors employed a large sample size and elicited respondents in a wide variety of organisations, sampling criteria adopted for this exploratory study as well, despite the additional time and cost involved.

Snell and Dean (1992, p.467ff) examined the relationship between three construct domains from a human capital perspective: advanced manufacturing technology, just-in-time inventory control, total quality management and human resource management. The authors empirically confirmed the dimensionality of the scales using principle components factor analysis with varimax rotation, a procedure also used in this study.

3.4 Survey design

The two hypotheses presented in 2.4.7 and 2.5.24 were tested using a cross-sectional design. Accordingly, the research undertaken could not be expected to uncover longitudinal trends in managerial perceptions of Intellectual Capital (Remenyi, Williams, Money and Swartz, 1998, p.47).

The research survey was directed at senior managers in three broad types of Australian organisations: business, government and non-profit organisations. As explained in 1.2, each of these types of organisation and therefore their managers are potentially exposed to the emerging imperatives of the Knowledge Era and therefore the phenomenon of Intellectual Capital.

The names and addresses of Australian organisations employing 200 or more people were obtained from a computerised database from the Kompass Australia: Register of Australian Industry and Commerce (Business Magazines Pty Limited, 1995). The database alphabetically listed 1,859 organisations of this size.

Following the example of Bouillon, Doran and Orazem, (1995/96, p.30ff) a large sample size and a wide variety of organisations were adopted for this exploratory study in order to (a) offset an anticipated low response rate and (b) maximise the generalisability of the results (Remenyi, Williams, Money and Swartz, 1998, p.195). It was therefore planned to seek 1,500 respondents, consisting of five senior managers across the functional types (general manager, finance, human resource, information technology directors and marketing) drawn from each of 300 organisations (represented by an equal number of business, government and non-profit organisations).

Stratified random samples were assembled by dividing the population of 1,859 organisations into segments according to organisation type (business, governmental and non-profit). The organisations thus listed were then coded according to their type (BUS, GOV, NPO). The list was then sorted into three homogenous groups, each alphabetically listed. The total population was found to comprise: 1,655 business organisations, 133 government instrumentalities (including 33 government business enterprises) and 71 non-profit organisations. Several business organisations exhibited similar names suggesting that they belonged to the same group. To ensure that the organisations selected from each group were as discrete from each other as possible, the survey mailing list was compiled by systematic sampling.

The five key managerial functional responsibilities within each organisation (general manager, finance, human resource, information technology and

marketing managers) were then identified as were the names of their incumbents. The head office of each selected organisation was personally telephoned to seek and/or verify the following information -

- the name, title and job description of their respective general manager, finance, human resource, information technology and marketing directors or their approximate equivalents. This step specifically addressed the advice of Bontis (1996a, p.8) to establish the respondent's scope of knowledge and authority.
- the full name of the organisation.
- the mailing address for each organisation.

The following exceptions were noted in the course of assembling and validating the mailing list -

- organisations, especially government and non-profit organisations, whose senior executive profile did not reflect the functional responsibility profile (general manager, finance, human resource, information technology, and marketing directors) upon which this study was based. In these cases, the executive in the organisation who represented, *prima facie*, the closest 'fit' was included on the mailing list for that organisation.
- organisations, especially non-profit organisations, which had very 'light' administrative structures that employed perhaps only two or three of the target executives. These organisations characteristically employed executives in only two or three of the five target managerial functional responsibilities. In these cases, another organisation of the same type was selected from the sources noted above and the balance of their executives added to the mailing list.
- organisations, especially non-profit organisations and several smaller government organisations, which had very 'light' administrative structures and whose target senior executives tended to 'double-up' on their functional responsibilities. In these cases, the executives concerned were entered on the mailing list for what appeared to be their more

significant managerial role. Another organisation of the same type was selected from the sources noted above and a number of their executives added to the mailing list to make up the five required managers.

To address the last point, the initial 71 non-profit organisations selected from the Kompas listing were supplemented by a further 44 non-profit organisations extracted from the 1997 Business Review Weekly 'BRW 500' issue and the Yellow Pages telephone directories for Sydney, Melbourne, Brisbane and Adelaide, providing a total of 115 non-profit organisations. A further 2 government organisations were selected from the 'government' section of the White Pages telephone directory for Sydney, providing a total of 102 government organisations. The final sample consisted of 1,448 executives drawn from 317 organisations. The percentage sample coverage of the total population in each homogenous group is presented in **Table 5**.

TABLE 5			
SAMPLE POPULATION COVERAGE OF ORGANISATIONS			
Organisation type	n =	Sample	% coverage
Business	1,655 ¹	100	6.04%
Non-profit	115 ²	115	100.00%
Government	133 ³	102	76.69%
TOTAL	1,903	317	16.66%

1 All 1,655 business organisations employing 200 or more people as per Kompas listing.

2 All 71 non-profit organisations employing 200 or more people as per Kompas listing plus an additional 44 significant non-profit organisations selected from the 1997 'BRW 500' listing and the Yellow Pages.

3 All 133 government organisations employing 200 or more people as shown in the Kompas listing plus an additional two significant government organisations selected from the White Pages. Government organisations included 33 Government Business Enterprises.

The need to target five key executives in each sampled organisation produced inconsistent percentage sample sizes. Each organisation's general manager and, where existent, each organisation's nominal finance, human resource, information technology and marketing managers were surveyed. The finalised mailing list comprised 1,448 executives, as summarised in **Table 6**.

TABLE 6	DISTRIBUTION OF DATA SOURCES					
Managerial role	GEN	FIN	HRM	ITM	MKT	n =
Organisation type						
Business (n = 100)	100	100	100	95	100	495
Non-profit (n = 115)	115	96	70	76	97	454
Government (n = 102)	102	101	97	98	101	499
TOTAL	317	297	267	269	298	1,448

Note: Government organisations included Government Business Enterprises inclusive of 163 Executives (33 CEOs; 33 Finance Managers; 32 HR Managers; 33 Information Technology Managers; and 32 Marketing Managers).

The number and range of organisations and managerial functional responsibilities to be surveyed was expected to improve the statistical power and generalisability of the results.

3.5 Survey instrument

A copy of the survey instrument is exhibited in **Appendix A**. It consisted of four typewritten pages (front and back), with a total of 47 questions plus one further question inviting brief written responses. The instrument preserved anonymity and confidentiality. The simplified language employed in the questionnaire recognised the wide range of organisations and executives to be surveyed. Respondents were advised to interpret words such as 'organisation', 'customers' and 'product' as they considered appropriate to their organisation and current executive responsibility. Apart from the use of the word 'knowledge', terms indicative of the emerging vocabulary of knowledge management (eg 'Intellectual Capital', 'structural capital' etc) were avoided altogether in the survey instrument, to minimise preconceptions.

Before finalising the survey instrument, a draft was pre-tested for clarity and relevance by six people academically qualified in various branches of business or management. This procedure also established face validity. Their recommendations were actioned where possible. This procedure closely replicated the pilot-test measures used by Snell and Dean (1992, p.479) and Chatterjee, Lubatkin, Schweiger and Weber (1992, p.324) to ensure internal consistency and reliability in their respective studies.

Demographic information about the respondents (managerial role, age, gender etc) and their organisations (organisational type, size, national headquarters) was obtained on **Items 1 to 4** and **Items 38 to 47**. These items were organised on nominal scales. Item 2 (organisational type) and Item 40 (managerial role) provided the dependent variables for the tests of **Hypothesis 1** and **Hypothesis 2** respectively. The remaining items were used to explore more deeply, on a post hoc basis, the results obtained from the tests of each hypothesis.

Organisational and managerial performance were addressed by **Items 5 to 7** on the survey instrument organised on a five point Likert scale, ranging from strongly disagree to strongly agree. These items were intended to establish the outcomes, if any, arising from (a) managers' perceptions of Intellectual Capital and (b) managers' active management of Knowledge Resources. These items were used to explore, on a post hoc basis, the results obtained from the tests of **Hypotheses 1** and **2**. The rationale for each item is summarised in the following paragraphs.

Item 5 was: "This organisation is achieving its intended mission". In view of the range of business and non-business organisations surveyed, an assessment of organisational performance could not be confined to a consideration of profitability, return on assets, market share or other measurable business-specific criteria. It was considered that 'mission achievement' best defined the quality of organisational performance in a general sense.

Item 6 was: "This organisation only manages things which have a definite financial value". This statement examined, indirectly, the management of Knowledge Resources.

Item 7 was: "My ambitions are not fully realised in my present position". An association between this item and either or both of the independent variables, organisational type (Item 2) and managerial position (Item 40) would prima facie indicate that, as perceived by the managers themselves, active knowledge management by a managerial group produces a more reliable manager and by extension a more satisfied one.

Actions on Knowledge Resources were addressed by 24 items, numbered 8 to 31 on the survey instrument organised on a five point Likert scale, ranging from strongly disagree to strongly agree. Each item was based on the literature review findings presented in 2.3 and was intended to establish the degree to which managers actively manage the Knowledge Resource within their respective functional domains. The rationale for each item is summarised in the following paragraphs.

Item 8 was: "I believe that I systematically encourage employees to continually question the way things are done" and reflected the literature brought to light at 2.5.1. The phrase 'the way things are done' refers to employee interaction with task and process, or the way human capital interacts with other elements of Intellectual Capital.

Item 9 was: "I believe that I systematically encourage employees to seek novel solutions to organisational problems". This item reflected the observations made at 2.5.2. While associated with the previous Item 8, there is a crucial differentiation to be made between passively encouraging employees 'to continually question the way things are done' and actively encouraging them to solve organisational problems.

Item 10 was: "I believe that I systematically involve the opinions of relevant employees in reaching decisions" and reflected the observations made at 2.5.3.

Item 11 was: "I believe that I systematically deploy the national, ethnic and special qualities of employees for maximum effect" and reflected the observations made at 2.5.4.

Item 12 was: "I believe that I systematically strive to retain experienced employees" and reflected the observations made at 2.5.5.

Item 13 was: "I believe that I systematically provide employees with carefully tailored training, development and experience" and reflected the observations made at 2.5.6, the term 'carefully tailored' emphasising the firm-specific nature of human capital accumulation through structured experience.

Item 14 sought reverse coded reactions to the statement "I believe that I systematically outsource human resource needs, whenever appropriate" and reflected the observations made at 2.5.7.

Item 15 was: "I believe that I systematically channel employee creativity into organisational objectives" and reflected the observations made at 2.5.8.

Item 16 was: "I believe that I systematically provide employees with access to any information they require" and reflected the observations made at 2.5.9.

Item 17 was: "I believe that I systematically keep track of past lessons learned by employees to avoid repeating mistakes" and reflected the observations made at 2.5.10, the accumulation of human capital through unstructured experience.

Item 18 was: "I believe that I systematically suspend activities, when necessary, to discover a better way of doing things" and reflected the observations made at 2.5.11. The 'macro' issue of organisational learning demanded separate attention from the 'micro' issues of worker learning (Item 17) and worker development (Item 13).

Item 19 was: "I believe that I systematically ensure that information systems are continuously updated" and reflected the observations made at 2.5.12.

Item 20 was: "I believe that I systematically plan strategically at least three years ahead" and reflected the observations made at 2.5.13.

Item 21 was: "I believe that I systematically ensure that policies, systems and procedures are efficient and comprehensive" and reflected the observations made at 2.5.14.

Item 22 sought reactions to the reverse coded statement, "I believe that I systematically avoid sharing information with other organisations" and reflected the observations made at 2.5.15.

Item 23 was: "I believe that I systematically collect and record employee suggestions" and reflected the observations made at 2.5.16. The degree to

which managers establish control over the ideas produced by their employees would be pre-requisite to both acting on those ideas at the appropriate time (Items 9 and 10, for example) and asserting legal control over employee innovations (Item 24).

Item 24 was: "I believe that I systematically assert my organisation's legal rights over employee innovations" and reflected the observations made at **2.5.17**.

Items 25 was: "I believe that I systematically sample the opinions of customers/clients in designing products or services" and reflected observations made at **2.5.18**.

Item 26 was: "I believe that I systematically sample the opinions of customers/clients of existing products or services" and also reflected observations made at **2.5.18**.

Item 27 sought reactions to the reverse coded statement, "I believe that I systematically withhold sensitive customer/client opinions of products/services from employees", and reflected the observations made at **2.5.19**.

Item 28 was: "I believe that I systematically manage my relationships with customers/clients" and reflected the observations made at **2.5.20**.

Item 29 was: "I believe that I systematically make use of informal channels and office 'grapevines' in reaching decisions" and reflected the observations made at **2.5.21**.

Item 30 was: "I believe that I systematically encourage employees to continuously re-evaluate the work culture" and reflected the observations made at **2.5.22**. The phrase 're-evaluating the work culture' refers to the questioning of shared assumptions that either facilitate or inhibit action, or how an organisation's Intellectual Capital impacts upon its human capital.

Item 31 was: "I believe that I systematically seek out the opinions of external stakeholders before reaching decisions" and reflected the observations made at **2.5.23**.

Upon these items (Items 8 to 31) was constructed an **Index of Knowledge Resource Action** (see 3.10.2 below) which served as the independent variable for the test of **Hypothesis 2**.

Perceptions of Intellectual Capital were addressed by six items organised on a five point Likert scale, ranging from strongly disagree to strongly agree. Each item was intended to establish the degree to which managers believe that their organisation should place a realistic financial value on its different types Knowledge Resources. As worded, each item avoided any suggestion of how to calculate a realistic financial value as well as other issues beyond the scope of this study such as outcomes and organisational performance.

Item 32 was: "I believe that this organisation should place a realistic financial value on the accumulated knowledge, skills and experience of each of its employees" and reflected the observations made at 2.4.1 as well as the human capital 'action' variables in the survey instrument, Items 8 to 17.

Item 33 was: "I believe that this organisation should place a realistic financial value on established systems, internal controls, databases, quality controls" and reflected the observations made at 2.4.2 as well as the systems capital 'action' variables in the survey instrument, Items 18 to 21.

Item 34 was: "I believe that this organisation should place a realistic financial value on legally protected assets such as patents, designs, copyrights, trade marks" and reflected the observations made at 2.4.3 as well as the intellectual property 'action' variables in the survey instrument, Items 22 to 24.

Item 35 was: "I believe that this organisation should place a realistic financial value on relationships with its customers/clients" and reflected the observations made at 2.4.4 as well as the customer capital 'action' variables, Items 25 to 28.

Item 36 was: "I believe that this organisation should place a realistic financial value on employee perspectives and beliefs formed from organisational experience" and reflected the observations made at 2.4.5 as well as the cultural capital 'action' variables, Items 29 and 30.

Item 37 was: "I believe that this organisation should place a realistic financial value on relationships with stakeholder groups in the wider community" and reflected the observations made at 2.4.6 as well as the social capital 'action' variable, Item 31.

Upon these items (Items 32 to 37) was constructed an **Index of Intellectual Capital Perception** (see 3.10.1 below) which served as the independent variable for the testing of **Hypothesis 1**. The rationale for each item is summarised in the following paragraphs.

One further item at the end of the survey form (unnumbered on the form but hereinafter identified as Item 48), solicited further information from respondents with the request "If there is anything else you would like to tell me about how you feel knowledge is managed within Australian organisations, please record your thoughts in the space below". Where appropriate, the responses obtained on this item were used to anecdotally elaborate upon the hypothesis test results.

3.6 Validity

Validity ensures that what is to be measured is indeed what is measured. Generally, a number of independent studies are required to establish the validity of a construct (Gay and Diehl, 1992, p.160).

Face validity establishes, superficially at least, that a test appears to measure what it purports to measure (Gay and Diehl, 1992, p.158). Face validity was determined in the initial screening procedure described in 3.5.

Content validity ensures that the measure includes an adequate and representative set of items that will tap the concept (Sekaran, 1992, p.171). This requirement was addressed by developing the 'action' and 'perception' variables to reflect the scope and emphasis of the literature on 'knowledge management' as set out in 2.4 and 2.5.

Construct validity is a scale evaluation criterion that establishes how well the results obtained from the use of the measure will fit the theories around

which the test is designed (Remenyi, Williams, Money and Swartz, 1998, p.179). Although construct validity can be established through convergent and discriminant validity (Sekaran, 1992, pp.172-3), this would require a body of Intellectual Capital theory. However, there is none. Construct validity was therefore improved by constructing indices of 'Intellectual Capital Perception' and 'Knowledge Resource Action', based on factor scores obtained in the course of the principal components analysis, as presented at 3.10 below. Although these constructs as originally conceived were ultimately modified, as explained at 3.10.3, their modification was not considered to have a material bearing on the research findings.

3.7 Procedure

A copy of the survey instrument was mailed to each of the 1,448 executives listed in the final mailing list. Each questionnaire was accompanied by a covering letter, marked 'Private and Confidential', which set out the purpose of the study and the procedure for replying. To maximise the survey response rate, each addressee was offered a summary of the survey findings and a reply paid envelope.

3.8 Responses

A total of 612 useable responses were received. The inability to identify non-respondents precluded a follow-up mail out. Of the respondents, 76 volunteered additional written comments.

Of the total 18,972 data cells (31 items x 612 observations), less than 1% had missing cell values. The means of each variable were assigned to these missing cell values.

Review of the responses suggested a need to recognise an additional organisational category, 'government business enterprises', as a fourth organisational category for analysis. Of the 223 responses received from executives in government organisations, 91 emanated from executives within government business enterprises (hereinafter indicated by the acronym of 'GBE'). In view of the profit making orientation of GBEs as well as the

material level of responses that had been received from executives in this type of organisation, it was considered that GBEs should be treated as a separate and additional organisational category.

The responses received across the organisational and managerial groupings were grouped and presented in **Table 7**.

TABLE 7	TABLE OF RESPONSES AND % RESPONSE RATE						
Functions	GEN	FIN	HRM	ITM	MKT	ALL	% rate
Organisations	n = 317	n = 297	n = 267	n = 269	n = 298	n = 1,448	
BUS (n = 495)	58	47	52	40	39	236	47.68
NPO (n = 454)	60	29	25	22	25	161	35.46
GOV (n = 336)	43	21	28	22	10	124	36.90
GBE (n = 163)	33	15	17	17	9	91	55.83
Total (n = 1,448)	194	112	122	101	83	612	42.27
	61.20	37.71	45.69	37.55	27.86	42.27	

Response levels were not significantly different between managerial and organisational types ($\chi^2 = 16.374$, $df = 12$, $p > .05$).

3.9 Reliability

Cronbach's alpha co-efficient can be considered an adequate index of inter-item consistency reliability (Sekaran, 1992, p.174). Cronbach's alpha co-efficient was obtained for Intellectual Capital Perception (Items 32 to 37) and Knowledge Resource Action (Items 8 to 31) as shown in **Table 8**.

TABLE 8		CRONBACH'S ALPHA CO-EFFICIENT	
Scale	Items	Items excluded as result of Factor Analysis	Cronbach's alpha
Intellectual Capital Perception			
Perception (<i>original</i>)	32-37 inclusive	None	0.6446
Perception (<i>modified</i>)	32,33,35-7	34	0.6023
Knowledge Resource Action			
Action (<i>original</i>)	8-31	None	0.7662
Action (<i>modified</i>)	8-13, 15-19, 21, 23, 26	14, 20, 22, 24, 25, 27-31	0.7627

Original = items resulting from literature review.

Modified = as modified after factor analysis. See 3.10 below.

Establishing a satisfactory level of reliability will ultimately depend upon how a measure is to be used. A commonly used threshold value for acceptable reliability is .70. However, in the early stages of research into hypothesised constructs, alpha co-efficients below .70 are acceptable because modest reliabilities are expected (Hair, Anderson, Tatham and Black, 1995, p.641; Nunnally, 1978, p.245; Nunnally, 1970, p.112). An alpha co-efficient lower than .60 is generally considered poor (Sekaran, 1992, pp.287-8).

An alpha co-efficient was obtained for each of two alternative Intellectual Capital Perception scales, one scale with all 6 items included and an alternative scale with 5 items only, Item 34 (Intellectual Property) being excluded on the grounds of the Factor Analysis reported at 3.10.1 below. Alpha co-efficients of **0.6446** and **0.6023** were obtained respectively, demonstrating that reliability is somewhat impaired but not completely sacrificed by excluding Intellectual Property. The five-variable construct of Intellectual Capital Perception was therefore used for the construction of an Index of Intellectual Capital Perception.

A co-efficient was then obtained for each of two alternative Knowledge Resource Action scales, one scale with all 24 items and an alternative scale with 14 items, 10 being excluded following the factor analysis reported at 3.10.2 below. Alpha co-efficients of **0.7662** and **0.7627** were obtained respectively, demonstrating that reliability is not seriously affected by the exclusion of the

10 items. The reliability obtained justified the use of a 14-variable construct of Knowledge Resource Action for the construction of an Index of Knowledge Resource Action.

3.10 Index construction

To test the two hypotheses, an Index of Intellectual Capital Perception and an Index of Knowledge Resource Action were assembled. The design and use of these indices follow similar procedures employed by Bouillon, Doran and Orazem (1995/96, p.40) and Snell and Dean (1992, p.479).

3.10.1 Index of Intellectual Capital Perception

Six 'perception' items were intended to define the construct 'Intellectual Capital Perception': that is, managerial perceptions of the desirability placing a financial value upon Knowledge Resources. Following Snell and Dean (1992, pp.480-1), principle components analysis with varimax rotation was used to assess underlying dimensionality. The analysis produced only two factors which met Kaiser's criterion, eigenvalues greater than 1.00 (Nunnally and Bernstein, 1994, p.482; Remenyi, Williams, Money and Swartz, 1998, p.223). These two factors together explained 74.9% of the variance (Table 9).

TABLE 9		FACTOR ANALYSIS: PERCEPTIONS OF INTELLECTUAL CAPITAL			
		Rotated factor loadings			
Item	'Perception' Variable	Factor 1	Factor 2	Communality	Notes
36	Cultural capital	0.888	0.057	0.791	
37	Social capital	0.878	0.053	0.774	
32	Human capital	0.791	0.226	0.676	
35	Customer capital	0.783	0.254	0.678	
33	Systems capital	0.642	0.489	0.651	
34	Intellectual property	0.096	0.959	0.928	a
	Eigenvalue	3.2188	1.2800	4.4987	
	% of variance explained	0.5360	0.2130	0.7500	

a) Item excluded from final scale based on Factor 1 as factor loading < .30.

Bold type indicates items best explained by a given factor.

Each of the variables returned loadings on at least one of the two factors that were comfortably above the minimum .30 threshold (Nunnally, 1978, p.346). The communality returned by each variable was considerably higher than the .20 threshold recommended by Tabachnick and Fidell (1996, p.693), thus ensuring 'factorial purity'.

The rotated factor loadings show that Factor 1 was defined by five of the six 'perception' variables. The sixth remaining 'perception' variable (Item 34, intellectual property) loaded highly onto Factor 2 but only negligibly onto Factor 1, suggesting that respondents held a distinctly separate perception of 'intellectual property' from the other five elements of Intellectual Capital. Unlike any of the other five 'perception' variables, 'intellectual property' is already recognised, albeit inadequately, as the legal and commercial embodiment of a productive asset. This may explain the separate perception of Intellectual Property. In contrast, the productive asset qualities of the other five variables await exploration and comprehensive legal and commercial codification. Factor 1 could therefore be tentatively labelled 'valuing knowledge resources not presently captured by traditional accounting paradigms'.

The interpretation of a factor which is defined by only one or two variables is hazardous under even the most exploratory factor analysis (Tabachnick and Fidell, 1996, p.674). Factor 2 was therefore excluded from further analysis and the 'Index of Intellectual Capital Perception' (ICP) was constructed on the basis of factor scores computed from the variables that loaded on to Factor 1. Factor scores were used in preference to either summed scales or surrogate variables, as the data is only to be used in relation to the original sample. In any case, surrogate variables are prone to error. Although the ICP Index is untested and exploratory, evidence of the reliability and validity of its underlying variables has been established. The use of factor scores to construct the Index would appear therefore to be appropriate and justified (Hair, Anderson, Tatham, and Black, 1995, pp.390-1).

3.10.2 Index of Knowledge Resource Action

A similar process to 3.10.1 was employed in the construction of an Index of Knowledge Resource Action. The principal components analysis produced

two factors with eigenvalues greater than 1.00. Fourteen useable variables loaded on to Factor 1. Three useable variables loaded on to Factor 2 (Table 10).

TABLE 10		FACTOR ANALYSIS: KNOWLEDGE RESOURCE ACTIONS			
		Rotated factor loadings			
Item	'Action' Variable (condensed)	Fac 1	Fac 2	Community	Notes
15	Channel employee creativity into organisational objectives	0.640	d	0.431	
17	Keep track of lessons learned to avoid repeating mistakes	0.591	d	0.368	
9	Encourage employee solutions to organisational problems	0.575	d	0.356	
13	Provide employees with training, development and experience	0.563	d	0.327	
11	Deploy the special qualities of employees for maximum effect	0.555	d	0.311	
10	Involve the opinions of employees in reaching decisions	0.554	d	0.332	
8	Encourage employees to question the way things are done	0.544	d	0.331	
21	Ensure systems and procedures efficient and comprehensive	0.526	d	0.306	
16	Provide employees with access to any information	0.509	d	0.260	
12	Strive to retain experienced employees	0.503	d	0.268	
19	Ensure that information systems are continuously updated	0.494	d	0.275	
18	Suspend activities to discover a better way of doing things	0.477	d	0.245	
26	Sample the opinions of existing products/services	0.476	d	0.273	
30	Encourage employees to re-evaluate the work culture	0.476	0.409	0.171	c
23	Collect and record employee suggestions	0.404	d	0.235	
20	Plan strategically at least three years ahead	0.348	0.398	0.280	b
29	Make use of informal channels in reaching decisions	d	0.864	0.751	
28	Manage my relationships with customers/clients	0.317	0.848	0.733	
25	Sample opinions in designing products/services	d	0.848	0.023	c
31	Seek opinions of stakeholders before reaching decisions	0.317	0.406	0.162	c
27	Withhold opinions of products/services from employees	d	0.406	0.218	
24	Assert organisation's legal rights over employee innovations	d	d	0.023	a, c
14	Outsource human resource needs, whenever appropriate	-0.317	d	0.102	a, c
22	Avoid sharing sensitive information with other organisations	d	d	0.011	a, c
	Eigenvalue	4.3786	2.4118	6.7903	
	% of variance explained	0.182	0.100	0.283	

a) Item excluded from final scale as no factor loadings > .30.

b) Item excluded from final scale as difference between loadings on two factors < .10.

c) Item excluded from final scale as communality < .20.

d) Item excluded from final scale as factor loading < .30.

Bold type indicates items best explained by a given factor

The analysis produced only two factors with eigenvalues greater than 1.00. These two factors together explained only 28.3% of the variance. Although low, a solution that accounts for less than 60% of the total variance may still be of practical significance in the social sciences. There is no absolute threshold for all applications (Hair, Anderson, Tatham and Black, 1995, p.378) since a suitable threshold depends heavily on the average correlation between the underlying variables which in turn depends upon many other considerations (Nunnally and Bernstein, 1994, p.483).

To further improve the robustness of each of these factors, Nunnally's two stage rule (cited by Snell and Dean, 1992, p.480), was applied. Firstly, in order to ensure that a given item was representative of the construct underlying each factor, a weight of .30 was used as a minimum cut-off. Items that did not meet this criterion were excluded from further consideration. Three variables fell into this category, as indicated by symbol 'a'. Secondly to avoid the problem of cross-loadings, each remaining item was required to define only one factor: if the difference between the weights for any given item was less than .10 between the two factors, then it was also deleted from the final scale. One variable fell into this category, as indicated by symbol 'b'.

Consideration was then given to the communalities reported by the remaining variables. As suggested by Tabachnick and Fidell (1996, p.693), variables with communalities lower than .20 indicate considerable heterogeneity and impinge upon 'factorial purity'. Six variables fell into this category, as indicated by symbol 'c', and were excluded from further analysis.

The rotated factor loadings showed that Factor 1 was well-defined by 14 of the 24 'action' variables. Factor 2 was well-defined by another 3 variables only, while the remaining 7 variables failed to satisfactorily define either factor. The items that have loaded highly onto Factor 1 suggested a primary construct of Knowledge Resource Action, characterised by the theme 'managing internally to maximise organisational learning'. On the other hand, the few items that have loaded highly onto Factor 2 suggest a secondary construct of Knowledge Resource Action that is vaguely characterised by the theme 'managing externally'. However, Factor 2 was excluded from further analysis as the reliability of its three constituent variables (Items, 27, 28 and 29) produced an alpha co-efficient of only **0.4864**, well below the minimum acceptable threshold of .60 (Sekaran, 1992, pp.287-8).

Since Factor 1 was reliable and Factor 2 was not, and as the fewest possible factors should be retained (Tabachnick and Fidell, 1996, p.674), only Factor 1 was retained. An 'Index of Knowledge Resource Action' (IKA) was then constructed on the basis of factor scores computed from the variables that loaded on to Factor 1.

The remaining factor, Factor 1, accounted for 18.2% of the total variance, not an 'outstanding' result (Tabachnick and Fidell, 1996, p.696). Nevertheless, factors which account for at least 5% of the total variance still have practical value (Harman, 1976, p.129). Whatever rule or rules are adopted to determine the number of factors to be retained from an exploratory factor analysis, the factor must make theoretical sense. The major criterion is that any factor or factors resulting from rotation should contain at least two variables and be meaningful (Nunnally and Bernstein, 1994, p.483, 489). In this case, fourteen variables loaded onto Factor 1 and its resulting theme - 'managing internally to maximise organisational learning' - was readily apparent (Hetzl, cited by Stapleton, 1997, p.9; Dunteman, 1989, pp. 22-3). If Factor 1 fails to explain a larger proportion of variance, might this suggest that Australian managers' degree of attention to Knowledge Resource management does not closely mirror the American and European experience upon which Items 8 to 31 in the survey instrument were based?

For the same reasons given at 3.10.1 with the construction of the ICP, factor scores were used in preference to summed scales and surrogate variables to construct the IKA.

3.11 Construct refinement

Using only one factor for each index necessitated some refinement to the rationale underlying the constructs of ICP and of IKA.

As noted at 1.5, contemporary descriptions suggest that Intellectual Capital is the outcome of managing six broadly described resources of organisational knowledge (human, structural, intellectual property, customer, cultural and social), while prominent proponents Saint-Onge (1996, p.10) and Bontis (1996a, p.4) recognise as few as three resources (human, structural and customer) in their respective attempts to explain Intellectual Capital.

Although both factor analyses failed to reliably define any more than one factor approaches to Intellectual Capital (and not a multiple factor approach as suggested at 1.5) this is not of paramount concern. Although we have ample anecdotal evidence of the existence of Intellectual Capital, we have little idea at present of the relative strength or relative importance of its perceived elements and sub-elements, nor of the nature of their synergistic interaction.

3.12 Summary

The literature review failed to reveal any closely replicable research in the field of Intellectual Capital. To seek a suitable alternative precedent, methodologies employed in other managerial studies were examined but none of these provided completely appropriate models for replication. Therefore, a methodology was developed to meet the specific requirements of this study as outlined in this chapter. The two hypotheses presented in 2.4.7 and 2.5.24 were tested using a cross-sectional design.

A consideration of the broad dimensions of methodology strongly suggested that an inductive, quantitative approach was warranted and that a survey approach was appropriate to capture the 'big picture' of the extent to which Knowledge Resources are perceived and actively managed by managers in Australian organisations. A survey instrument, grounded in the literature review, was sent to 1,448 executives across 317 organisations throughout Australia. 612 useable responses were received. Validity and reliability were established.

To test the two hypotheses, an Index of Intellectual Capital Perception (ICP) and an Index of Knowledge Resource Action (IKA), principle components factor analysis with varimax rotation was used to assess underlying dimensionality. A single factor was produced for each index. For ICP this was 'valuing knowledge resources not presently captured by traditional accounting paradigms'. For IKA, it was 'managing internally to maximise organisational learning'. These factors accounted for 53.6% and 18.2% of the variance generated by respective rotated factor loadings. Although each factor's explanation of the proportion of variance fell short of the commonly accepted threshold (60%), it was considered that each was deserving of further

analysis, in view of the exploratory nature of this analysis and the emergent character of Intellectual Capital, with any resulting findings being appropriately qualified.

For an exploratory investigation of Intellectual Capital, the foregoing considerations established the adequacy of the methodology employed. Future studies in this area could justify a number of refinements, however, as detailed at the end of Chapter 5.

CHAPTER 4

RESULTS and DISCUSSION

4.1 Introduction

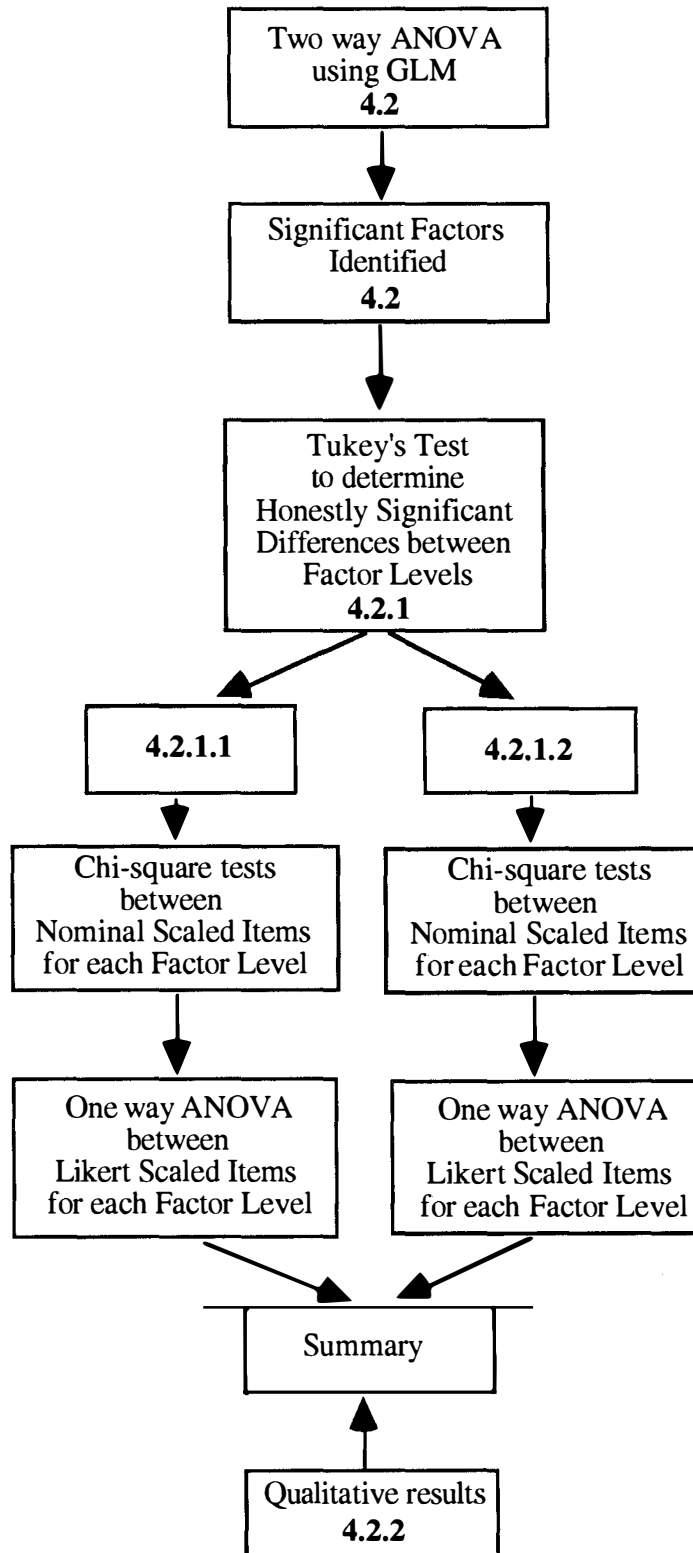
In this chapter, each of the two hypotheses, **H₁** and **H₂**, were tested by means of a two-way analysis of variance (Sections 4.2 and 4.3 respectively). Where significant factors were identified from each ANOVA, Tukey's Test was employed to determine the existence, if any, of a critical or 'honestly significant' difference (HSD) between different groups of managers, whether grouped by organisational type or by managerial role. Chi-square tests and one-way ANOVAs were next used to more closely examine the key characteristics of managers critically different groups in order to gain a better understanding of managers' perceptions of Knowledge Resources (**H₁**) and managers' actions with respect to the management of their Knowledge Resources (**H₂**).

Due to the unbalanced design produced by unequal response groups, Minitab did not permit the execution of the factorial analysis of variance required to test **Hypotheses 1** and **2**. Therefore, the General Linear Model ('GLM') was used in its place in testing these hypotheses. The GLM is a generalisation of the model used in analysis of variance (Minitab Inc., 1995, p.10.41) and its use was considered justified in this study since most statistical methods are merely applications of the GLM (Tabachnick and Fidell, 1996, p.813).

As the response groups were of unequal size, this will increase the probability of Type I error in factorial designs with more than one between-subjects independent variable (as employed in the tests of **Hypothesis 1** and **Hypothesis 2**) because systematic variance will contribute to more than one test. This possibility can be overlooked in a non-experimental, exploratory work such as this since the unequal sample sizes will often reflect the nature of the population as a whole. To artificially equalise the cell sizes would distort differences and sacrifice generalisability (Tabachnick and Fidell, 1996, p.48).

4.2 Hypothesis 1

Testing of **Hypothesis 1** is shown in **Diagram 5**.



Hypothesis 1 was expressed by the following two null statements -

H1-1_o Organisational type does not significantly explain managers' perception of the need to place a realistic financial value upon the organisation's Knowledge Resources.

H1-2_o Managerial role does not significantly explain managers' perception of the need to place a realistic financial value upon the organisation's Knowledge Resources.

The tests of the two versions of **Hypothesis 1** also tested for an interaction between organisational type (OT) and managerial role (MR).

A two-way analysis of variance using the GLM was executed using Minitab and employing the full set of 612 managerial responses. The dependent variable (managers' perception of the need to place a realistic financial value upon the organisation's Knowledge Resources) was created from the factor scores computed for the ICP, as outlined in 3.9.1. (Table 11).

TABLE 11		ANOVA FOR MANAGERIAL PERCEPTIONS OF KNOWLEDGE RESOURCES				
Source	DF	Seq SS	Adj SS	Adj MS	F	P
2 (OT)	3	5.4335	6.2196	2.0732	2.26	0.081
40 (MR)	4	48.0725	36.5354	9.1338	9.94	0.000
2 * 40 (OT * MR)	12	13.5928	13.5928	1.1327	1.23	0.256
Error	592	543.9012	543.9012	0.9188		
Total	611	611.0001				

alpha = 0.05

Although the effect of OT was insignificant ($F = 2.26$, $df = 3$, $p = 0.081$), MR did significantly explain managers' perceptions ($F = 9.94$, $df = 4$, $p = 0.000$). The interaction between OT and MR was not significant ($F = 1.23$, $df = 12$, $p = 0.256$).

4.2.1 Analysis

Where interaction is not significant but one or both factors show significant differences among the group means within the factor, the magnitude of each difference can be determined in order to establish the relative importance of the various factor levels. As a post hoc procedure (Levine, Berenson and Stephan, 1998, pp.424-5), Tukey's multiple comparison test can be used to gauge the significance of the difference between pairs of sample means within a factor (Byrkit, 1987, p.687). The mean and HSD obtained for each MR are presented in **Table 12**.

TABLE 12		DIFFERENCES BETWEEN MANAGER MEANS FOR PERCEPTION OF KNOWLEDGE RESOURCES					
			FIN	GEN	HRM	ITM	MKT
	HSDs		0.3288	0.2498	0.3150	0.3462	0.3819
		Means	- 0.4810	- 0.0554	0.1807	0.1852	0.3641
FIN	0.3288	- 0.4810	0				
GEN	0.2498	- 0.0554	0.4256	0			
HRM	0.3150	0.1807	0.6617	0.2361	0		
ITM	0.3462	0.1852	0.6662	0.2406	0.0045	0	
MKT	0.3819	0.3641	0.8451	0.4195	0.1834	0.1879	0

Bold type indicates significant difference between managerial types.

Differences = (row mean - col mean).

Significant differences where (row mean - col mean) > row HSD and > col HSD.

alpha = 0.05 but 0.10 for each multiple comparison.

Table 12 shows that, firstly, non-finance managers (marketing, information technology, human resource and general managers) have a significantly more favourable view of the proposition than finance managers. Secondly, **Table 12** shows that, although general managers held a significantly more favourable view of the proposition than finance managers, they held a significantly less favourable view than marketing managers.

Tables 13 and **14** (below) show that perceptions of the relative importance of the five elements of Intellectual Capital were uniform between each of these sub-groups, with the exception that customer capital was rated (a) more highly

than human capital by non-finance managers (*vis-a-vis* finance managers) and rated (b) more highly than both structural (systems) capital and human capital by marketing managers (*vis-a-vis* general managers). Across all responses, perceptions of the financial value of human, customer and structural (systems) capital were higher than the social and cultural forms of structural capital and suggest the elements of Saint-Onge's double arrow dynamic (1996, p.14).

TABLE 13	ITEM MEANS AND STANDARD DEVIATIONS (I)			
	FIN		NON	
	n = 112		n = 500	
	Mean	St Dev	Mean	St Dev
Systems capital	3.6875	1.155	3.9800	0.8055
Human capital	3.3929	1.188	3.9060	0.9093
Customer capital	3.3839	1.101	3.9320	0.9017
Social capital	3.0357	1.098	3.5660	0.9161
Cultural capital	3.0000	1.074	3.4880	0.9119

TABLE 14	ITEM MEANS AND STANDARD DEVIATIONS (II)			
	GEN		MKT	
	n = 194		n = 83	
	Mean	St Dev	Mean	St Dev
Systems capital	3.8144	0.8913	4.1807	0.7349
Human capital	3.7526	1.0029	4.1084	0.9240
Customer capital	3.7216	0.9737	4.3373	0.7852
Social capital	3.4639	0.9610	3.7952	0.9074
Cultural capital	3.3866	0.9764	3.7349	0.8846

Chi-square and ANOVAs were used to compare finance managers with all other managers and marketing managers with general managers in terms of key characteristics.

4.2.2.1 Finance managers and non-finance managers contrasted

Fifteen independent variables (Items 1, 3 to 7, 38, 39, and 41 to 47) were used to collect data on managers' key characteristics. Three items (5 to 7) were based on an interval scale, and twelve were nominal scales. Item 40, the dependent variable, was a nominal scale. Where both independent and dependent variables are nominal, chi-square tests can be used to test the independence (Sekaran, 1992, p.269) of these variables.

Chi-square values were obtained from a cross tabulation of (a) the 112 finance managers with (b) the 500 non-finance managers across the 12 variables of interest organised on a nominal scale. For each key characteristic, the null hypothesis was that the two groups of managers do not differ significantly. These findings are summarised in Table 15.

TABLE 15		CHI-TESTS OF KEY MANAGERIAL CHARACTERISTICS			
Item and characteristic	Chi	n=	a	df	Null hypothesis
1. Managerial approach	4.173	612	0.05	2	Support
3. Organisational headquarters	0.618	612	0.05	2	Support
4. Organisational size	10.531	612	0.05	6	Support
38. Most reliable relationship	133.515	612	0.05	5	Reject
39. Least reliable relationship	21.135	612	0.05	5	Reject
41. Length of service	6.013	612	0.05	4	Support
42. Age	1.596	612	0.05	4	Support
43. Gender	8.105	612	0.05	1	Reject
44. Salary	2.256	612	0.05	4	Support
45. Educational level	14.486	612	0.05	4	Reject
46. Hours worked per week	6.669	612	0.05	4	Support
47. Domestic pursuits	2.377	612	0.05	2	Support

Item 38 (*Area of most reliable relationship*)

Finance managers considered that the relationships with people in their own area were significantly more reliable than those with people in other organisational areas, especially the areas of human resources, information technology and marketing. (Table 16).

TABLE 16		AREA OF MOST RELIABLE RELATIONSHIP		
		FIN	NON	ALL
GEN	o	40	243	283
FIN	o	69	68	137
HRM	o	1	62	63
ITM	o	1	55	56
MKT	o	1	49	50
OTH	o	0	23	23
ALL	o	112	500	612

Chi-square = 133.515, df = 5.

This finding could suggest that the needs of non-financial managers for solutions to and perspectives on financially-related problems are not being met by the conventional finance manager. However, these results must be interpreted with some caution. Since each managerial type appears to have rated their respective functional area highest for reliability, the findings also suggest a 'silo' effect: the compartmentalisation and management of organisational knowledge along traditional functional lines instead of its organisation-wide distribution and integration.

Item 39 (*Area of least reliable relationship*)

The chi-square result tended to reinforce the findings obtained for Item 38. (Table 17).

TABLE 17		AREAS OF LEAST RELIABLE RELATIONSHIP		
		FIN	NON	ALL
GEN	o	9	48	57
FIN	o	2	66	68
HRM	o	20	54	74
ITM	o	33	165	198
MKT	o	35	98	133
OTH	o	13	69	82
ALL	o	112	500	612

Chi-square = 21.135, df = 5.

Two broadly divergent groupings are apparent: firstly, finance managers' weakest relationships were in the areas of marketing and human resources and secondly, non-finance managers' weakest relationships were in the areas of finance, general management and information technology. Arguably, the softer, more subjective criteria that characterise marketing and human resource functional areas may be less susceptible to financial evaluation than the other three areas. As a result, conventional financial and/or performance measurement criteria may not satisfactorily communicate the financial value of Knowledge Resources consumed and/or generated by marketing and human resources staff in terms that are acceptable to finance managers. These findings also imply some support for James' revelation (1993, pp.122-3) that Australian business has found that the demarcation lines between the areas of human resources and information technology have been the most troublesome. Again, these results should be interpreted with some caution due to the possibility of a 'silo' effect.

Item 43 (*Managers and gender*)

Since females were under-represented among finance managers compared to non-finance managers, it could be argued that gender - rather than managerial role - might best explain why finance managers as a group are not favourably disposed towards the proposition. Accounting is a male-dominated profession, its rational, quantifiable and analytical criteria consistent with masculine logical, fact-based functioning (Moore, 1998, p.20). Coupled with the observation that Australian companies currently lag their overseas counterparts in addressing the Intellectual Capital phenomenon and are free of any formal rules for its measurement and reporting (Guthrie, quoted by Moodie, 2000, p.43), the apparent disinterest of finance managers in the proposition is understandable. Without the confrontation of a problem demanding a solution, issues surrounding Intellectual Capital will receive little attention from male-dominated Australian finance managers since male socialisation processes stress the high status role of giving orders and telling others what to do (Zanetic and Jeffery, 1997, p.14) and since men, generally, are more singularly focused and competitive as well as preferring more rigid structures and career paths (Moore, 1998, p.20). Even if Intellectual Capital did demand the immediate attention of finance managers, the masculine

operating style would typically exclude or undervalue female perspectives, thus limiting the resulting quality of any solutions that might be generated (Zanetic and Jeffery, 1997, pp.12, 14).

Item 45 (*Managers and educational level*)

More finance managers possessed educational qualifications at graduate and postgraduate levels than other managers. (**Table 18**).

TABLE 18		MANAGERS' EDUCATIONAL LEVELS		
		FIN	NON	ALL
Secondary school	o	1	53	54
Technical college	o	13	78	91
University degree	o	52	178	230
Postgraduate	o	24	87	111
Masters/Doctorate	o	22	104	126
ALL	o	112	500	612

Chi-square = 14.486, df = 4.

Non-finance managers can be divided into those who attained secondary or technical college educational levels and those who attained higher educational degrees (at the masters or doctorate levels), both of which were more common than for finance managers. Conventional accounting paradigms form the basis of the tertiary level professional training of finance managers, while the questioning of these paradigms is left to higher educational pursuits. The apparent resistance of finance managers to the proposition may reflect the significantly fewer finance managers who have pursued and attained these higher educational qualifications.

Where the independent variable is a nominal scale item but the dependent variables are interval scaled, an analysis of variance is appropriate as a test of independence (Sekaran, 1992, p.269). A one-way ANOVA, using the GLM, was therefore computed using Item 40 (MR) and each of the remaining dependent variables, Item 5 (organisational mission), Item 6 (organisational management of Knowledge Resources) and Item 7 (personal job satisfaction). No significant F values were obtained.

Summary

Significantly more non-finance managers than finance managers agreed with the proposition.

Non-finance managers are more likely to be female and their education level, while polarised between technical college level qualifications and a higher university degree such as a masters or doctorate, is generally lower. Non-finance managers identified the general, finance, information technology and other functional areas as their least reliable relationships within their organisations but the areas of human resources and marketing as the most reliable. Conversely, finance managers identified their own functional areas as their most reliable and the areas of human resources and marketing as their least reliable.

4.2.2.2 Marketing managers and general managers contrasted

Chi-square values from cross tabulation of the key characteristics of (a) the 83 marketing managers and (b) the 194 general managers across the 12 variables of interest are summarised in **Table 19**.

TABLE 19	CHI-TESTS OF KEY MANAGERIAL CHARACTERISTICS				
	Chi	n=	a	df.	Null hypothesis
1. Managerial approach	0.085	277	0.05	2	Support
3. Organisational headquarters	4.679	277	0.05	2	Support
4. Organisational size	7.637	277	0.05	6	Support
38. Most reliable relationship	59.514	277	0.05	5	Reject
39. Least reliable relationship	43.919	277	0.05	5	Reject
41. Length of service	9.962	277	0.05	4	Reject
42. Age	71.271	277	0.05	4	Reject
43. Gender	17.399	277	0.05	1	Reject
44. Salary	37.624	277	0.05	4	Reject
45. Educational level	5.723	277	0.05	4	Support
46. Hours worked per week	15.158	277	0.05	4	Reject
47. Domestic pursuits	1.172	277	0.05	2	Support

For Items 38, 39, 41, 42, 43, 44 and 46, the null hypothesis was rejected.

Item 38 (*Area of most reliable relationship*)

The chi-square test suggested a perceived lack of mutual reliability between the areas of marketing and general management (Table 20).

TABLE 20		AREA OF MOST RELIABLE RELATIONSHIP		
		GEN	MKT	ALL
GEN	o	114	35	149
FIN	o	37	6	43
HRM	o	15	1	16
ITM	o	4	2	6
MKT	o	11	35	46
OTH	o	13	4	17
ALL	o	194	83	277

Chi-square = 59.514 , df = 5.

Each group rated its respective functional area significantly higher in terms of reliability than other organisational areas and both rated the reliability of each other's areas, significantly lower. These findings mirror the divergent attitudes of each group towards the proposition established at 4.2.2. It could be inferred that marketing and general managers do not possess a shared understanding of the financial value of the Knowledge Resources, giving rise to an apparent lack of empathy between the two MRs.

Item 39 (*Area of least reliable relationship*)

The chi-square results reinforced the findings obtained for Item 38 (Table 21).

TABLE 21		AREA OF LEAST RELIABLE RELATIONSHIP		
		GEN	MKT	ALL
GEN	o	9	8	17
FIN	o	12	23	35
HRM	o	22	11	33
ITM	o	77	33	110
MKT	o	43	0	43
OTH	o	31	8	39
ALL	o	194	83	277

Chi-square = 43.919, df = 5.

Of the six managerial areas, general managers significantly rated marketing as the least reliable. On the other hand, marketing managers perceived no lack of reliability in their own area but did perceive a significant lack of reliability in most other areas, especially the areas of general management and finance. These results reinforce the findings obtained at **Item 38** above.

Items 41, 42, 44 and 46 (*Length of service, age, salary level and working hours*)

At each of Item 41 (length of service), Item 42 (age), Item 44 (salary level) and Item 46 (hours worked), the characteristics of marketing managers differed from those of general managers. Marketing managers tended to have 3 years or less service with their organisation, general managers 4 years or more. The age of marketing managers tended to be 39 years or less, that of general managers 40 years or more.

The greater length of service and age of general managers (compared to marketing managers), as well as the higher salary levels (**Table 22**) and longer working weeks (**Table 23**), compared to marketing managers, is presumably explained by the greater maturity, experience and diligence demanded of their positions. These results may also explain general managers' apparent conservatism - or complacency - about the proposition.

TABLE 22		MANAGERS' SALARY LEVELS		
\$		GEN	MKT	ALL
<50,000	o	3	13	16
50-100,000	o	60	41	101
100,001-150,000	o	63	18	81
150,001-200,000	o	38	7	45
>200,000	o	30	4	34
ALL	o	194	83	277

Chi-square = 37.624 , df = 4.

TABLE 23		MANAGERS' WORKING WEEK		
Hours		GEN	MKT	ALL
< 40	o	2	3	5
41-50	o	46	34	80
51-60	o	87	33	120
61-70	o	41	6	47
>70	o	18	7	25
ALL	o	194	83	277

Chi-square = 15.158, df = 4.

In the light of their favourable response towards the proposition, the relative youth and greater mobility of marketing managers is important. As some inevitably graduate to roles in general management later in their working lives they may be expected to carry their expectations of the financial value of Knowledge Resources with them and thus critically influence future decisions in this area.

Item 43 (*Managers and gender*)

Females are significantly more represented among marketing managers than general managers (**Table 24**).

TABLE 24		MANAGERS' GENDER		
		GEN	MKT	ALL
M	o	170	55	225
F	o	24	28	52
ALL	o	194	83	277

Chi-square = 17.399, df = 1.

As with finance managers (see 4.2.2.1 above), the under-representation of women among general managers suggests that gender - rather than managerial role - may explain why general managers as a group are not favourably disposed towards the placement of a financial value on Knowledge Resources. Men who single-mindedly climb the corporate ladder to senior executive status, typically lack the 'whole brain' chemistry of women that enables them to focus on various issues at once, to perceive their environment more sensitively, to be more open to new ideas and to respond more quickly to change (Moore, 1998, p.20)

For each of the remaining dependent variables, items 5 (organisational mission), 6 (organisational management of Knowledge Resources) and 7 (personal job satisfaction), a one-way ANOVA using the GLM was computed on MR. No significant F value was obtained for Item 5 or Item 7.

Item 6 asked whether managers considered that their organisations manage things beside those which possess a definite financial value. These are by implication, Knowledge Resources. It was hypothesised that MR does not explain managers' perception of the degree to which their organisations manage Knowledge Resources. There is a significant difference between the means for general managers (3.835) and marketing managers (3.542) ($F = 4.19$, $p = 0.042$). Although general managers consider that their organisations manage Knowledge Resources, marketing managers, while not disagreeing with the proposition, were less in agreement.

Summary

Significantly more marketing than general managers agreed with the proposition. In comparison with general managers, marketing managers are

more likely to be younger, have shorter lengths of service, earn less and work a shorter working week. Marketing managers identified the areas of general management, finance and human resources as the functional areas of least reliable relationships in their organisations. On the other hand, general managers identified marketing and other managers as having the least reliable functional relationships. Perceptions of the reliability of the information technology area did not differ between marketing and general managers. Marketing managers tended to be less generous than general managers in their assessment of the degree to which their organisations manage Knowledge Resources.

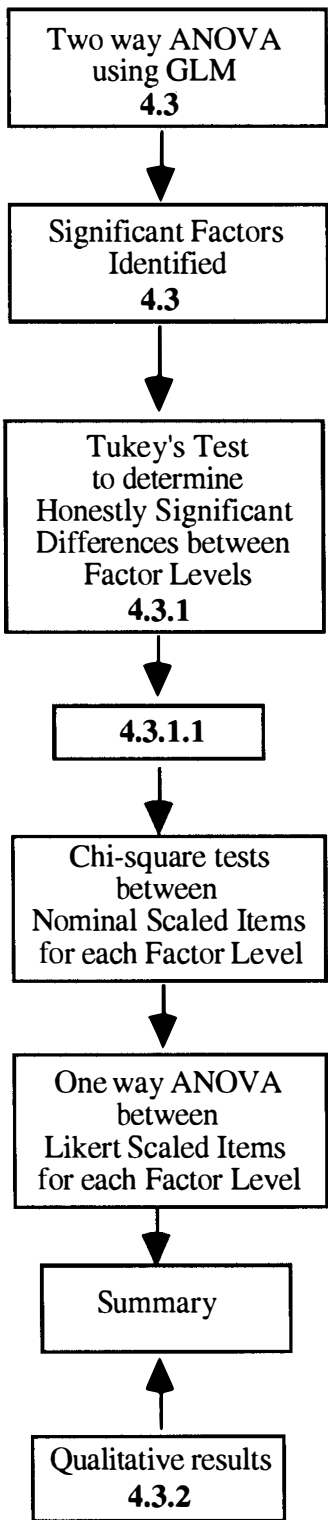
4.2.2 Qualitative results

The divergence of opinion between finance and non-finance managers over the proposition found expression in some of the written responses to Item 48, providing clarification of the findings in 4.2.2.1.

Two non-finance managers were favourably disposed towards the proposition, despite the invisibility of knowledge and the major obstacle posed by conventional accounting methods. Other non-finance managers were generally favourable to the proposition but were divided over its practicality. Some indicated that business organisations not only fail to place a value on the human aspect of business but they significantly under-value worker knowledge and corporate memory. Other respondents averred that the real value of knowledge is embodied in its application rather than in knowledge itself and the direct financial gain of knowledge can only be measured by a comparison 'before' and 'after' its acquisition. At the other extreme, a finance manager doubted whether knowledge, other than patentable knowledge, had any value in the long term due to the 'velocity of change'. No other comments were received from finance managers about the proposition. No written responses were received from general managers or marketing managers.

4.3 Hypothesis 2

Testing of **Hypothesis 2** is shown in **Diagram 6**.



Hypothesis 2 was expressed by the following null statements -

H2-1_o Organisational type will not significantly explain managers' tendency to actively manage Knowledge Resources.

H2-2_o Managerial role will not significantly explain managers' tendency to actively manage Knowledge Resources.

As with **Hypothesis 1**, the tests of the two versions of **Hypothesis 2** sought also to establish the significance of a possible interaction between the two variables, OT and MR.

A two-way analysis of variance using the GLM was executed, using Minitab, on the full set of 612 managerial responses. The dependent variable "managers' active management of Knowledge Resources" was created from the factor scores computed for the IKA. The following results were obtained (Table 25).

TABLE 25		ANOVA FOR MANAGERIAL ACTIONS ON KNOWLEDGE RESOURCE MANAGEMENT				
Source	DF	Seq SS	Adj SS	Adj MS	F	P
2 (OT)	3	11.2481	12.4758	4.1586	4.21	0.006
40 (MR)	4	3.6743	3.7295	0.9324	0.94	0.438
2 * 40 (OT * MR)	12	11.8234	11.8234	0.9853	1.00	0.449
Error	592	584.2541	584.2541	0.9869		
Total	611	610.9999				

a = 0.05

Although OT significantly explained managers' tendency to actively manage Knowledge Resources ($F = 4.21$, $df = 3$, $p = 0.006$), MR did not ($F = 0.94$, $df = 4$, $p = 0.438$). Consequently, the alternate for **H2-1_o** was **accepted** while **H2-2_o** was **supported**. Interaction between the variables was not significant ($F = 1.00$, $df = 12$, $p = 0.449$).

4.3.1 Analysis

As with H1-2, Tukey's multiple comparison test was used to establish the relative importance of the various factor level means. The mean and HSD obtained for each OT are presented in Table 26.

TABLE 26		DIFFERENCES IN ORGANISATIONAL MEANS OF KNOWLEDGE MANAGEMENT ACTIONS				
			GBE	BUS	NPO	GOV
	HSDs		0.3447	0.2140	0.2592	0.2953
		Means	- 0.2293	-0.0964	0.1415	0.1869
GBE	0.3447	- 0.2293	0			
BUS	0.2140	- 0.0964	- 0.1329	0		
NPO	0.2592	0.1415	0.3708	0.2379	0	
GOV	0.2953	0.1869	0.4162	0.2833	0.0454	0

Bold type indicates significant difference between managerial types.

Differences = (row mean - col mean).

Significant differences where (row mean - col mean) > row HSD and > col HSD.

alpha = 0.05 but 0.10 for each multiple comparison.

Table 26 demonstrates that managers within government and non-profit organisations exhibit a greater tendency to actively manage Knowledge Resources than managers of government business enterprises. Government and non-profit organisations are hereafter identified with the collective acronym GNO, and government business enterprises with the acronym GBE. The means and standard deviations across the 14 items making up the IKA for each of these two groups are presented in Table 27.

TABLE 27		ITEM MEANS AND STANDARD DEVIATIONS			
		GNO n = 285		GBE n = 91	
Variable (condensed)		Mean	StDv	Mean	StDv
10	Involve the opinions of relevant employees in reaching decisions	4.3053	0.6292	4.1868	0.6652
12	Strive to retain experienced employees	4.0982	0.7989	3.8901	0.8090
8	Encourage employees to continually question the way things are done	4.0912	0.6436	4.0769	0.7921
9	Encourage employees to seek solutions to organisational problems	4.0912	0.6651	4.0440	0.8016
16	Provide employees with access to any information they require	3.9404	0.8265	3.6593	0.9336
26	Sample the opinions of customers/clients of existing products/services	3.9298	0.7886	4.0440	0.6817
21	Ensure that policies, systems and procedures efficient and comprehensive	3.8456	0.7200	3.7253	0.8441
19	Ensure that information systems are continuously updated	3.8421	0.9380	3.6703	0.8699
15	Channel employee creativity into organisational objectives	3.7965	0.7321	3.6593	0.7336
13	Provide employees with training, development and experience	3.6070	0.9154	3.5495	0.8201
17	Keep track of lessons learned to avoid repeating mistakes	3.5719	0.9073	3.1538	0.8423
11	Deploy the special qualities of employees for maximum effect	3.5614	0.8183	3.3516	0.7051
23	Collect and record employee suggestions	3.2456	0.9656	3.1320	1.024
18	Suspend activities to discover a better way of doing things	3.1649	0.9293	3.0879	0.8775
	Mean	3.7922	0.8056	3.6593	0.8143

The managers of business (non-government) enterprises, which are also obligated to a profit imperative did not exhibit greater or lesser tendency to actively manage Knowledge Resources compared to managers of other types of organisations.

Chi-square tests and ANOVAs were used to compare the responses of managers on each factor level in terms of key characteristics. In each case, the null hypothesis was that managers do not differ significantly between OT.

4.3.1.1 GNO and GBE managers contrasted

Chi-square values obtained from a cross tabulation of (a) the 285 GNO managers and (b) the 91 GBE managers, across the 12 nominal scale based items are summarised in Table 28.

TABLE 28	CHI-TESTS OF KEY MANAGERIAL CHARACTERISTICS				
	Item and characteristic	Chi	n=	a	df
1. Managerial approach	1.826	376	0.05	2	Support
3. Organisational headquarters	1.947	376	0.05	2	Support
4. Organisational size	26.029	376	0.05	6	Reject
38. Most reliable relationship	4.207	376	0.05	5	Support
39. Least reliable relationship	4.269	376	0.05	5	Support
41. Length of service	1.872	376	0.05	4	Support
42. Age	11.359	376	0.05	4	Reject
43. Gender	8.242	376	0.05	1	Reject
44. Salary	18.868	376	0.05	4	Reject
45. Educational level	1.509	376	0.05	4	Support
46. Hours worked per week	4.463	376	0.05	4	Support
47. Domestic pursuits	2.633	376	0.05	2	Support

For Items 4, 42, 43 and 44, the null hypothesis was rejected.

Item 4 (*Managers and organisational size*)

GNO managers tended to work in organisations of 1,000 people or less while GBE managers were typically employed in organisations of 200 people or more, up to 10,000 people and over. GNO managers, who more actively manage Knowledge Resources, tend to be employed by smaller organisations. Could this suggest that the active management of Knowledge Resources is encouraged or facilitated by smaller organisational size? Alternatively, could it suggest that increasing organisational size has some debilitating effect on the active management of Knowledge Resources?

Item 42 (*Managers and age*)

GNO managers were significantly represented in three of the five age groupings, 20-29, 30-39 and 50-59 (Table 29). The apparent dichotomy between these two broad age groupings (20-39 and 50-59) is puzzling. However, the preponderance of GNO managers in comparison to GBE managers in the 20-29 age group, suggests that active management of Knowledge Resources will be firmly entrenched in GNOs for years to come.

TABLE 29		MANAGERS' AGE		
		GNO	GBE	ALL
20-29	o	17	0	17
30-39	o	54	17	71
40-49	o	121	52	173
50-59	o	84	18	102
60>	o	9	4	13
ALL	o	285	91	376

Chi-square = 11.359, df = 4.

The concentration of GBE managers in the middle age grouping, 40 to 49 years, suggests that the relative under-management of Knowledge Resources by managers in this type of organisation may continue into the foreseeable future, at least until the natural career spans of these managers reach their conclusion in 15 to 25 years time.

Item 43 (*Managers and gender*)

Females are significantly more represented among GNO managers than GBE managers (Table 30).

TABLE 30		MANAGERS' GENDER		
		GNO	GBE	ALL
M	o	213	81	294
F	o	72	10	82
ALL	o	285	91	376

Chi-square = 8.242, df = 1.

As with finance managers and general managers (see 4.2.2.1 and 4.2.2.2 above), the under-representation of women among GBE managers suggests that gender - rather than organisational type - may explain why GBE managers as a group are not favourably disposed towards the active management of Knowledge Resources. Women's under-representation among GBE managers may be reflective of a trend for women to leave larger corporations when they find management ranks not as welcoming as they would like (Moore, 1998, p.20). On the other hand, female managers in non-profit organisations, if not

in GNOs generally, may find that their intuitive, people-oriented qualities (Moore, 1998, p.20) are more closely aligned with policies and practises that for-profit businesses will have to learn for themselves tomorrow (Drucker, 1992, p.203).

Item 44 (*Manager and salary level*)

The salaries paid to GBE managers were typically higher (\$100,000 or more) than those paid to GNO managers, who were typically paid less than \$100,000 (Table 31).

TABLE 31		MANAGERS' SALARY LEVELS		
\$			GBE	ALL
<50,000	o	35	0	35
50-100,000	o	150	41	191
100,001-150,000	o	70	34	104
150,001-200,000	o	23	12	35
>200,000	o	7	4	11
ALL	o	285	91	376

Chi-square = 18.868, df = 4.

As with general managers' apparent reluctance to place a financial value on organisational resources (4.2.2.2), the significantly higher salaries paid to GBE managers may be consistent with the apparent complacency of this group towards the active management of Knowledge Resources.

For each of the remaining dependent variables, Item 5 (organisational mission), Item 6 (organisational management of Knowledge Resources) and Item 7 (personal job satisfaction), a post hoc one-way ANOVA, using the GLM, was computed for each item with Item 40. No significant F value was obtained for Item 5 (F = 1.15, df = 4, p = 0.332) or Item 7 (F = 0.48, df = 4, p = 0.752).

Item 6 shows how managers consider their organisations manage things besides those possessing a definite financial value - by implication, these are

Knowledge Resources. For Item 6, it was hypothesised that the type of organisations in which managers are employed does not explain their perception of the degree to which these organisations manage their Knowledge Resources. The hypothesis was rejected ($F = 22.83$, $df = 1$, $p = 0.000$): there is a significant difference between GNO managers (mean = 4.0175) and GBE managers (mean = 3.4725). As expected, GNO managers were more in agreement with this statement, suggesting that GNO organisations are more inclined to manage Knowledge Resources and thus possibly preserve and accumulate their Intellectual Capital, even in the absence of formal policies or strategies in this area.

4.3.2 Qualitative results

The written responses obtained from Item 48 provided some clarification and support for the quantitative findings.

If GNOs and GNO managers more actively manage Knowledge Resources than GBEs and GBE managers, the written responses suggest that this is made necessary by the apparent inability of GNOs to cope with rapid technological, organisational and social change rather than the existence of a benign organisational environment or culture.

In one type of GNO, the government organisation, several respondents identified fixed human resource policies as restricting management's capacity to flexibly handle change, risk and innovation, a situation compounded by a lack of tolerance, listening and acceptance of diversity. Another pointed to a *laissez-faire* attitude that permeates Australian government departments, one that is difficult to change. In this environment, the emphasis is on appearance rather than substance and there is a lack of expertise in managing knowledge professionals. The unquestioning 'mate' is preferred to the critical analyst whose skills and knowledge are devalued as a result. An emphasis on the cost of knowledge rather than its value leads to the under-valuation and under-management of knowledge and the worker with specialist knowledge, while the possession of too much knowledge can create a conflict of interest.

In the other type of GNO, the non-profit organisation, one manager commented that a short term focus often takes precedence over a long term

one. Another manager described the non-profit workplace environment as aggressive, where diversity, gender and intuitive feelings can be ignored. Inter-generational issues are also starting to emerge. Although long standing knowledgeable staff augmented by knowledge systems are essential for the management of organisational knowledge, a manager pointed out that the bright and ambitious are superseding the old and knowledgeable. Also, in non-profit organisations, better systems are required to classify, advertise and access knowledge within organisations. Even with the introduction of email systems, a departmental culture can still leave knowledge 'chasms' in lateral communications.

If GBE managers fail to manage their Knowledge Resources as effectively as GNO managers, on the other hand, the open-ended responses suggest that this is due less to a lack of appreciation of the value of Knowledge Resources as to knowing how to effectively use and apply them. For example, unless coupled with managerial responsibility, an employee's technical expertise may not be effectively deployed. The management of Knowledge Resources is generally underdeveloped, a situation that would appear to be exacerbated by self-interest and personal ambition.

4.4 Summary

The results obtained from testing of **H₁** and **H₂** are discussed in further detail in **4.4.1** and **4.4.2** below.

4.4.1 Managerial perceptions of Intellectual Capital

First, it was demonstrated that finance managers held a significantly less favourable opinion of this proposition than non-finance managers. What does this mean? As Drucker (1992, p.246) pointed out, informed evaluation of organisational and managerial performance depends upon the distribution of financial objectives and financial accountability throughout an organisation. That finance managers rate the human resource and marketing areas significantly lower for reliability than other managerial areas suggests the inadequacy of applying conventional notions of financial objectives and financial accountability to these areas. At an organisational level, this could

mean that the knowledge attributable to these areas is not being accumulated and productively applied for the organisation as a whole as advocated by Mason (1986, p.10).

Rogers (1996, p.6) observed that traditional financial accounting mechanisms fail to account for organisational Knowledge Resources. The findings reported here demonstrate that, contrary to the disinterest in the proposition displayed by finance managers, there is widespread interest among non-finance managers in the proposition (Edmonds and Rogow, 1986, p.44). That finance managers should fail to account for knowledge as a legitimate organisational resource, due to their inability or reluctance to engineer paradigms suitable for the Knowledge Era, effectively allows them to critically influence (and, whether intentionally or not, possibly diminish) its management. This would run counter to Nonaka's belief (1991, p.97) that no individual or group should monopolise responsibilities for knowledge in the knowledge creating company.

Of the non-finance MRs, marketing and human resources are the only areas specifically (although not exclusively) 'connected' to perceived elements of Intellectual Capital - specifically, the elements of customer capital and human capital respectively. The literature review demonstrated that these two elements of Intellectual Capital are served poorly by existing accounting paradigms. It may be no co-incidence therefore that finance managers, on the one hand, and marketing and human resource managers on the other, rated each others' functional areas low in terms of reliability. This supports James observation (1993, p.77) that the two sides will have to make consistent their underlying assumptions and critical perspectives if they are to communicate usefully: marketing and human resource managers use the 'language of behaviour' not the 'language of finance'. As Edmond and Rogow (1986, p.44) pointed out, recording and integrating human resource information with information about other 'assets' is necessary if human resources are to receive the valuation that they deserve.

Second, although general managers held a significantly more favourable view of the proposition than finance managers, they held a significantly less favourable one than marketing managers. What does this mean? From their organisation-wide perspectives, general managers see significantly more

merit in applying a realistic financial value to Knowledge Resources than the people whose focus is traditionally confined to the stewardship of an organisation's tangible physical and financial capital (its finance managers) but significantly less merit than the people who spend much of their time developing and fostering the organisation's intangible customer capital (its marketing managers). Although general managers and finance managers credit each others' areas with a significant degree of reliability, it is apparent that general management and marketing mutually perceive a significant lack of reliability in each other. A significant lack of reliability perceived between the finance and marketing areas has already been noted (4.2.1). These dichotomous points of view suggest the need to develop a common 'language' for communication that addresses the financial value of Knowledge Resources, especially in the marketing area, with possibly general management being the final arbiter in the choice of 'language' to be adopted. The language and criteria of communication between general managers and their creative people may require review if (Anon., 1993a, p.34) the concept of 'ruling and executing authority' embodied in the designation of 'general manager' is no longer appropriate.

Paradoxically, but perhaps predictably, the test of Item 6 demonstrated that general managers were more favourable than marketing managers in their assessment of the degree to which their organisations manage Knowledge Resources. If general managers consider that they are already attending to the management of Knowledge Resources, this may explain their apparent complacency towards the proposition. If marketing managers consider that their organisations are indifferent towards the management of Knowledge Resources, this may explain to some degree their support for the proposition.

The youthfulness of marketing managers relative to general managers was significant, an attribute that also manifested itself in terms of shorter length of service, lower salary levels and shorter working weeks. No such distinguishing features had been significantly noted between finance and non-finance managers. Despite their relative youth, marketing managers appear to be as well educated as general managers, no significant difference between their educational levels being noted whereas significant differences had been noted between finance and non-finance managers. As Ettorre and

McEnerney observed (1995b, p.15), younger employees are closer to the future, while top managers have their 'intellectual capital' buried in the past. Older Australian business leaders honed their decision making and management skills in the 1970s and 1980s, but the economic and social climate has changed radically since then (Petre and Harrington, 1996, p.55). The differentiating age factor between marketing managers and general managers suggests that, in the long term, as some marketing managers inevitably graduate to roles in general management later in their working lives, they will carry their Knowledge Resource perceptions with them and possibly influence future decisions that may be made in this area. The ascendancy of Intellectual Capital and Knowledge Resource management may therefore be a long term one.

For both sets of differences (finance and non-finance, marketing and general manager) gender appears to be a significant factor in influencing managers' perception of the need to place a financial value on Knowledge Resources. In other words, in each of the two types of managers least disposed to the proposition, general managers and finance managers, women were relatively under-represented. The literature review did not bring to light any suggestion that the proposition might be critically influenced by gender. These results tend to reinforce Carmody's observation (1991, p.15) that any organisation which continues to predicate its policies and practices on the male, Anglo-Saxon monoculture that once prevailed risks overlooking some of the very people who are likely to make a difference. If it is accepted that men and women think and communicate differently, learning how to draw out the best of both genders will be crucial for not only good management and organisational success (Moore, 1998, p.21) but to effectively address the issues surrounding the emerging phenomenon of Intellectual Capital.

That OT was insignificant in explaining managerial perceptions of the need to place a financial value on Knowledge Resources strongly suggests that few of these organisations, if any, have formalised knowledge management policies or strategies in place, much less that such policies have been articulated and implemented. Although each of the four OTs could embody Knowledge Resources, the absence of formalised knowledge management policies is not unexpected given the freshness of the concept of knowledge management. However, if Knowledge Resources escape valuation at an organisational level, these resources may be mismanaged and may fail to deliver, as Bontis (1996b, p.47) indicated, their potentially positive impact on performance.

At this stage, managerial perspectives on the proposition - whether favourable or unfavourable - appear to be shaped by personal/professional perspectives and experience rather than organisational environment and organisational imperatives. As rapid business transformation leads to the development of new organisational models, Toffler (1991, p.153) and Keen (1992, p.12) point out that managerial roles will relate to flows of data, information or knowledge rather than command over information. As new organisational types and accompanying managerial roles are developed, and as the management of Knowledge Resources is more widely formalised, it may be expected that the new organisational types and the new managerial roles will interact more closely with each other to influence managers' perceptions of the proposition. Stewart observed that the benefits to be gained from the management of an organisation's intellectual assets justified their measurement and recognition in financial terms despite their 'fuzzy' or subjective characteristics (1994b, p.24). However, the practicality of doing so, both in terms of overcoming entrenched attitudes and in terms of measuring the 'unmeasurable' would appear to be major obstacles.

4.4.2 Managerial actions on Knowledge Resources

It was demonstrated that managers in non-profit and government organisations showed a significantly higher tendency to manage Knowledge Resources than managers in government business enterprises. For further post hoc tests, non-profit and government organisations were combined into a single group labelled the 'GNO'. The findings were reinforced by the result of the ANOVA conducted on Item 6: in the eyes of their managers, significantly more GNOs actively manage Knowledge Resources than GBEs. Thus, not only do GNO managers actively manage Knowledge Resources within their own functional domain but they consider that their organisations (or, perhaps more accurately, other managers within their organisations) do so as well. It was further established that the NGOs tend to be smaller than the GBEs sampled. If, as Kurtzman (1996, p.20) asserted, organisations which manage knowledge best are those whose survival and prosperity depends upon it, then GNOs would appear to depend on knowledge for their continuation more so than the GBEs.

Age, gender and salary levels were the significant differentiating characteristics between GNO and GBE managers, with GNO managers tending to be younger, less male-dominated and experiencing lower remuneration levels. In the long term, this could mean that GNOs hold greater prospects for the formal adoption of knowledge management policies than GBEs.

When considered in relation to the qualitative results extracted at Item 48, it would appear that GNOs and their managers are managing their Knowledge Resources more actively than GBEs due to their apparently under-resourced ability to cope with rapid technological and social change, rather than because of the existence of benign organisational strategies, policies or culture. With respect to one type of GNO, the non-profit organisation, this observation would appear to be consistent with Kaplan's remark (1992, p.24) that non-profit organisations' lack of 'financial and organisational capital' leaves committed workers to carry the human debt of working for these organisations. The observation also reinforces Tecker and Eide's view (1995, p.100) that non-profit organisations will require knowledge-based operational philosophies if they are to meet the future. With respect to the other type of GNO, the government organisation, the observation is not inconsistent with Rogers' view (1996, p.6) that government agencies are being forced to produce significantly more results for the consumer than can be provided by incremental improvements.

For GBEs on the other hand, a different picture emerges. Possibly enjoying super-normal profits owing, as Haynes pointed out (1994, p.123), to anticompetitive privileges through their dominance of key areas of the service and infrastructure support industries, GBE's may be growing too quickly to be concerned with the careful management of their Knowledge Resources. If, as Rogers asserted (1996, p.5), a 'community of practice' now recognises that all types of organisations (whether for-profit or non-profit) must grapple with the effective management of knowledge, then the message appears not to have reached Australia's GBEs. This could have negative, long term consequences for GBEs since, as Stewart (1991, p.54) maintained, an organisation's Intellectual Capital may be eroded if not periodically renewed, due to the constant acceleration of technological change and global competition.

4.4.3 Closure

The foregoing considerations led to the formulation of a set of findings, the identification of emerging issues in the field of Intellectual Capital and the tabulation of possible directions for future research in this area. These are presented in Chapter 5.

CHAPTER 5

FINDINGS, ISSUES AND FUTURE DIRECTIONS

5.1 Introduction

In this chapter, Section 5.2 presents the formal, summary-level findings arising from the testing of each of the two hypotheses, **H₁** and **H₂**. Section 5.3 presents associated issues that would appear to underlay the emerging practise of knowledge management. Section 5.4 presents several issues that could be addressed when designing future studies in this emerging field.

5.2 Findings

This study addressed the question, "To what extent does organisational type and a managerial role define managers' perception of Intellectual Capital?" This research question was addressed by two hypotheses designed to test the strength of two basic prerequisites that are considered to be critical to the leverage of organisational Knowledge Resources into Intellectual Capital.

5.2.1 Hypothesis 1

The purpose of **H₁** was to test whether organisational type (OT) or managerial role (MR), or some combination thereof, significantly explains managers' perception of the need to place a realistic financial value upon organisational Knowledge Resources.

It was found that MR but not OT, nor any interaction between MR and OT, significantly influences this perception. Specifically, (a) non-finance managers exhibited a significantly more favourable view of the proposition than finance managers and (b) marketing managers exhibited a significantly more favourable view of the proposition than general managers. That the interaction between OT and MR was insignificant would appear to reinforce the finding that managerial perception is shaped solely by managers' personal/professional experience and not to any degree by the organisational environment within which they work.

5.2.2 Hypothesis 2

The purpose of **H₂** was to test whether organisational type (OT) or managerial role (MR), or some combination thereof, will significantly explain managers' active management of Knowledge Resources.

It was found that OT but not MR, nor any interaction between OT and MR, significantly explains managers' active management of these resources. Specifically, managers in government and non-profit organisations ('GNOs') exhibited a significantly higher tendency to manage Knowledge Resources than managers in government business enterprises ('GBEs'). Managers in business (non-government) enterprises were not significantly different from either group. That interaction between OT and MR was insignificant suggests that specific organisational policies and strategies, which are crucial to a systematic organisational-wide approach to knowledge management, may be generally underdeveloped in Australian organisations.

Because the Index of Knowledge Resources Action used to test this hypothesis accounted for only a small percentage of variance (18.2%), this finding should be interpreted with caution.

5.3 Emerging Issues

The phenomenon of Intellectual Capital belongs to the broad area of 'knowledge management' (Stewart, 1999, p.31). The conclusions reached above suggest the presence of several issues that underlay the emerging practise of knowledge management. These issues lie in the areas of -

- the communication of knowledge management (5.3.1).
- the impact of gender on knowledge management (5.3.2).
- the impact of youth on knowledge management (5.3.3).
- the impediments to knowledge management (5.3.4).

Needless to say, none of these issues are mutually exclusive.

5.3.1 Communication

Wriston (1995, p.6) and Tecker and Eide (1995, p.96) assert that the quality of information, its accessibility and its application to the means of production have become fundamental to the wealth creation process. Saint-Onge pointed out (1996, p.14) that collaboration and skilful knowledge exchange require participants who can actively hear and listen, detect the assumptions of others, recognise their own assumptions and understand how these

assumptions influence their own reactions. These observations being accepted, the divergence in perceptions of reliability between organisational areas, each of which is charged with responsibility for managing crucial Knowledge Resources, suggests the need for the development of a universally acceptable language of knowledge management - terminology, symbols and even slang.

5.3.2 Gender

Issues of gender in relation to the specific management of Knowledge Resources were not brought to light by the literature review. Given the importance so far of business pragmatism in driving issues of Knowledge Resource management, and the dearth of applicable academic research and theory (James, 1996b, p.69; Rogers, 1996, p.6), it is not surprising that issues of gender have not yet warranted examination. However, issues of gender in relation to the management of Knowledge Resources are clearly deserving of attention. The findings reported at 5.1.1 demonstrate that gender could be a significant factor in determining managers' perception of the need to place a realistic financial value on Knowledge Resources. In each of the two types of managers favourably disposed to that proposition, non-finance managers (*vis-a-vis* finance managers) and marketing managers (*vis-a-vis* general managers), women were significantly represented. As women gradually but inevitably occupy an increasing number of senior managerial positions, they may be expected to carry their more liberal views of the proposition with them and thus critically influence future decisions that may be made in this area. When the apparent gender imbalance among finance managers is redressed and the issue of Intellectual Capital can no longer be avoided, it may be expected that finance managers, as a group, will begin to exhibit a more favourable view of the proposition. In addition, the findings reported at 5.1.2 demonstrate that gender could be a significant factor in determining the degree to which managers are prepared to actively manage Knowledge Resources within their functional domains. If women tend to be more conspicuous among GNO than GBE managers, it could be anticipated that initiatives in the area of Knowledge Resource management will materialise in GNOs sooner than in GBEs.

5.3.3 Youth

Issues of age in relation to the management of Knowledge Resources received only passing notice in material brought to light by the literature review. Hamel's assertion that young employees are closer to the future while top managers have their 'intellectual capital' invested in the past (cited by Ettore and McNerney, 1995a, p.153) appears to have been supported to some extent by the results reported here. The findings reported at 5.1.1 demonstrate that marketing managers exhibited a significantly more favourable disposition than general managers towards the need to place a realistic financial value on Knowledge Resources. They were also significantly younger than general managers. On the other hand, although finance managers had exhibited a significantly more favourable disposition towards this proposition than non-finance managers, age did not appear to be a factor in explaining this differentiation. The findings reported at 5.1.2 demonstrate that age was also a significant differentiating characteristic between GNO and GBE managers.

Issues of age, like gender, have implications for the time frame within which we can expect that initiatives in Knowledge Resource management become firmly entrenched in organisational practise. The managers who are more favourably disposed towards the management of Knowledge Resources and recognition of the financial value of these resources tend to be younger than those managers who are not so favourably disposed. This implies that the ascendancy of Intellectual Capital - its implementation lead time - may depend upon younger generations of managers replacing older generations. For example, formal adoption of knowledge management policies is likely to occur sooner in GNOs than in GBEs, since managers of the former are not only younger than the latter but more favourably disposed toward the management of Knowledge Resources.

5.3.4 Impediments

Toffler (1991, pp.225-6) and von Krogh and Roos (1996, p.333) pointed out that investments in the human and social capital of the firm and improvements in the allocation of resources could justify the development of alternative accounting mechanisms that would capture the net economic value added by various informational activities. As desirable as this may sound, two

impediments to this initiative are immediately apparent. Firstly, at an organisational level, knowledge management policies are conspicuous by their absence. This could be attributable to the lack of leadership from Australia's standard setting authorities. Although the OECD has suggested that national authorities consider innovations in these areas (Miller and Wurzburg, 1995, p.19) this suggestion is yet to be taken up in Australia (Thomson, 1996, personal communication). Secondly, at a managerial level, the apparent reluctance of finance managers to depart from their established paradigms does not augur well for the imminent creation of a knowledge management culture in Australian organisations. If the cultivation and leverage of knowledge to create and add value means more than the mere measurement and management of physical and financial assets (LaBarre, 1996, p.53; Bennis, 1995, p.6; Dickson, 1995, p.14), progress in the face of enormous practical and conceptual challenges will probably require, as James suggested (1996b, p.69), widespread 'real world' experimentation. It may also require expanded professional training and development for finance managers to foster their ability to integrate ideas from other disciplines (Strober, 1990, p.238).

5.4 Future directions

There were limitations to this study that, combined with the findings, raise several issues that could be addressed when designing future studies in this emerging field. These are enumerated below and cross-referenced where appropriate to the literature.

One, the results achieved reflect opinions gathered three years prior to the completion of this study. Since important structural changes are taking place in the nature of economic activity in this emerging Knowledge Era (Miller and Wurzburg, 1995, p.16) and the foundation upon which an organisation is created, evolves and matures, dies or is reformed is being severely shaken (Rogers, 1996, p.7), survey respondents may well have developed quite different opinions as a result of their experiences in the intervening period. Future studies could be designed with the intention of securing and reporting results within a shorter time frame so as to more clearly articulate these findings on a 'real time' basis.

Two, as a broadly exploratory study for which there was no close precedent to replicate nor improve upon, the variables of interest employed such as 'Intellectual Capital', 'Knowledge Resource management', 'organisational type' and 'managerial role' were necessarily crude. Knowledge management would appear to transcend the conventional organisational types and functional boundaries upon which reliance was placed. Consideration could be given in future studies to refining the terminology used especially since new descriptive terms (e.g. 'knowledge company', 'chief knowledge officer', 'chief information officer') are now emerging to reflect the strategic and operational realities of the Knowledge Era.

Three, the North American and European literature upon which this study is predominantly based reflects the serious attention being given to, and the practical experience being gathered on, issues of knowledge management in these economically advanced parts of the world. Neither North American nor European experience may be completely generalisable to the Australian context. A more substantial body of Australian-based literature, whether descriptive or scholarly in character, may well have accumulated since this study was initiated upon which future Australian studies could be soundly based and which could also be used to appropriately 'filter' contemporary literature derived from North American and European experience.

Four, although this study focused on cross-sectional relationships, future research might be directed at uncovering the dynamic elements of change in the emerging field of knowledge management. From this study, it is unclear whether perceptions of the need to place a financial value upon Knowledge Resources (prima facie, the recognition of 'Intellectual Capital') necessarily translates into active management of these resources nor that their active management necessarily improves organisational performance (and thus the accumulation of 'Intellectual Capital'). Future studies could be dedicated to establishing the strength of these possible linkages as well as establishing whether Knowledge Resource management is a leading or lagging aspect of technological change.

Five, since the phenomenon of Intellectual Capital is a tentative and unprecedented proposition, the definitional criteria formulated for the purpose of this study are in themselves tentative and unprecedented. Future

studies could be specifically devoted to establishing more clearly, under a variety of environmental conditions, the philosophical dimensions of Intellectual Capital; the constituent elements of Intellectual Capital; the relative strength or importance of these elements and their relationship to each other; their relative importance between different types of managers; and the relative strength or importance of Intellectual Capital in relationship to forms of organisational wealth and performance captured to varying degrees by conventional accounting systems.

Six, this study distinguished between organisational type on a descriptive basis (government, non-profit, business and government business enterprise). Future research could make useful distinctions between organisations on the basis of operational characteristics, for example, whether service or manufacturing-based, especially since (Mathews and Perrera, 1996, p.256; Toffler, 1991, p.71) the service sector is now assuming a greater importance than the manufacturing sector.

Seven, consistent with Drucker's assertion (1994, p.67) that we are still to understand and define knowledge in terms of its quality and productivity, the development and application of concepts of Intellectual Capital, no matter how well-merited at an intrinsic level, may not always be economically justifiable, especially in the case of smaller organisations and/or organisations which do not meet knowledge-based criteria. Future studies could therefore be specifically devoted to establishing the critical organisational mass (however this is to be defined) over and above which concepts of Intellectual Capital can be meaningfully and productively applied.

Eight, the notion of Intellectual Capital is but one theoretical perspective to be taken on organisations emerging into the Knowledge Era. For example, Snell and Dean (1992, p.467ff) examined the relationship between advanced manufacturing technology, just-in-time inventory control, total quality management and human resource management from a human capital perspective. The same factors could just as profitably be studied from an Intellectual Capital perspective. The identification and exploration of alternative theoretical perspectives to determine their degree of relevance to the notion of Intellectual Capital could serve as a prelude to further research.

Nine, this study confirmed James' observation (1993, p.197) that there is likely to be great resistance to the modernisation of accounting methods. In particular, conventional accounting paradigms explain the entrenched negativism of finance managers towards the concept of Intellectual Capital and may represent a major obstacle to the concept's 'real-world' implementation and application. However, there may be other obstacles. Future studies could be meaningfully devoted to identifying any other organisational impediments - whether human, systemic or cultural - that could prevent or retard the implementation and application of concepts of Intellectual Capital.

Ten, to the extent that Australian organisations are beginning to learn how to measure and manage their Intellectual Capital as is already taking place in other countries (Thornburg, 1994, p.51ff; Barton, 1993, p.39), future research could examine the performance impact of such initiatives over time, possibly applying longitudinal analysis to 'before' and 'after' scenarios. At the moment, it may be too early to see whether these efforts are being adequately rewarded (Maglitta, 1995, p.86).

Eleven, since the responses on active Knowledge Resource management (Items, 5, 6, and 8 to 31) represent the self-assessments of managers, these responses may be biased by managers' personal orientation and assumptions (Saint-Onge, 1996, p.14). Future studies could be designed in such a way as to minimise or eliminate these sources of possible bias, possibly by seeking managers' opinions of organisation-wide knowledge management instead of their own functional areas.

Twelve, to the extent that exogenous factors (such as super-normal profits arising from market dominance; the velocity of technological change and adaptation; superior salary levels and so on) may impact upon the management of knowledge, whether positively or negatively, future studies could be designed in such a way as to determine the significance of such factors.

APPENDIX

SURVEY QUESTIONNAIRE

KNOWLEDGE & ORGANISATIONS

Confidential survey

This survey is being sent to executives in 300 Australian organisations. Please interpret 'organisation', 'customers', 'product' and other terms throughout this questionnaire as you consider appropriate to your organisation and current executive role.

1 My management approach was principally shaped in (tick one box only).....

Australia	<input type="checkbox"/>	1-1
USA	<input type="checkbox"/>	2-2
UK	<input type="checkbox"/>	3-1
Canada	<input type="checkbox"/>	4-1
New Zealand	<input type="checkbox"/>	5-1
Germany	<input type="checkbox"/>	6-1
Switzerland	<input type="checkbox"/>	7-1
Japan	<input type="checkbox"/>	8-1
Other (please specify)	<input type="text"/>	9-1

2 This organisation is a.....

Private company	<input type="checkbox"/>	1-1
Public company - listed	<input type="checkbox"/>	2-1
Public company - unlisted	<input type="checkbox"/>	3-1
Non-profit organisation	<input type="checkbox"/>	4-1
Government business enterprise	<input type="checkbox"/>	5-1
Federal government department	<input type="checkbox"/>	6-1
State government department	<input type="checkbox"/>	7-1
Local government department	<input type="checkbox"/>	8-1
Other (please specify)	<input type="text"/>	9-1

3 This organisation's head office is located in.....

Australia	<input type="checkbox"/>	1-1
USA	<input type="checkbox"/>	2-1
UK	<input type="checkbox"/>	3-1
Canada	<input type="checkbox"/>	4-1
New Zealand	<input type="checkbox"/>	5-1
Germany	<input type="checkbox"/>	6-1
Switzerland	<input type="checkbox"/>	7-1
Japan	<input type="checkbox"/>	8-1
Other (please specify)	<input type="text"/>	9-1

4 This organisation employs in Australia

20 people or less	<input type="checkbox"/>	1-1
21-100 people	<input type="checkbox"/>	2-1
101-200 people	<input type="checkbox"/>	3-1
201-500 people	<input type="checkbox"/>	4-1
501-1,000 people	<input type="checkbox"/>	5-1
1001-10,000 people	<input type="checkbox"/>	6-1
More than 10,000 people	<input type="checkbox"/>	7-1

Items 5-7 seek your opinions as to how successful you and your organisation are in achieving intended missions. Please circle the number on the right that best describes your reaction to the statement: "I believe that"		Strong disagree	Disagree	Neutral	Agree	Strongly Agree
5	This organisation is achieving its intended mission	1	2	3	4	5
6	This organisation only manages things which have a definite financial value	1	2	3	4	5
7	My ambitions are not fully realised in my present position	1	2	3	4	5

Items 8-31 seek your opinions on how you currently manage knowledge resources in your organisation. Please circle the number on the right that best describes your reaction to the statement: "I believe that I systematically...."		Strong disagree	Disagree	Neutral	Agree	Strongly Agree
8	Encourage employees to continually question the way things are done	1	2	3	4	5
9	Encourage employees to seek novel solutions to organisational problems	1	2	3	4	5
10	Involve the opinions of relevant employees in reaching decisions	1	2	3	4	5
11	Deploy the national, ethnic and special qualities of employees for maximum effect.	1	2	3	4	5
12	Strive to retain experienced employees	1	2	3	4	5
13	Provide employees with carefully tailored training, development and experience	1	2	3	4	5
14	Outsource human resource needs, whenever appropriate	1	2	3	4	5
15	Channel employee creativity into organisational objectives	1	2	3	4	5
16	Provide employees with access to any information they require	1	2	3	4	5
17	Keep track of past lessons learned by employees to avoid repeating mistakes	1	2	3	4	5
18	Suspend activities, when necessary, to discover a better way of doing things	1	2	3	4	5
19	Ensure that information systems are continuously updated	1	2	3	4	5
20	Plan strategically at least 3 years ahead	1	2	3	4	5
21	Ensure that policies, systems and procedures are efficient and comprehensive	1	2	3	4	5
22	Avoid sharing sensitive information with other organisations.....	1	2	3	4	5
23	Collect and record employee suggestions	1	2	3	4	5
24	Assert my organisation's legal rights over employee innovations	1	2	3	4	5
25	Sample the opinions of customers/clients in designing products/services	1	2	3	4	5
26	Sample the opinions of customers/clients of existing products/services	1	2	3	4	5
27	Withhold sensitive customer/client opinions of products/services from employees ..	1	2	3	4	5
28	Manage my relationships with customers/clients	1	2	3	4	5
29	Make use of informal channels and office 'grapevines' in reaching decisions	1	2	3	4	5
30	Encourage employees to continuously re-evaluate the work culture	1	2	3	4	5
31	Seek out the opinions of external stakeholders before reaching decisions	1	2	3	4	5

Items 32-37 seek your opinion as to whether knowledge resources should be financially accounted for in order to better manage them. Please give your reaction to the statement: "I believe that this organisation should place a realistic financial value on:

- 32 The accumulated knowledge, skills and experience of each of its employees
- 33 Established systems, internal controls, databases, quality controls.....
- 34 Legally protected assets such as patents, designs, copyrights, trade marks
- 35 Relationships with its customers/clients
- 36 Employee perspectives & beliefs formed from organisational experience.....
- 37 Relationships with stakeholder groups in the wider community

	Strong disagree	Disagree	Neutral	Agree	Strongly Agree
32	1	2	3	4	5
33	1	2	3	4	5
34	1	2	3	4	5
35	1	2	3	4	5
36	1	2	3	4	5
37	1	2	3	4	5

Items 38-47 seek some background opinions and other information from you as a manager in an Australian organisation. Please tick the box for the answer that most closely approximates your opinion.

- 38 In this organisation, I have the **most** reliable relationship with people in ...
- General management
 - Finance
 - Human resources
 - Information technology
 - Marketing
 - Other (please specify)

1
2
3
4
5
6

- 39 In this organisation, I have the **least** reliable relationship with people in ...
- General management
 - Finance
 - Human resources
 - Information technology
 - Marketing
 - Other (please specify)

1
2
3
4
5
6

- 40 My current managerial role/position in this organisation is in the area of
- General management
 - Finance
 - Human resources
 - Information technology
 - Marketing
 - Other (please specify)

1
2
3
4
5
6

- 41 I have been employed by this organisation for
- No more than 1 year
 - No more than 3 years
 - No more than 5 years
 - No more than 10 years
 - More than 10 years

1
2
3
4
5

- 42 My age last birthday was
- 20 to 29 years
 - 30 to 39 years
 - 40 to 49 years
 - 50 to 59 years
 - More than 60 years

1
2
3
4
5

- 43 My gender is
- Male
 - Female

1
2

- 44 My annual gross salary package is
- | | | |
|---------------------------|--------------------------|---|
| Under \$50,000 | <input type="checkbox"/> | 1 |
| \$50-100,000 | <input type="checkbox"/> | 2 |
| \$100,001-150,000 | <input type="checkbox"/> | 3 |
| \$150,001-200,000 | <input type="checkbox"/> | 4 |
| More than \$200,001 | <input type="checkbox"/> | 5 |
- 45 The educational level I have attained is (tick one box only)
- | | | |
|---------------------------------|--------------------------|---|
| Secondary | <input type="checkbox"/> | 1 |
| Technical college diploma | <input type="checkbox"/> | 2 |
| University degree | <input type="checkbox"/> | 3 |
| Post-graduate diploma | <input type="checkbox"/> | 4 |
| Master's degree | <input type="checkbox"/> | 5 |
| Doctorate | <input type="checkbox"/> | 6 |
- 46 My working week is usually
- | | | |
|--------------------------|--------------------------|---|
| 40 hours or less | <input type="checkbox"/> | 1 |
| 41-50 hours | <input type="checkbox"/> | 2 |
| 51-60 hours | <input type="checkbox"/> | 3 |
| 61-70 hours | <input type="checkbox"/> | 4 |
| More than 70 hours | <input type="checkbox"/> | 5 |
- 47 My favourite pursuit out of hours is (tick one box only)
- | | | |
|---------------------------------------|--------------------------|----|
| Sport (participant) | <input type="checkbox"/> | 1 |
| Sport (spectator) | <input type="checkbox"/> | 2 |
| Camping/outdoors | <input type="checkbox"/> | 3 |
| Community/charity work | <input type="checkbox"/> | 4 |
| Obtaining higher qualifications | <input type="checkbox"/> | 5 |
| Gardening/domestic chores | <input type="checkbox"/> | 6 |
| Hobbies/indoors | <input type="checkbox"/> | 7 |
| Arts (practitioner) | <input type="checkbox"/> | 8 |
| Arts (spectator) | <input type="checkbox"/> | 9 |
| Other (please specify) | <input type="text"/> | 10 |

If there is anything else you would like to tell me about how you feel knowledge is managed within Australian organisations, please record your thoughts in the space below or on a blank page and attach it to this questionnaire.

.....

.....

.....

.....

Please return the completed questionnaire in the REPLY PAID envelope as soon as possible to REPLY PAID, Mark St Leon, C/- Edith Cowan University, Pearson Street, Churchlands WA 6018

If you would like a summary of the survey results, please fax your request to me as follows: (09) 370 6665, Attention: Mark St Leon, CONFIDENTIAL. It is anticipated that a summary will be available early in 1998.

THANK YOU FOR YOUR TIME!

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